The Economic Impact of Migrant, Seasonal, and H-2A Farmworkers on the Virginia Economy

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EXECUTIVE SUMMARY

Migrant and seasonal farmworkers make a substantial contribution to the Commonwealth's economy. These workers assist in the production of high-value crops that are among the most profitable in agriculture. Tobacco, fresh fruits and vegetables, and many nursery products require short-term, seasonal labor inputs; no widely available alternatives to this labor input exists. The presence of migrant and H-2A workers in the state also causes federal and private funds to flow into the state for programs that assist these workers and help enforce regulations relative to their employment. This study measures the contribution of migrant and seasonal farmworkers to Virginia's economy. These contributions include

- Combined production of approximately 93,100 acres of tobacco, fruits, vegetables, and nursery crops.

- Approximately $284 million in annual cash receipts from the high-value crop acreage.

- Approximately $4.5 million annually in total federal dollars entering the Commonwealth as a direct result of the presence in the state of MSFWs.

- Approximately $5.7 million annually for all farm spending related to employing MSFWs, including construction and maintenance of housing and transportation.

- Approximately $67.6 million in annual wages are paid by Virginia growers to MSFWs.

- The total value of wages spent in Virginia by these workers is approximately $49.4 million. The percent of total earnings spent in Virginia by migrant and H-2A farmworkers ranges from 49 percent (for an H-2A tobacco worker) to 80 percent (for a migrant apple picker in the Shenandoah Valley). Seasonal workers spend nearly 100 percent of their wages locally.

These above direct effects (sales of high-value products, wage payments to seasonal and migrant workers) have further impacts on the economy because of multiplier effects. For example, wages spent locally help employ people in the retail sector, growers purchase inputs locally, and so forth. These additional (indirect and induced) effects lead to total impacts of

- Approximately $460 million more is generated annually in the state by production of MSFW-dependent crops compared to the next best use of the land—the production of grain crops.

- An additional $323 million in value added is generated.

- The presence of MSFWs provides over 14,300 full-time equivalent jobs, in addition to the 18,000 to 20,000 MSFW employees.

- If the forward linkages of fruit, vegetable, and tobacco production are examined, an additional $170 million annually in output from tobacco stemming and re-drying and canned fruit and vegetable sectors using MSFWs is generated.

- Approximately 1,300 full-time equivalent jobs due to tobacco stemming and redrying and canned fruit and vegetable activities, result of the presence of MSFWs.

These impacts are associated with all three types of seasonal farm workers: local seasonal, migrant workers, and H-2A workers. The latter two types of workers are guest workers in the state, while the first are full-time residents of Virginia. The study measures the impact of all three types of workers. If guest workers were not available, some substitution of local seasonal workers would occur or changes in the crop production mix would be made.

The study is informative to state and local policy makers who legislate and regulate migrant and seasonal agricultural labor. A number of decisions affect labor availability and such decisions are better informed if the magnitude of the contribution of seasonal labor is known. At the state level, various agencies can better coordinate information about and access to seasonal labor, thereby reducing transaction costs faced by farmers. Programs to support migrant workers make the Commonwealth a more attractive destination for such workers, and better state programs can increase the inflow of federal funds. Research into alternatives to seasonal, migrant, and H-2A labor can also benefit farmers.

Local decisions such as permits for farm labor camps, zoning regulations, access to local public services, and so forth all affect the ability of farmers to attract and manage workers. Consensus about these decisions is more easily reached when information is available about the economic contributions of MSFWs. Local governments can also be proactive in working with growers to better understand their labor needs and how these needs can be met.

INTRODUCTION

The participation of migrant, seasonal, and H-2A farmworkers (MSFWs)[1] in the United States workforce is widely documented, but no study has adequately described the role that the MSFWs play in statewide agricultural production, nor have any studies quantified the contribution of MSFWs to the Virginia economy. Sound empirical information is needed to assist governmental agencies, as well as the private sector, in making policy decisions and developing appropriate production strategies. As world markets are increasingly open to free trade, the ability of domestic labor-intensive industries to compete with foreign producers has become a heavily debated issue.

Large numbers of MSFWs working in Virginia contribute to the economy by providing essential labor inputs to producers of several labor-intensive crops. Federal funds also flow into the state in support of these workers. However, the contribution of MSFWs to the overall economy is unknown. Decisions affecting MSFWs and the ability of growers to employ these workers will impact service providers for MSFWs and agricultural growers, workers, suppliers, processors, wholesalers, and retailers dependent on labor-intensive agricultural production. This study provides information that policy makers can use to serve those sectors of the economy that are dependent on labor-intensive agricultural production.

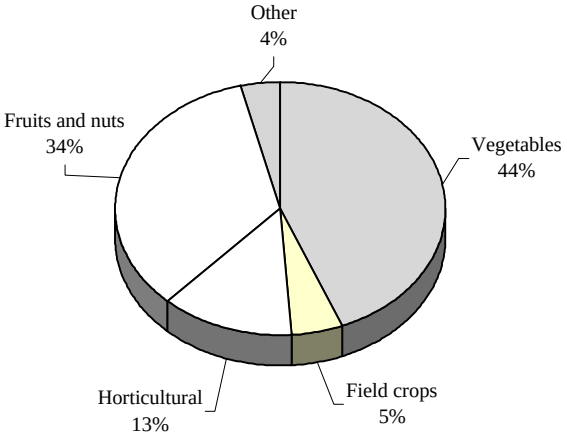
Background Information

In 1994, 1.6 million MSFWs were employed in the United States.[2] Of these MSFWs, a high percentage were migrants; 78 percent of MSFWs were employed in the production of vegetables, fruits, and nuts (Figure 1). Migrant farmworkers constitute 42 percent of the United States total agricultural work force and 54 percent of the labor force engaged in short-term agricultural tasks. The major reason for the high proportion of migrant and H-2A agricultural workers is the lack of seasonal workers (usually settled workers, homemakers, or students), who comprise only 6 percent of the total farm labor force and 12 percent of short-term labor force (U.S. Dept. of Labor, 1994). This shortage of seasonal workers is partially attributable to increasing female participation in the non-farm labor force and economic development in rural areas which has led to more attractive alternatives in the non-farm sector. For many fruit and vegetable crops, no known technology can adequately replace the manual tasks performed by the farmworker because visual inspection of individual pieces of fruit for size, color, and ripeness is essential.

[1] The acronym MSFW refers to the overall study group which consists of migrant, seasonal, and H-2A farmworkers. When only one or two groups are specifically discussed, the name of that group will be used rather than MSFW. (See Box 1 for definition of MSFWs.)

[2] Based on Commission of Agricultural Workers (U.S. DOL, 1993).

Figure 1. Distribution of migrant farmworkers by crops in United States



Objectives

The main objective of this study was to quantify the economic contributions of MSFWs in Virginia. To accomplish this objective several sub-objectives were met:

1) Identify the crops requiring seasonal work and locate areas of the state where such crops are produced in large numbers.
2) Estimate the sales value of these crops and determine the quantity and value of inputs used in their production.
3) Determine the number of MSFWs working in the Commonwealth, their earnings, and how they spend their earnings.
4) Determine the value of funds flowing into the state to provide services to migrant and H-2A workers and to regulate the employment of MSFWs.
5) Determine the total economic activity attributable to the presence of MSFWs.

Four major steps in the analysis are to

1) *Define the sectors of interest*. Measuring the contributions of MSFWs to the economy depends on the definitions of MSFWs and agriculture.
2) *Measure the direct contribution of these workers*. The crops in which MSFWs contribute to production, harvesting, or related activities are identified, and the value of these crops as well as the distribution of this value (among inputs such as labor, physical inputs, and profits) is determined. An additional direct contribution is federal funds that flow to the state as a result of the presence of MSFWs.
3) *Measure the total contribution of expenditure patterns for workers and owners*. The input-output analysis quantifies these "indirect" and "induced" effects (see Appendix 1 for details).
4) *Compare the total output, employment, and value added associated with MSFWs with the estimates of these outcomes under an alternative patterns of production*. The comparison is based on the assumption that land currently devoted to high-valued production (because of the supply of MSFW labor) will be converted to less labor-intensive and less profitable grain crops. The impacts of MSFW are, thus, based on a comparison of what would emerge without them.

Definition of Farmworkers

The definition of MSFW varies among the different agencies providing services to farmworkers. Some agencies group all farmworkers together, including local full-time farmworkers, family labor, seasonal, and migratory workers. Some agencies provide services to H-2A workers while others do not. Some agencies continue to service migrant farmworkers after they have become permanent residents. Questions of the workers' legal status and their permanent residence may affect estimates of the number of farmworkers. For example, in 1996 the Virginia Employment Commission (VEC) estimated the MSFW population in Virginia to be 14,000, while in 1993, the Migrant Enumeration Project conducted by Migrant Legal Services estimated the number at 42,000 (Stallsmith, 1996). A major factor contributing to this large difference is that the VEC counted only legally registered workers while Migrant Legal Services also counted the spouses and dependents of legally registered workers among their clients. Neither agency included non-registered workers.

Definitions used in this study are from the Department of Labor at 20 CFR 651.10 and 20 CFR 655.100 (Box 1). Nursery workers and food processors are not included in the Department of Labor definitions. However, approximately 400 nursery workers meet the definitions and are, therefore, included in this study. The definition of farmwork and food processors also plays an important role in estimating the number of MSFWs.

Box 1. United States Department of Labor definitions for MSFWs

Migrant farmworkers are United States residents who travel from their permanent residence to their place of work and are unable to return home the same day. Commonly, migrant farmworkers are residents of Florida or Texas who travel to Virginia for summer farmwork. National origin and primary language of the farmworkers do not classify them as migrants.

Seasonal farmworkers are non-migrant workers: they return to their permanent place of residence the same day. They earn the majority of their annual income from farmwork, and work at least 25 days per year, but not year-round, for the same employer. Many seasonal workers are former migrant farmworkers who have settled in the community and continue to perform farmwork.

H-2A guest workers are not United States residents and can only be employed when a shortage of labor exists in a particular region. They are prohibited by law from taking other employment within the United States upon completion of their contract. Employers must pay for H-2A workers' transportation to and from their country of origin, must provide them with housing, and must pay them a guaranteed wage.

Farmwork includes all crop, livestock, poultry production, and on-farm post-harvest handling tasks such as grading and packing.

Migrant food processors are considered to be MSFWs if they work in food processing and are migrants as defined above.

For purposes of this study, agricultural production refers to all aspects of producing agricultural commodities. Processing work is also included if it is done by MSFWs. Agricultural production data are based on the 1992 Virginia Agricultural Census and more recent data

provided by Virginia Agricultural Statistics Service (VASS). All crops produced within the state were assessed for their likelihood of requiring MSFWs. Specific crops requiring MSFWs were identified by reviewing Virginia agricultural budgets, consulting horticultural experts and Virginia Cooperative Extension (VCE) agents, and later corroborating this information through interviews with individual growers who employ MSFWs.

Agencies using broader definitions of farmwork than the Department of Labor include other sectors of the economy such as Christmas tree production, tobacco warehouse employees, or packinghouse workers. If the definition of MSFWs is broadened to include these industries, obviously, the economic impact of the MSFWs will also increase.

AGRICULTURAL WORKFORCE SUPPORT NETWORK

The United States agricultural workforce is characterized as unstable because of the seasonality of farmwork, the migratory nature of the workers, the high percentage of workers born outside the United States, the relatively low compensation paid to the farmworkers, and the continual outflow of workers from the agricultural sector.

Of the farm labor force, 50 percent perform tasks lasting less than 6 weeks (U.S. Dept. of Labor, 1994), with most of these short-term jobs occurring during peak harvest periods. The need to constantly move from one short-term job to another to achieve an acceptable income has led to the increasing prevalence of migrant and H-2A farmworkers.

Several characteristics associated with seasonal farmwork apparently make it less appealing to local workers as they consider their employment opportunities in other labor markets. H-2A workers, faced with a different set of employment options, find this type of work relatively more appealing than other alternatives available to them.

Some of the major characteristics of seasonal farmwork include

- considerable down time moving from job to job,
- difficulty maintaining a family life with the long periods of separation,
- difficulty providing a stable educational and home environment for children,
- the lack of benefits,
- low wages paid to farmworkers,
- inadequate access to health care and government assistance,
- isolated labor camps, and
- strenuous physical nature of farmwork.

These less-than-optimal conditions have led to the continual outflow of local workers from the agricultural sector to other sectors of the economy that provide higher wages, more benefits, less strenuous working conditions, and greater stability. Increasing opportunities for female participation in other sectors of the economy, higher levels of educational attainment by children, rural to urban migration, and abundant employment opportunities in minimum (and higher) wage positions for school-age children have led to the shrinking availability of local residents to meet the required demand for seasonal agricultural labor.

The nature of the work carried out by the MSFWs is substantially different from that carried out by full-time farmworkers, providing further evidence of a segmented labor pool. A higher percentage of settled workers is found in grain production and other field crops, while migrant and H-2A are found working in greater proportions in the fruit and vegetable crops.

A much higher proportion of migrant and H-2A workers in Virginia are employed to perform harvest and post harvest jobs, while than seasonal workers who are found in greater proportion in packing produce and operating farm equipment.

The lack of locally based seasonal labor has led to the increased reliance on Latin American immigrants, especially young Mexican men (U.S. Dept. of Labor, 1993). The reliance on Hispanic immigrants is not new, but the trend is now spreading to regions where American workers have traditionally done the farmwork. In Virginia, this new trend is most evident in the southwest corner of the state, where an increasing out-migration of working age residents is occurring, and a greater portion of the remaining population is participating in service sectors of the economy.

MSFW Support Agencies

The migratory and seasonal nature of a large segment of the Virginia farm labor force has contributed to the perception that this population does not receive adequate education, unemployment compensation, health care, government benefits, and adequate housing. Over the years, governmental, private non-profit, and religious agencies have worked to alleviate some of the problems faced by the MSFW population. These agencies act as advocates on behalf of workers to ensure that regulations are being enforced.[3]

These agencies generate added economic impact by attracting federal funds to the state and by creating additional employment. Some MSFW service providers exist for other purposes as well and spend only a fraction of their budget providing services related to the presence of MSFWs. Those providers serving MSFWs exclusively would be severely affected should Virginia's MSFW population cease to exist (Table 1).

Table 1. Estimated federal dollar expenditures on MSFWs.

Agency	Total spent on MSFW	Federal dollars spent on MSFWs	% of budget equaling federal dollars spent
	--$--	--$--	--%--
Virginia Employment Commission (VEC)	597,298	597,298	100
Virginia Council of Churches	1,650,000	1,402,500	85
Virginia Department of Education	2,096,610	800,525	73
Virginia Department of Labor & Industry	9,025	0	0
Telemon	1,000,000	500,000	50
Eastern Shore Rural Health System, Inc.	700,000	700,000	100
Shenandoah Valley Medical Center[1]	60,000	60,000	100
Legal Aid	200,000	200,000	100
Other		200,000	
Total	6,312,933	4,460,323	

[1] Headquartered in West Virginia, serves both Virginia and West Virginia.
Source: Survey of service providers.

Although they are important providers of services to MSFWs, the economic impact of agencies supported by state or local funds was not included in this assessment. If state or local funding were not spent to provide services to MSFWs in Virginia, this same level of funding was

[3] The major MSFW service providers in Virginia include the Virginia Department of Labor and Industry, VEC, Legal Aid, Migrant Education, Telemon Corporation, Virginia Council of Churches, Migrant Head Start Program, and Department of Health. Numerous religious and community-based organizations have been created to provide volunteer services in areas where large populations of farmworkers are located.

assumed to be reallocated within the state to provide other services having a similar economic impact. Similarly, many local churches and other organizations use local donations to fund events and provide services to MSFWs. If MSFWs were no longer used, again these funds were assumed to be spent on other activities with the same economic impact.

The total amount of federal spending that enters the state through the service providers and is directly attributed to the presence of MSFWs was estimated to be $4.46 million annually, in 1996 dollars, of which approximately 71 percent is the cost of employing personnel. An estimated 95 full-time equivalent jobs (FTEs) provide services to MSFWs in Virginia. To the extent that MSFWs receive food stamps, WIC payments, and Medicaid services and to the extent that grants to various agencies have gone unreported, the impact of federal spending is underestimated. This impact is believed to be small.

VIRGINIA AGRICULTURE

Because crop production occurs regionally, MSFWs are found in greater concentrations in some areas of the state. The majority of Virginia's MSFWs are employed in vegetable production on the Eastern Shore. Other large groups include the apple pickers located in the Shenandoah Valley, flue-cured tobacco workers in the Southside, and burley tobacco workers in Southwest. The crops included in the impact analysis, acreages, and cash receipts are shown in Table 2.

Five-year average (1992-96) cash receipts were used for the labor-intensive crops requiring MSFWs. This averaging reduces the effects of short-term phenomena such as poor weather conditions affecting Virginia crop production or conditions in other states causing Virginia prices to change substantially for a single crop year.

Although MSFWs are rarely contracted specifically for field crops, MSFWs who are contracted for planting or harvesting fruits or vegetables commonly spend a portion of their time working in field crops. For example, between 5 and 10 percent of the early arrival H-2A tobacco workers' time is spent in hay production.

Fruit

Apples and peaches are the major fruits produced in Virginia that use MSFWs. Apples account for approximately 69 percent of the fruit sector's total output. Other fruits produced in much smaller volumes but also using MSFWs are aggregated in the category other fruit.[4] The total value of sales for all fruits averaged approximately $48.2 million for the period 1992-96. Of this total, apples accounted for $32.7 million (68 percent), peaches accounted for $4.1 million (8.5 percent), and all other fruit accounted for $11.4 million (25.5 percent) in sales value.

Vegetables

The vegetables identified as primary users of MSFWs were tomatoes, bell peppers, cabbage, sweet corn, cucumbers, potatoes, and sweet potatoes.[5] Other vegetables use MSFWs, but these vegetables are produced in such small volumes that data are not available by crop. These crops were aggregated into the category "other vegetables."[6] Total average value of sales for all vegetable production[7] was approximately $78.7 million for the period 1992-96.

[4] Other fruits include grapes, berries, strawberries, prunes, plums, and apricots.
[5] Potatoes and sweet potatoes, considered field crops by VASS classification, were included as vegetables.
[6] Other vegetables include melons, watermelons, hot peppers, broccoli, snap beans, spinach, and others.
[7] Excluding potatoes and sweet potatoes.

Of this total, tomatoes accounted for approximately $38.2 million (48.5 percent), cucumbers $9.2 million (11.7 percent), cabbage $4.7 million (6.0 percent), snap beans $4.5 million (5.7 percent), fresh peppers $3.9 million (5.0 percent), sweet corn $1.9 million (2.4 percent), spinach $1.4 million (1.8 percent), and all other vegetables $14.9 million (18.9 percent).

Table 2. MSFW-dependent crops used in analysis.

Crop	Acreage	Cash Receipts
		--$ million--
All tobacco	47,940	180.4
Flue cured	35,740	
Burley/other	12,200	
Vegetables	25,675	94.3
Tomatoes, fresh	3,380	38.2
Cucumbers, fresh	5,740	9.2
Cabbage, fresh	1,520	4.7
Bell peppers fresh	1,520	3.9
Sweet corn, fresh	2,520	1.9
Other vegetables		16.3
Potatoes	9,600	19.4
Sweet Potatoes	520	0.8
All fruits	31,671	48.2
Apples	26,684	32.7
Peaches	2,100	4.1
Other fruit	2,887	11.4
Nursery		76.5
All MSFW crops		**399.4**

Source: Study estimates. The estimate of total cash receipts associated with the production of MSFW-intensive crops does not reflect the value of these crops that is not attributable to the existence of MSFWs.

Tobacco

Tobacco has traditionally been Virginia's principal cash crop, averaging over $180 million in annual cash receipts from 1992-96. It makes up 21.1 percent of cash receipts for all crops produced and marketed in Virginia and 9 percent of all agricultural commodities produced in the state. All types of tobacco produced in Virginia (flue-cured, burley, sun-cured, and fire-cured) use a large number of MSFWs and are, therefore, included in the economic impact analysis.

Nursery

Nursery and greenhouse sales add about $76.6 million to the economy. Only the fraction of the total gross income from nursery and greenhouse production attributable to MSFWs is included in the economic impact calculations.[8]

[8] VASS estimates nursery, greenhouse, and Christmas tree sales together at $145 million. Since Christmas trees are considered forestry not agricultural crops, the value of their production was estimated the Nurserymen's Association and Association of Christmas Tree Growers and subtracted from the total.

LABOR REQUIREMENTS

Accurate estimates of the number of MSFWs in Virginia are difficult to calculate. Definitions vary among agencies; farms are geographically isolated; workers do not always register. Some workers may work on several farms, which can lead to double counting; some workers stay for a very brief period and are then replaced by other workers.

Because of the difficulty in obtaining actual employment numbers for MSFWs, estimates of the number of workers were made based on a variety of sources: VEC, Department of Health, grower survey responses, and private agencies working with MSFWs. To calculate the various economic impacts of these workers, the number of hours they worked in each crop and their total wage had to be known. Estimates of these amounts were based on actual payroll amounts or on historical data for hours required for a particular crop and average wages paid.

The total demand for farmworkers was estimated using the average hourly labor requirements at different times of the year for crops where MSFWs are used. Labor requirements were based on horticultural budgets prepared by VCE for different regions of the state (Table 3). The labor hours are reported for two-week periods based on the primary harvesting dates.

The peak two-week period demand for farmworkers in Virginia comes during the first two weeks of August. The total number of labor hours demanded was divided by an average work week of 45 or 50 hours for an estimate of the total number of farmworkers required for each time period. Assuming a 50-hour workweek, 18,994 workers would be required to perform all tasks required in the various crops. Assuming a 45-hour workweek, the number of workers required to perform all the agricultural tasks climbs to 21,104 (Table 4). Many workers surveyed reported working as many as 60 hours per week.

These approximately 19,000 to 21,000 farmworkers include all hired farm labor: full-time, permanent workers and MSFWs. Considerable variation in these estimates is due to changes in the hours of the workweek or variations in harvest periods or both. Increasing the hours worked per week reduces the number of workers required. These estimates were based on the most frequently reported harvest periods for the selected crops. However, harvest periods can be stretched over longer periods so that the same workers can be used on several crops where harvest periods overlap.

The estimate of farm labor demand does not predict the total number of MSFWs that come through Virginia each year, it only estimates the total number of farmworkers required throughout the year. The VEC estimated the peak total number of MSFWs in Virginia for 1996 at approximately 16,300. The VEC number is 2,700 to 4,700 less than the analysis indicates is needed by farmers during peak periods. Several possible explanations exist for the differences in the two estimates. First, the potential for errors in the data or assumptions used to estimate labor hours, harvest periods, and acreage exists. Second, full-time, permanent workers or family labor or both may account for a portion of the difference. Third, VEC estimates may be low because of unreported farmworkers. Fourth, MSFW family members may contribute unreported labor. Fifth, good farm management and staggered harvest could reduce the peak demand estimates.

Table 3. Hours of labor required during crop year, selected crops.

Crop	Dec.-Jan.-Feb.	Mar.-Apr.-May 15	May 16-31	June 15	1-June 16-30	July 1-15	July 16-31	Aug 1-15	Aug 16-31	Sept 1-15	Sept 16-30	Oct.-Nov.	Total
Cabbage	0	37	43	43	6	23	23	23	29	23	23	5	278
Sweet corn	0	9	0	3	0	50	50	106	0	0	0	16	234
Cucumbers	0	7	30	2	3	3	100	64	0	0	0	18	227
Peppers	0	7	20	6	0	2	2	39	57	45	22	0	200
Potatoes	0	39	2	2	2	2	0	0	30	70	0	2	149
Sweet Potatoes	0	39	2	2	2	2	0	0	0	0	125	18	190
Tomatoes[a]	0	25	30	36	36	15	75	75	75	75	50	18	510
Strawberry	0	11	104	350	100	40	0	20	0	0	0	20	645
Burley Tobacco	30	20	10	10	5	0	8	16	15	15	20	81	230
FC Tobacco	0	5	5	5	5	10	10	15	15	15	15	20	120
Apples	0	0	0	0	0	1	1	2	2	5	10	18	39
G.H./Nursery	57	1200	250	80	0	0	0	0	0	0	0	0	1,587
Other[b]	0	7	12	12	3	3	3	80	4	0	0	16	140

[a] Stringweave tomatoes

[b] Includes grapes, melons, etc.

Table 4. Total demand for farmworkers, based on 45 hours per week.

	July 1-15	July 16-30	Aug. 1-15	Aug. 16-31	Sept. 1-15	Sept. 16-30	Oct.-Nov
Total hours	625,394	1,442,291	1,899,387	1,391,881	1,637,215	1,482,224	2,191,106
No. of workers	6,949	16,025	21,104	15,465	18,191	16,469	24,346

Distribution of Migrant, Seasonal, and H-2A Farmworkers

Migrant farmworkers represent the majority of MSFWs in all regions of the state, except Southside, where almost 50 percent of MSFWs are H2-A (Table 5). Outside of the Eastern Shore, local or full-time residents constitute at lease one-fourth of the MSFWs. The close correspondence between the type of worker and geographic region is the result of the geographic concentration of crops: for example, Southside tobacco production, Eastern Shore vegetable production, and Shenandoah Valley apple production (Tables 5 and 6).

Table 5. Distribution of MSFWs by region.

Region	Seasonal	Migrant	H-2A
	----------%- ----------		
Eastern Shore	9	91	0
Southside	38	13	49
Southwest	35	60	5
Shenandoah	25	60	15
Eastern	41	59	0
Central	42	58	0

Source: Survey of producers. Regions defined in Appendix 4.

Table 6. Distribution of MSFWs by crop.

Crop	Seasonal	Migrant	H-2A
	----------%----------		
Vegetables	10	85	5
Flue-cure tobacco	38	13	49
Burley tobacco	30	70	0
Apples	31	61	8
Other fruits	12	88	0

Source: Survey of producers.

The Central and Eastern regions reported over 40 percent of their workforce as seasonal workers. Several respondents from the Central and Eastern regions stated that by employing migrant workers they could also employ seasonal farmworkers. These growers use migrant workers for most the harvest labor, thus allowing them to shift the limited supply of seasonal workers to machine operations, grading, packing, and supervising.

FARMWORKER EARNINGS and SPENDING

An important portion of the economic contribution of MSFWs to local and state economies is where and how they spend their earnings. The cost of labor makes up as much as 70 percent of the total cost of producing and marketing horticultural goods. A common perception of an agricultural system dependent on out-of-state labor is that a very high percentage of the gross payroll leaves the state for the workers' place of permanent residence. Such a leakage would mean that the workforce itself contributes little to the local economy.

To measure the additional economic impacts created by employee spending, the MSFWs were asked their average length of stay in Virginia, their average weekly earnings, and their wage spending patterns in and out of state.

Farmworker Earnings

Farmworkers were surveyed between July and November 1997, to determine their average earnings and spending patterns. Spanish-language surveys were sent to the 600 registered labor camp operators with a translation and instructions. Personal interviews were conducted in the workers' native language at informal settings, such as social gatherings, after church services, at English language classes and health clinics, or in the evening at the larger labor camps. Interviews with fruit, vegetable, tobacco, and nursery workers were conducted in all six regions of the state.

Earnings vary according to crop, time of year, method of payment, geographic location, employer, and the ability of the worker. Variations in crop quality and production volumes caused by weather conditions also affect farmworker wages in much the same way that they affect farmers' annual incomes. In the cases where workers are paid per unit harvested, a poor crop decreases their earning potential.

Workers' earnings also vary by the time in the season. For example, the H-2A flue-cured tobacco workers generally arrive in two groups. The first group stays for six months and performs many of the production tasks. A second group arrives for harvest, staying between six weeks and three months. The workers who perform the production tasks have much more idle time; are employed more hours on farm repairs and in agricultural crops such as hay and wheat; and average fewer hours than the workers hired exclusively for harvest. A weighted average of the two groups was used to estimate weekly earnings.

The form of payment, whether by piece rate or hourly wage, may affect the wage earned. A worker commonly earns a piece rate for harvesting and an hourly wage for non-harvest tasks such as pruning, weeding, irrigating, and spraying. Weekly earnings during peak harvest periods tend to be higher than the pre-harvest hourly wage, even though harvest periods are frequently accompanied by greater periods of downtime.

Geographic region also affects earning potential. Growers and workers laboring outside of major production centers—Shenandoah Valley, Eastern Shore, and Southside—tended to report lower earnings. Three factors have been frequently cited:

1) A larger presence of undocumented, unregistered workers may drive down the market wage.
2) Advocacy groups generally help drive up wages. The lack of advocacy groups in the areas with fewer MSFWs has helped keep wages lower.
3) Crew leaders for smaller crews may deduct transportation and other services from the workers' paychecks, thus causing the worker to report lower weekly earnings.

The range of reported weekly wages varied from $150 to $400. Migrants working in Southwest in burley tobacco, hay, and vegetables generally earned the $5.15 minimum wage for non-harvest labor. The H-2A flue-cured tobacco workers and cabbage workers earned $5.80 an hour while the H-2A apple pickers were paid the market piece rate of $0.53 per bushel. A weekly minimum wage of $197 was computed by multiplying $5.80 times the minimum number of hours per week. At the other extreme, H-2A workers reported working as much as 60 hours per week during the peak harvest time, which would provide a weekly wage of $348. H-2A workers reported working an average of 49 hours per week over the 6-month period, for which they earned average weekly income of $284. The typical Virginia MSFW earned an average of $255 a week (Table 7). Workers with previous experience in Virginia expected to earn almost $6,000 during their stay in

Virginia. The expected yearly earnings ranged from $1,600 for the short-term apple pickers to $12,000 for the 10-month nursery workers.

Table 7. Weekly earnings reported by migrant and H-2A.

Type of worker	Weekly earnings	Expected earnings
	----------$----------	
Migrant vegetable	266.33	5,974
H-2A tobacco	266.02	4,660
Migrant fruit	231.06	1,683
H-2A APPLE	229.00	1,800
Burley tobacco	214.71	2,500

Source: Farmworker surveys, grower and farmworker interviews (see Trupo and Alwang for details).

Based on estimated average weekly wages and estimated labor hours required per acre, the total value of employee compensation paid by farm employers to MSFWs was approximately $75 million dollars, of which approximately $67.6 million was paid directly to MSFWs. Thus, total wage compensation payments to all classes of farmworkers accounted for 23 percent of the value of total state sales for MSFW-dependent crops.

Farmworker Spending

MSFWs were asked to describe their spending and savings patterns so that the additional economic impact generated by these expenditures could be measured. The multiplier effects were estimated using the IMPLAN software (Appendix 1).

The distinct characteristics of the three farmworker groups would lead to the expectation that their spending patterns are different. Seasonal workers will spend most of their money locally because they have families who live with them, they own houses, and they have personal property locally, unlike the migrant and H-2A workers. Migrant workers are more mobile, have greater access to recreational activities, spend more money on cars and transportation, and occasionally travel with their families. H-2A workers are much less mobile, may not speak much English, have their housing provided for them, and receive a portion of their earnings when they return to their country of origin. Therefore, H-2A workers would be expected to spend less of their earnings locally than the other two groups.

The *leakage* of money from the state's economy because their work is not in the same state as their permanent residence is a major factor affecting the local (that is in-state) impact of migratory and H-2A workers.[9] Money spent (or sent) outside Virginia contributes no additional economic impact to the state's economy. Factors found to affect farmworker spending include proximity of labor camps to commercial businesses, access to transportation, provisions by the employer to pay housing and utilities, traveling independently of or with a crew leader, family composition, and the availability of certain goods in the H-2A workers' countries of origin.

[9] The national averages for spending patterns for low-income wage earners provided by IMPLAN were used to estimate spending patterns of seasonal farmworkers. The surveys and interviews with migrant and H-2A workers were used to modify the IMPLAN low-income worker spending patterns to reflect the spending patterns of these two groups.

Survey results showed that workers who travel with their families spend most of their income in similar proportions to seasonal workers. Single workers tend to spend more of their money than married workers traveling without their families. Since H-2A workers do not own, nor are they permitted to drive cars, they frequently must rely on their employers for transportation into town or city for groceries and recreation. In the case of isolated H-2A tobacco workers, spending is frequently limited to the one day per week that employers are obligated to provide them with transportation. Migrant workers who own cars or travel in crews where fellow workers have cars tend to spend their money on recreation, eating-out, alcoholic beverages, and other consumer goods.

Workers who live in or near large labor camps such as those on the Eastern Shore, Winchester, and Berryville usually have access to more social and recreational events, which also results in increased spending. Centers with large MSFW populations tend to have more parties, picnics, dances, and other social events. These activities encourage workers to spend money on gifts, clothing, food, and beverages. Local residents often sell commercial goods at camps to avail themselves of the large, captive audience. In many cases, the presence of a crew chief also tends to induce spending. Crew chiefs try to capture a portion of their crews' earnings by selling them services like transportation and meal preparation, thus inducing greater spending.

Farmworkers tend to make large purchases of goods at the very end of the harvest season, just before they leave the state to return to their winter residences. H-2A workers spend a small percentage of their weekly earnings during most of the agricultural season, but tend to spend large amounts on goods to take home. The most common purchases are clothing, inexpensive jewelry, toys, and electronics. Most H-2A workers said their purchases were limited by baggage allowances on buses and planes and customs duties. Workers with families tend to purchase goods for their homes and families when they leave, but even single workers carry as much as they are allowed when they return to their countries of origin.

Migrant workers are responsible for their own transportation and, therefore, have greater flexibility in determining when and where they will make their purchases. Of the Hispanic migrant farmworkers surveyed, 86 percent still considered some country other than the United States, to be their permanent residence. Even the migrant farmworkers who are based in Florida and are contracted by the same employer most of the year still leave the United States for at least a month: usually at Christmas and New Years. The migrant workers, like the H-2A workers, tend to purchase goods to take with them when they leave the state.

A fair percentage of migrant farmworkers, upon completing their contracts in Virginia, purchase used cars. Estimates show 10 to 25 percent of migrant workers own cars. Many migrants report purchasing used cars, either individually or with other workers, upon the completion of service. In the case of the Shenandoah Valley workers, easy access to the police auto auctions stimulates a high percentage of used car sales in the region. With the purchase of used cars, additional economic activity is generated through sales of gasoline, tires, auto supplies, and mechanical services.

The leakage rates reflect the percentage of total payroll that leaves the state as expenditures outside the state or as money sent home. Southside H-2A tobacco workers take approximately half their earnings out of state, compared to migrant apple pickers who take only 20 percent of their wages out of state.

Migrant and H-2A farmworkers usually do not have bank accounts in Virginia. They are generally paid weekly and need to secure their earnings. This need creates a demand for Western Union services. Of great concern to the migrant and H-2A farmworkers is the high surcharge for wiring

money out of the country (Table 8). But with few alternatives for sending money safely out of state or country, the migrant and H-2A farmworkers are forced to pay the high cost for this service.

Table 8. Costs of using Western Union.

Amount sent	Cost to send	% surcharge
Mexico	--$--	--%--
0-$200	22	11.0
$300	27	9.0
$500	34	6.8
$1,000	48	4.8
Jamaica		
0-$200	22	11.0
$300	29	9.7
$500	43	8.6
$1,000	68	6.8

Source: Western Union, rates effective Aug. 2, 1998.

The total expenditures of all MSFWs in Virginia were estimated to be approximately $49.4 million (Table 9). Food accounts for nearly $13 million (44.1 percent) of the total expenditures by migrant and H-2A workers.

Table 9. MSFW spending by category.

Expenditure item	Total expenditure
	--$--
Eating, drinking places	6,343,642
Food stores	5,888,374
General merchandise	3,910,794
Miscellaneous retail	3,169,964
Western Union	2,194,312
Auto dealers/service	1,898,000
Apparel accessories	1,086,234
Used and 2nd-hand items	550,363
Phone and postage	465,698
Laundry	422,461
Auto repair/ services	394,669
Other personal services	380,433
Recreation	233,220
Barber shops	199,356
Doctors and dentists	154,850
Personal services	89,836
Transportation	82,476
Total expenditures, migrant and H-2A	**27,464,682**
Seasonal workers spending, all categories[a]	21,968,919
Total MSWF spending	**49,433,601**

[a] Estimate based on IMPLAN coefficients for spending by low income wage earners; individual categories not available.
Source: MSFW interviews.

COSTS of EMPLOYING MIGRANT and H-2A WORKERS

Two major expenses associated with employing migrant and H-2A workers are transportation and housing. Some producers provide transportation to and from the labor camps; costs of this transportation include the costs of vehicle ownership—gas, maintenance, and insurance. H-2A employers are also required to pay round-trip transportation from the point of contract (country of origin) to the employers' places of business. Average costs range from $250 to $350 depending upon the country of origin, and they can be as high as $500 from Jamaica to the Shenandoah Valley. Most of these transportation costs leak from the state's economy.

Costs of Housing

Agricultural producers are not obligated by law to provide housing for migrant workers. However, housing is generally made available to migrants as well as H-2A workers. Many growers said that they need to offer housing to attract the desired quality and quantity of labor. The costs (and associated expenditures) of this housing affect the overall impact of the workers on the economy.

State and federal regulations ensure that migrant and H-2A labor camps meet certain minimum standards. Depending on the year of the camp construction, labor camps must meet either United States Department of Labor, Employment and Training Administration (ETA) or Occupational Safety and Health Administration (OSHA) regulations. The state Department of Health is responsible for making periodic inspections of registered labor camps to ensure that standards are being met.

The average housing cost per worker depends on a wide variety of housing types and contractual arrangements. On the Eastern Shore, the majority of workers are housed in large, corporately owned labor camps, managed by the producers. In the Shenandoah Valley, two large labor camps, managed by the Frederick County Fruit Growers Association, provide an arrangement where the charge to employers for housing the workers depends on the bushels of apples that the worker picks. A common arrangement for tobacco producers using H-2A workers and other small-scale growers scattered throughout the state is to house the workers in trailers and single-family houses located on the grower's property. Another less frequent arrangement is to pay a labor camp operator an hourly wage per worker to hire his workers. The camp operator pays the workers their hourly wage and keeps the rest to pay housing costs and himself. The least common arrangement is to rent a room or rooms in a nearby community.

The information used to estimate average and total expenditures on migrant and H-2A housing came from two primary sources. First, labor camps were visited, growers and camp operators were interviewed, and surveys were sent to camp operators asking questions about MSFW housing expenditures. The second source was the 1997 study by Koebel and Daniels evaluating housing conditions of migrant and seasonal farmworkers. This study provided estimates used to calculate total and average costs of housing workers in different regions of the state (Table 10).

Table 10. Housing characteristics.

	--%--
Age of housing structure	
< 10 years	7.0
10 – 19 years	21.2
20 – 49 years	43.2
> 50 years	28.6
Number of workers in camp	
< 5	13.9
5 – 9	57.6
10 – 19	16.2
> 20	12.3
Type of dwelling	
Trailers/mobile homes	36.3
Single family homes	26.2
Dormitories/campsites	24.5
Apartments	2.7
Other	10.3

Source: Koebel and Daniels.

Initial Housing Costs

Koebel and Daniels found 93 percent of the growers had housing that was at least 10 years old. Housing costs for these growers are reported as the costs associated with maintaining and furnishing the housing. Most growers fail to include the one-time fixed costs of building, purchasing, or replacing the facility.

Koebel and Daniels converted all historic housing purchases for which information is available into 1996 dollars using the Consumer Price Index (CPI) and depreciated them over the age of the structure or 25 years, whichever was greater. Although most growers ignore their initial housing investment, equating past expenditures with current dollars demonstrates that real and significant expenditures have occurred and cannot be dismissed as insignificant. For example, a $28,000 barracks has been used for housing an average of 40 workers per season over its 35-year life. Inflated to 1996 dollars using the CPI, annual fixed costs alone equal $104 per worker.

Not all farm housing is exclusively for the use of the migrant and H-2A workers. When multiple-use housing facilities occur, an estimated percentage of the total construction cost was assigned as use by farm labor. Multiple-use housing was most frequently encountered with small-scale growers employing no more than eight workers, but generally only four.

Since nearly 72 percent of the state's MSFW housing structures are over 20 years old, large, periodic repairs and improvements are frequently needed. Average annual costs of maintaining and furnishing housing structures reported in the surveys by employers and labor camp operators were used.

Total Costs of Housing and Transporting Workers

Total per acre costs to all producers for employing MSFWs was $5.7 million annually (Table 11). This amount was distributed across six sectors of the economy based on the grower survey responses (Table 12).

Table 11. Per acre housing and transportation associated with costs of employing migrant and H-2A workers.

	Per acre	Total acres	Total costs
	--$--		--$--
Apples	43.01	26,680	1,147,560
Other fruits	38.19	4,987	190,454
Vegetables	74.07	18,449	1,366,579
Flue cured tobacco	65.46	35,740	2,339,540
Burley tobacco	35.38	10,720	379,286
Nursery	650.12[a]	--	260,048
Total			5,683,468

[a] Cost per worker.

Source: Koebel and Daniels and producer/labor camp surveys. See Trupo and Alwang for details.

Table 12. Total state producer expenditures associated with housing and transporting MSFWs.

IMPLAN Sector	% of total	Total expenses
	--%--	--$--
Construction	5.89	334,756
Maintenance	52.59	2,988,936
Transport	27.28	1,550,626
Furnishings	9.36	532,014
Mobile homes	2.87	163,116
Utilities	2.00	113,669
Total		$5,683,117

Source: Koebel and Daniels and grower surveys.

CONTRIBUTION of MSFWS

Economic impact analyses typically focus on the contributions to the economy that are made by the presence of an industry or a portion of the industry. The contribution of MSFWs is significant: they add $5.7 million in housing and transportation spending, $6.3 million in agency spending, $95 million to the tobacco stemming and redrying sector, $29.1 million to the canned fruit and vegetable sector, $49.4 million in direct spending of their wages, and $283.9 million in crop sales. However, an alternative way to measure the economic impact is to ask, "What would be the economic impact if the resource were removed?"

The economic impact analysis to address this question focuses on a series of scenarios depicting changes that would occur in Virginia agricultural production if producers of labor-intensive crops no longer had a supply of MSFWs. Changes in economic activity would occur if producers were forced to shift from more profitable labor-intensive crops into less profitable farm commodities.

The contribution of the farmworker to the statewide production of each crop was an important component of this study. Through surveys and interviews, growers were asked what alternative uses for land they would consider if the current supply of MSFWs ceased to exist. Over 80 percent of the respondents reported that they would retire from farming and sell their farms. Assuming that this response reflected the view of the majority of producers, the assumption was made that some

alternative crop or livestock production would take place on the land, or current agricultural practices would continue using more-mechanized, less-labor-intensive method of production.

The economic impacts include more than just the lost revenues to growers from producing less profitable crops. They include economic impacts from changes in inputs used, decreases in labor camp housing construction and maintenance, decreases in farmworkers' spending, and changes in industries dependent on Virginia-grown produce as inputs into their production processes. The primary economic indicator in the impact analysis is the decrease in total value-added that would occur in the Commonwealth in the absence of all MSFWs. Assuming no MSFWs is a worst-case scenario, but one that highlights their contribution to the total Virginia economy.

Long-term versus short-term impacts

If all MSFWs disappeared from Virginia, the immediate, short-term impact would be the loss of production of nearly all the state's vegetable, tobacco, and fruit crops *except for that volume which could be handled by family and full-time labor*. The loss of MSFWs would undoubtedly lead to some conversion into pasture and mechanized field crop production.

More difficulty surrounds predicting the longer-run consequences of the lost labor supply. However, a labor shortage would likely cause the wages paid to farmworkers to rise, potentially inducing entry of new workers into the farm labor market. However, these local workers would still be considered seasonal unless they became full-time employees. This scenario would be forestalled by the increase in wages pushing the cost of producing the products to a point where retailers would rely more heavily on imports into the state.

The absence of MSFWs could lead to decreased supply of tobacco or other commodities. A smaller supply could cause the price to increase. If the price of the commodity increases, more resources might be dedicated to researching technological advancements, such as mechanized harvesting equipment, to overcome the labor supply shortage. Methods that were previously not cost effective might become economically feasible with the increased price. The decrease in production could also result in supporting businesses closing and, ultimately, production moving to lower cost regions, probably outside Virginia.

Two additional factors make it difficult to predict whether short-term impacts differ from long-term impacts. First, in the long-term, alternative land uses would likely emerge. These new land uses would probably mitigate the negative impacts associated with a decrease in MSFWs. On the other hand, spillovers due to turmoil in the retail and processing markets, such as decreased availability of inputs, higher prices from foregone economies of size, and fewer opportunities to sell to wholesalers and retailers, may make long-term impacts greater than short-term impacts.

The potential negative effect on land prices must also be considered. In the absence of MSFWs, earning potential of the farmer has been assumed to decrease. As his/her income decreases, the future value associated with the productivity of the farmland would also decrease. This decreased value could affect local tax revenues.

Decreased Fruit, Vegetable, and Tobacco Production

Some factors that must be considered when determining the impact of the total absence of MSFWs are

1) the proportion of total labor required for harvest;
2) the importance of economies of size in keeping costs low;
3) the reliance on other growers in the marketing process; and
4) the importance of the crop to the growers' overall farm operation.

Apples and grapes can be produced with relatively few workers. The impact of losing MSFWs for these fruits would occur during the harvest periods when large numbers of farmworkers are needed. Thus, the constraining factor for these fruits is harvest labor. Currently, no technology for mechanically harvesting these fruits exists.

Economies of size are important to keep costs low. Typically, small-scale farmers have not been successful in producing and marketing vegetables. Where large investments in packing, grading, or farm equipment are necessary, large volumes of produce are needed to offset the investment. On the Eastern Shore, the most successful growers have been the large, corporate producers who are able to keep the per unit costs of producing and marketing their crops low. If 150 acres of tomatoes are needed to justify the investment in equipment and only sufficient labor for 40 acres is available, a producer may choose not to grow any tomatoes. The fruit and vegetable market is competitive, and slight increases in production costs can make it uneconomical to produce and market these crops.

The third issue is the reliance on other growers to create a market. Several fruit grower associations and cooperatives exist to pool resources and risk, thus reducing marketing costs for the members. If a decreased labor supply caused a reduction in the number of growers, these institutions might not be able to capture as many economies of size, and costs would increase for the remaining producers. In addition, economies of size on the output market side may compound the problem. Produce buyers often purchase large volumes of produce in regions of concentrated production. If an insufficient volume of production were to be available in a particular region, purchasers might find it too costly to serve those markets.

The fourth issue is the importance of the crops requiring MSFWs to the growers' overall farm operation. Many farmers responded that their principal crop (fruits, vegetables, or tobacco) was their only profitable crop, and it helped subsidize the rest of their farming operations. If workers were not available to produce and harvest sufficient acreage to cover all costs of operating the farm, including subsidizing the production of other commodities, large structural changes in cropping patterns, land use, and farmland ownership might result. Many growers stated that the profits from raising 20 acres of tobacco helped cover the costs of employing full-time workers in dairy, hay, and cattle production.

The possible effects created by the absence of MSFWs can potentially be greater or less than those predicted. Markets may dry up because sufficient volume does not exist to justify purchases by produce buyers. Farms that are forced to cease operations because their high-value crops can no longer be grown will impact the input suppliers, possibly driving them out of business, thus affecting the production of still other crops. In both these scenarios, the impacts estimated in this study are conservative and probably understate the true economic impact on the Commonwealth. However, this interpretation is predicated on the assumption that sufficient profits do not exist in these enterprises to allow paying high enough wages to attract alternative labor resources as a substitute for MSFW labor. Recognizing that the definition of MSFWs includes local seasonal workers is important since the impact scenarios assume that such workers would no longer be available.

The impacts from a total loss of MSFWs on fruit, vegetable, and tobacco production are greater than the proportional loss of MSFWs. For example, a 50 percent decrease in MSFWs would probably lead to a greater than 50 percent decrease in total agricultural production. Many uncertainties surround the substitutability of labor and capital and the adjustment process that producers might go through as they transition to a new equilibrium. However, in the short run, producers are likely to be affected more severely than in the long run. Producers were asked if no MSFWs were available,

- Would you reduce the number of acres you currently produce using these workers?
- How many acres would you produce without MSFWs?
- What are your alternative uses for the land?

VCE agents and Virginia Tech faculty in the Departments of Agricultural and Applied Economics and Horticulture were also asked these questions. Their responses were similar to those of the growers.

Many felt the total absence of MSFWs would mean the disappearance from the state of all fruits, vegetables, and tobacco requiring MSFWs. That production of some vegetables in Virginia is dependent on MSFWs, coupled with the need for large acreages, led to the conclusion that no commercial vegetable production would exist *except that which family labor produces* (Table 13). The production of apples and other fruits would be reduced by 90 percent. Small-scale producers could probably continue to grow apples and peaches for processing, but the large-scale operations would cease to exist without the availability of MSFWs. Tobacco production would be reduced by 85 percent. Most tobacco allotments are still relatively small, and often ten or less acres are raised without the use of hired labor.

Table 13. Reduced production of agricultural crops.

Crop	% Reduction	Acreage reduction	Decreased sales
	--%--	--Acres--	--$--
Tobacco	85	40,749	$153,299,710
Apples	90	20,013	$27,711,540
Other fruits	90	4,997	$15,489,800
Vegetables	100	27,333	$82,115,000
Nursery	7	N/A	$5,358,000

Source: Survey of producers.

Change in Use of Agricultural Inputs

The costs of producing and marketing labor-intensive vegetables are much greater than the costs of producing, harvesting, and selling grains because of the high costs of labor, irrigation, and equipment for grading and packing. The average per acre cost of producing and marketing vegetables such as cucumbers, tomatoes, bell peppers, cantaloupes, and cabbage is approximately $7,259 (VCE,1994). The average cost of producing, harvesting, and selling an acre of wheat, corn, or soybeans is only $307 (VCE, 1991).[10]

The high costs associated with producing and marketing vegetables, fruits, and tobacco are generally the result of the greater use of paid labor, fertilizer, and pesticides; the need for irrigation

[10] Both averages converted to 1996 dollars

equipment; and the higher costs involved in post-harvest handling. A $7,000 per acre investment creates significant economic activity in the farm supply and farm machinery industries, in grading and packing houses, in cooling equipment sales, in the transportation industry, and in a number of other sectors of the economy that complement the growing and selling of these products. The conversion of land from a crop that requires $7,000 investment per acre into a crop that only requires a $300 investment per acre will greatly reduce the amount of economic activity taking place in the state. Not only will growers suffer, but those other sectors of the economy that sell inputs to agricultural producers or provide value-added services will also.

Changes in Housing and Transportation Expenditures

The major sectors of the economy that would experience reduced economic activity would be new housing construction, housing repairs and renovations, mobile home sales, home furnishings, and public utilities.

The transportation of large crews involves purchasing trucks or buses, paying drivers, or renting transportation services. In the case of H-2A workers, a portion of the costs of transportation involved in bringing them to Virginia and returning to them their country of origin are spent locally. A decrease in the demand for migrant and H-2A workers will, therefore, reduce the demand for transportation.

Changes in Farmworker Expenditures

Wages have a large multiplier effect on the economy. Farmworkers spend a portion of their wages locally on food, transportation, recreation, and a variety of consumer goods (Table 9). The loss of several thousand wage earners in Virginia would reduce the demand for the goods these workers consume. The sectors of the economy that would feel the greatest loss of economic activity would be the grocery, consumer goods, and clothing retailers. The greatest effect from losing a large number of MSFW wage earners would be most visible in the mid-sized areas such as Exmore, Winchester, and Danville.

Effects on processing sectors

Forward linkages are reflected through industries that rely on Virginia-grown produce as a major input into their production process. The major forward linkages associated with fruit, vegetable, and tobacco production are food processing, canning, freezing, and cigarette production.

The impact of decreased fruit, vegetable, and tobacco production on Virginia industries is difficult to identify. Industries may be located in Virginia for a number of reasons that have no relationship to the agricultural production that takes place in the state. For example, vegetable canneries may locate in the state because of transportation savings, proximity to major markets, access to ocean-going ports, or lower taxes. These canneries may purchase most of their vegetables from out-of-state sources; consequently, the disappearance of Virginia agriculture may have very little impact on them. However, industries sometimes locate in Virginia to take advantage of the unique attributes of a Virginia-grown product or to be near the supplier of a perishable commodity or to reduce high transportation costs involved in the initial stages of processing. Thus, the manufacturer might cease operations or relocate to a more reliable and inexpensive supply of produce outside the state.

To reliably predict the impact of decreased vegetable, fruit, or tobacco production on forward-linked industries, food processors and other manufacturers would have to be surveyed to determine their primary motivation for locating in Virginia, which was beyond the scope of this study. Therefore, estimates have been made based on IMPLAN data.

The two sectors of the Virginia economy that are most likely to be affected by losses of Virginia-grown produce are the canned fruit and vegetable industry and the tobacco stemming and redrying industry.[11] For the impact analysis, the canned fruit and vegetable sector was reduced by 18 percent, which is the proportional loss of fruit used by this sector that is purchased from within the state (Table 14). This result translates into a potential dollar decrease in output of $29.1 million for canned vegetables and fruit (Table 15). Likewise, tobacco sales were reduced by 15 percent, the proportional amount of its output from tobacco produced in Virginia, giving an even greater decrease in output: $94.9 million.

Table 14. Proportion of inputs purchased from Virginia.

Commodity	Proportion purchased from within Virginia
Fruit	0.1846
Vegetable	0.2623
Tobacco	0.1509

Table 15. Impact on manufacturing caused by decreased inputs.

Sector	Decrease in output (Million dollars)
Canned fruits, vegetables	$29.1
Tobacco, stemming-re-drying	$94.9

IMPACT ANALYSIS

Three scenarios were developed to analyze the impact of MSFWs on the economy—short term, overall impact, and loss of economic activity. Five variables, output, employment, employee compensation, personal income, and total value added, are measurements of these impacts.

Output refers to the total dollar value of the production of goods and services that would be lost within the state of Virginia. This basic category gives the overall economic impact on the state. **Employment** refers to the number of FTEs that would be lost as a result of the absence of MSFWs. **Employee compensation** is the total value of wages and salaries paid to workers in all industries affected by the loss of MSFWs. **Personal income** is the sum of employee compensation and proprietary income. Proprietary income is the profit earned by the owners of the industries. **Total value-added** refers to the value added to the final product after accounting for the cost of production. Value added includes proprietor income, employee compensation, interest, and indirect business taxes. Only output, value added, and employment are included in tables 18 and 19.

Each category is also broken down into its direct, indirect, induced and total effect. The **direct effect** is equal to the values derived from the primary research and entered directly into the

[11] Wise and Reaves has a complete discussion of economic impacts of Southside's tobacco stemming and redrying industry.

model. **Indirect effects** represent the impacts from other industries resulting from the direct contribution of MSFWs to final demand. For example, fertilizer sales or irrigation equipment sales resulting from vegetable production is an indirect effect. An **induced effect** represents the impacts on all industries caused by the disposable income generated by the direct and indirect effects. Food purchases by farmworkers is an induced effect. The **total effect** is the sum of the direct, indirect, and induced effects.

If no MSFWs were available, crop mix would undoubtedly change. MSFW-intensive crops would decrease and be replaced by traditional agronomic crops. The net effect is a decrease in sales of about $265.6 million (Table 16).

Table 16. Changes in crop production sales without MSFWs in Virginia.

Impact	Event	Amount
		$
Crop reduction	- reduce tobacco output 85%	- 153,299,700
	- reduce fruit output 90%	- 43,103,800
	- reduce vegetable output 100%	- 82,115,000
	- reduce nursery output 7%	- 5,358,000
Total crop reduction		**-283,876,500**
Crop substitutions	- increase hay production	3,627,224
	- increase cattle production	6,342,133
	- increase soybean production	2,650,613
	- increase corn production	2,391,916
	- increase other grain production	604,310
	- increase wheat production	2,746,866
Total substitutions		**18,363,062**
Net change		*265,513,438*

The presence of MSFWs creates additional spending in the state as the result of housing and transportation spending by employers, agency spending, and forward linkages. These direct effects, in turn, are associated with indirect and induced effects. The indirect and induced effects are estimated using IMPLAN.

Short-Term Impacts

The results of the Short-Term scenario measure the direct, indirect, and induced impacts caused by the reduced acreage of labor-intensive crops, lost federal funds entering the state through service providers, decreases in housing and transportation expenditures, and lost spending of farmworker wages. This scenario does not include the added output that would result if MSFW-dependent crop acreage were shifted to field crop production. The total value of lost economic output in 1996 dollars is nearly $485 million. The decrease in total value added to the Virginia economy is over $341 million. The total number of lost FTEs is 13,983, and the total value of lost personal income is almost $143 million.

Overall Impact

The scenario, Overall Impact, consists of the short-term direct effects and includes the positive impact of alternative land uses (that is the substitution of grain production for the lost crop acreage). The total value of lost production of goods and services in this scenario is $459.6

million. The impact is approximately $25 million less than the short-term impact because of output generated from the increased production of field crops and cattle. The direct, indirect, induced, and total economic impacts for this scenario are presented in Table 17.

Table 17. Impacts caused by absence of MSFWs.

Impact	Output	Value added	Employment
	$	$	Number of workers
Direct	-317,086,398	-240,037,182	-10,926
Indirect	-52,211,449	-29,018,520	-755
Induced	-90,315,348	-54,282,019	-1,368
Total	-459,613,195	-323,337,721	-13,049

The absence of MSFWs would lead to a net reduction in agricultural output of about $317 million caused by substituting grains and pasture for tobacco, fruits, and vegetables. The change in crops would indirectly impact other sectors of the economy causing a decrease of an additional $52.2 million. Most of this indirect effect would take place in the agricultural supply and service sectors. The loss of MSFW spending would lead to an additional $90.3 loss in induced spending on goods and services. The absence of MSFWs would cause a total decline in value added of $323.3 million.

The direct loss of jobs caused by the reduction in agricultural production would be 13,049. Another 755 jobs would be lost in backward-linked sectors of the economy. A reduction in another 1,368 jobs due to the induced effect of lost wages would also occur.

Loss of Economic Activity

The final scenario incorporates the impacts from the loss of agricultural production, federal spending, housing costs, and farmworker spending and the impacts from adjustments to field crops included in the overall impact scenario, as well as the loss of production in the stemming and re-drying sector and the canned fruit and vegetable sector. The additional loss of production in the tobacco stemming and re-drying and canned fruit and vegetable sectors would contribute to an additional negative impact of $170 million on the Virginia economy. The total value of lost production from within the state of Virginia increases to over $629 million with the loss of over 14,000 FTEs (Table 18). This loss of production adds up to a total of over $207 million less flowing into the hands of Virginia wage earners and entrepreneurs in the form of personal and proprietary income.

Table 18. Impacts on economy which include forward linkages.

Impact	Output	Value added	Employment
	$	$	FTEs
Direct	-441,050,156	-280,781,887	-11,320
Indirect	-81,594,057	-45,710,605	-1,400
Induced	-106,826,515	-64,205,687	-1,618
Total	-629,470,728	-390,698,179	-14,338

CONCLUSIONS

MSFWs have an enormous and far-reaching impact on the Virginia economy. They contribute between $460 and $630 million annually to the gross output in the state, between 13,000 and 14,000 full-time equivalent jobs, and between $140 and $160 million in personal income.

The economic impacts described above are particularly important because over 13,000 people draw their livelihood from agricultural production that relies on MSFWs. This population is generally located in rural areas and has much less potential for finding alternative sources of income. The typical Virginia farmer is 56 years old and has farm debt averaging $44,000 (VDACS, 1996.) Due to the age, average educational attainment levels, and geographic location of Virginia farmers, retraining for alternative employment in other sectors of the economy might prove to be difficult.

Each Virginia farm creates about five additional off-farm, private enterprise jobs in the state. The Virginia agricultural system accounts for 7.6 percent of the gross state product and 14.8 percent of all jobs in Virginia (Lamie, and Johnson and Wade). While not all these jobs are not attributable to MSFWs, their presence increases employment in many other sectors.

The competitiveness of Virginia's high-value agriculture depends on continued access to a reliable and reasonable-cost labor supply. Some producers benefit from federal programs which allow them to earn high profits on their product. These producers, such as those producing flue-cured tobacco, might still earn reasonable returns even if they were to raise wages substantially. By raising wages, they might be able to attract seasonal workers to substitute for migrant and H-2A workers.

Most other producers would, however, cease production of their high-valued crops, and their main resource—land—would move into a lower valued use. Decision makers at the state and local levels need to consider this outcome: a significant decrease in local economic activity and uncertainty about the future of this land.

Options to promote continued high-value production include

- Improved information about the availability of MSFW labor and the requirements related to their employment.
- Grants for housing construction and repairs.
- Strong state support for public services provided to these workers.
- An understanding of the magnitude of the economic contribution of MSFWs to the economy so that a lack housing permits do not limit the number of workers that can be housed.

All these steps would help maintain the contribution of such workers to the local economy.

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APPENDIX 1. IMPACT ANALYSIS

The economic impact of MSFWs was estimated by measuring the total value of the output of goods and services directly attributable to them. Output is used to indicate the sale of any good or service, such as the sale of 100 bulk bins of cantaloupes. The total economic impact of MSFWs will be the sum of all sales, by all individuals and firms, that result from the presence of these workers.

Input-output analysis was used to estimate the total economic impact generated by the presence of MSFWs. Three basic components of total economic impacts are direct, indirect, and induced effects (Appendix Box 1). The input-output database predicts the indirect and induced effects based on the interconnectedness or linkages between different sectors of the economy. IMPLAN, chosen for the analysis, is one of the most widely used input-output programs available.

Appendix Box 1. Impact Analysis Definitions

Direct effect: a change in output, employee compensation, and value-added. Direct effects include value of lost production, value of lost spending by workers, value of lost federal funds, and value of foregone camp construction costs.

Indirect effect: additional economic impact caused by additional rounds of spending by directly impacted firms purchasing from still other firms in the region. Indirect effects include expenditures on farm machinery used by Virginia farmers, expenditures on electricity at processing plants, and the cost of transporting pesticides from the factory to retail outlets.

Induced effect: additional economic impact caused by the spending of wages and profits in the directly and indirectly impacted sectors. Induced impacts include expenditures by employees of grocery stores who service MSFWs, household purchases by support agency workers, and spending by farm supply retail employees.

Backward Linkage: the link between an industry and its suppliers or a household and the producers of household goods and services.

Forward Linkage: links between industry producing a good and the consumers of that good. Tobacco production is linked to stemming/re-drying industry, and vegetables are linked to food stores.

Economic Linkages

Economic linkages refer to the interconnectedness of various industries. Linkages are created when one sector of the economy purchases goods and services that are used in the production process of another sector of the economy. Linkages trace all expenditures related to producing and moving agricultural goods from the farm through the post-harvest handling, processing, transportation, wholesaling, and retailing sectors of the economy. Examples of *backward* linkages include purchases of fertilizers, pesticides, and agricultural services *by farmers*. *Forward* linkages include purchases (*from farmers*) of fruits and vegetables by packinghouses, processors and juice manufacturers.

Virginia-specific information was gathered on linkages within the state and used where national averages were thought to inaccurately reflect the linkages associated with production using MSFWs. VCE horticultural budgets provided most of the information on agricultural inputs, while specific crop research publications provided additional insights into the uses of agricultural produce after it leaves the farm.

APPENDIX 2. DATA COLLECTION

Information on MSFWs earnings and expenditures was needed to trace the linkages created through the presence of these farmworkers. IMPLAN provides data on low, medium, and high-income workers' spending patterns. The unique nature of migrant and H-2A workers (who are thought to take a high percentage of their earnings out of the state because they are employed away from their permanent residence and frequently send money home) required specific spending patterns be developed. Money earned in the Commonwealth but spent (or sent) outside the state is a *leakage*. Since leakages are not associated with any further in-state economic activity, they must be identified and accounted for when estimating the effect of MSFWs' expenditures.

A questionnaire was designed to determine the spending and savings patterns of the MSFWs. The questionnaire was translated into Spanish to accommodate the large percentage of Hispanic workers employed. A survey team comprised of native Spanish-speaking graduate students from Virginia Tech was used to interview the various populations of farmworkers around the state.

To determine the best alternative uses of the land currently planted to labor-intensive crops, horticultural experts, county extension agents, and local growers were consulted. The alternatives were evaluated to estimate labor requirements, amount of capital investment needed to change production, and potential profitability. The assumption made, based on survey responses and interviews, was that land not used for labor-intensive crops would continue to be farmed, but with a different crop mix

The personal interviews, supplemented by written survey, also allowed for follow-up questions and greater detail in the responses. The data obtained from these surveys and interviews allowed the study team to build an expenditure profile for employing farm labor. Expenditure profiles were created for each major crop requiring MSFWs and were used in IMPLAN to better estimate the backward linkages (and leakages) associated with the employment of MSFWs.

To improve IMPLAN's estimations of backward linkages, data from primary and secondary sources were gathered on specific Virginia agricultural practices, grower expenditures, and MSFW savings and spending patterns.

The specific data requirements were classified into four categories:

1) agricultural production,
2) producer expenditures,
3) farmworker earnings and expenditures, and
4) economic linkages.

For each category, production volume and expenditures were identified. IMPLAN was then used to estimate the direct, indirect, induced, and total impacts attributable to the MSFWs.

APPENDIX 3: LABOR HOURS for SELECTED LABOR-INTENSIVE CROPS

Appendix Table 1. Labor hours required for selected labor-intensive crops.

Crop	1996 Acres	Dec. - Jan. - Feb.	Mar. – Apr. - May 15	May 16-31	June 1-15	June 16-30	July 1-15	July 16-31	Aug 1-15	Aug 16-31	Sept. 1-15	Sept. 16-30	Oct-Nov.	Total
Cabbage	1,300	0	48,100	55,900	55,900	7,800	29,900	29,900	29,900	37,700	29,900	29,900	6,500	361,400
Snap beans	5,100	0	45,900	10,200	15,300	15,300	15,300	45,900	255,000	255,000	0	0	91,800	749,700
Sweet corn	2,000	0	18,000	6,000	6,000	0	100,000	100,000	212,000	0	0	0	32,000	468,000
Cucumbers	5,200	0	36,400	156,000	10,400	15,600	15,600	520,000	332,800	0	0	0	93,600	1,180,400
Bell peppers	1,400	0	9,800	28,000	8,400	0	2,800	2,800	54,600	79,800	63,000	30,800	0	280,000
Potatoes	8,000	0	31,200	16,000	16,000	16,000	16,000	0	0	0	480,000	240,000	16,000	1,192,000
Sweet potatoes	500	0	19,500	1,000	1,000	1,000	1,000	0	0	0	0	62,500	9,000	95,000
Tomatoes	3,600	0	90,000	108,000	129,600	129,600	54,000	270,000	270,000	270,000	270,000	180,000	64,800	1,836,000
Flue cured tobacco	37,700		188,500	188,500	188,500	188,500	377,000	377,000	565,500	565,500	565,500	565,500	754,000	4,524,000
Burley tobacco	9,500	285,000	190,000	95,000	95,000	47,500	0	76,000	152,000	142,500	142,500	190,000	769,500	2,185,000
Apples 1,000 bu.	8190						13,794	20,691	27,587	41,381	82,762	172,421	324,151	689,684
Grapes tons	3,331										3,553	11,103	29,755	44,410
Total labor hours		285,000	677,400	664,600	526,100	421,300	625,394	1,442,291	1,899,387	1,391,881	1,637,215	1,482,224	2,191,106	13,605,594
No. of workers		487	1,368	7,384	5,846	4,681	6,949	16,025	21,104	15,465	18,191	16,469	24,346	151,173

Notes: 1) Labor hours for apples and grapes derived based on production not acreage because of better available data.
2) Labor estimates for apples and grapes only include harvest labor not establishment labor.
3) Number of workers calculated assuming a 45-hour work week per worker.

APPENDIX 4: COUNTIES by GEOGRAPHIC REGION

Appendix Table 3. Geographic regions.

Eastern Shore	Southside	Shenandoah Valley	Southwest	Central	Eastern
Accomack	Mecklenburg	Clarke	Washington	Albemarle	Northumberland
Northampton	Halifax	Frederick	Scott	Nelson	King and Queen
	Pittsylvania	Shenandoah	Lee	Cumberland	Westmoreland
	Brunswick	Warren	Russell	Amelia	Richmond
	Henry	Page	Wise	Henrico	Loudoun
	Franklin	Rockingham	Carroll	Roanoke	Essex
	Southampton		Grayson		Lancaster
			Wythe		Middlesex
			Giles		Virginia Beach