Estimated Impact on Hawaii's Economy of Replacing Selected Fresh Vegetable and Fruit Imports in 1991

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INTRODUCTION

In Economic Fact Sheet #7 (published in May 1990 but referred to as the "1988 study"), we estimated the *maximum* potential impact on Hawaii's economy if imports of selected fresh fruits and vegetables were to be replaced by Hawaii production in 1988. The objective of this fact sheet is to update the earlier estimates using crop and import data from 1991. Except as noted, this analysis uses the same procedures and data sources as the 1988 study. The list of selected crops is also identical, mostly based on data availability at the time of the earlier analysis.

RESULTS

In 1991, the supply of all fresh vegetables in Hawaii was 229.4 million pounds, of which 67% was imported (Table 1). Total supply increased by 7.8 million pounds compared to 1988, and the ratio of imports to locally-grown vegetables remained about the same. The 202.5 million pounds of vegetables selected for this analysis was 88% of the supply of all fresh vegetables, and had slightly more locally-grown produce. The locally-grown:import ratio for the selected vegetables also remained about the same.

For all fresh fruits and melons, supply increased by 13% to 173.6 million pounds in 1991. The share of locally-grown fruits and melons increased from 41% in 1988 to 48% in 1991. The selected fruits and melons accounted for 24.5% of the supply in 1991, and was 62% locally-grown. However, this was a decrease in both percentage and absolute terms from 1988.

Results varied by the individual selected fresh vegetables and fruits for import replacement (Table 2). Fifteen of the 37 crops listed had decreases in the Hawaii-grown supply of more than 10%, as opposed to nine with increases of more than 10%. The largest absolute decreases

Table 1. Supply of Fresh Fruits and Vegetables by Source

	1988 (1000 lbs)	%	1991 (1000 lbs)	%
Selected vegetables				
Locally grown	68,385	34.3%	70,725	34.9%
Imports	130,902	65.7%	131,739	65.1%
Subtotal	199,287		202,464	
% of all	*89.9%*		*88.3%*	
All vegetables				
Locally grown	72,335	32.6%	76,225	33.2%
Imports	149,251	67.4%	153,130	66.8%
Total	221,586		229,355	
Selected fruits & melons				
Locally grown	33,030	74.0%	26,440	62.0%
Imports	11,586	26.0%	16,183	38.0%
Subtotal	44,616		42,623	
% of all	*29.1%*		*24.5%*	
All fruits & melons				
Locally grown	62,550[a]	40.8%	83,610	48.2%
Imports	90,777	59.2%	90,018	51.8%
Total	153,327		173,628	

[a] Reflects updated figure from earlier publication

Table 2. Estimated Changes in Acreage and Farm Value of Selected Fresh Vegetables and Fruits from Import Replacement, 1991

	Market Supply[1]		Hawaii Share 1991	State Acreage Harvested[2]	Yield per Acre[3]	Farm Price	Estimated Additional Acreage[4]	Estimated Increase in Farm Value[5]
	Inshipments (1000 lb)	Hawaii (1000 lb)	(%)	(acres)	(1000 lb)	(¢/lb)	(acres)	($1000)
Fresh Vegetables								
Bean, snap	417	900	68	160	5.6	94.5	74	394
Bittermelon	19	180	90	15	12.0	94.0	2	18
Broccoli	6,484	320	5	95	4.3	51.0	1,508	3,307
Burdock	46	280	86	15	18.7	159.0	2	73
Cabbage, Chinese	164	6,800	98	460	17.8	23.1	9	38
Cabbage, head	956	14,900	94	620	24.0	19.7	40	188
Cabbage, mustard	164	1,400	90	150	9.3	42.5	18	70
Carrot	11,237	30	N/A	2	15.0	23.0	749	2,585
Cauliflower	2,008	470	19	45	10.4	60.0	193	1,205
Celery	6,103	1,900	24	70	27.1	27.5	225	1,678
Corn, sweet	292	2500	90	465	5.4	42.2	54	123
Cucumber	2,243	3,700	62	250	14.8	46.0	152	1,032
Daikon	22	3,270	99	250	15.2	28.2	1	6
Dasheen	115	100	47	5	20.0	80.0	6	92
Eggplant	449	1,150	72	50	23.0	72.0	20	323
Ginger root	132	12,000	99	250	48.0	63.0	3	83
Lettuce	20,435	3,000	13	240	12.5	43.0	1,635	8,787
Lotus root	32	75	70	10	7.5	120.0	4	38
Onion, dry	17,174	1,300	7	115	11.3	105.0	1,520	18,033
Onion, green	261	1,600	86	210	7.6	97.0	34	253
Parsley, American	110	220	67	20	11.0	94.0	10	103
Pea, Chinese	325	10	3	2	5.0	200.0	65	650
Pepper, green	2,545	1,920	43	170	11.3	63.5	225	1,616
Potato[6]	37,121	N.D.	N/A	N.D.	16.4	27.0	2,263	10,023
Pumpkin	1,155	100	8	8	12.5	22.5	92	260
Radish	17	210	93	20	10.5	50.0	2	9
Romaine	3,702	1,700	31	160	10.6	37.5	349	1,388
Squash, Italian	1,605	710	31	80	8.9	45.5	180	730
Squash, Oriental	59	280	83	15	18.7	33.5	3	20
Sweet potato	1091	1,700	61	140	12.1	35.5	90	387
Taro[7]	757	600	44	600	11.7	43.0	65	326
Tomato	14,497	6,000	29	250	24.0	52.0	604	7,538
Watercress[8]	2	1,400	100	40	35.0	115.0	*	2
Subtotal				4,982			10,198	61,379
Fresh Fruits & Melons								
Avocado	613	840	58	280	3.0	47.0	204	288
Banana	12,678	11,400	47	890	12.8	41.0	990	5,198
Tangerine	702	100	12	20	5.0	40.5	140	284
Watermelon	2,190	14,100	87	580	24.3	14.4	90	315
Subtotal				1,770			1,425	6,086
Total				6,752			11,624	67,465

Source: Statistics of Hawaiian Agriculture 1991, Hawaii Agricultural Statistics Service (HASS).

[1] Fresh market only.
[2] As defined by HASS, one acre harvested and planted repeatedly during the year is counted each time toward the total.
[3] Yield is derived by dividing total Hawaii production by harvested acres.
[4] Estimated additional acreage = inshipments ÷ yield per acre. The implicit assumption is one crop per acre per year. The estimate, therefore, is unadjusted for more than one crop cycle per year.
[5] Estimated increase in farm value = inshipments × farmgate price.
[6] Average of Hawaii's yield from 1973 to 1975, Statistics of Hawaiian Agriculture, 1976. The price is assumed to be 27¢/lb.
[7] Price = farm price of all types of taro. Yield = average yield of all types of taro.
[8] Yield per acre = production ÷ acreage in crop.
Note: N.D. = Not disclosed. N/A = Not available. * = less than one acre.
Totals may not added up due to rounding.

Table 3. Estimated Maximum Impacts on Hawaii's Economy

Fresh Produce	Direct Impact ($1000)	Indirect Impact ($1000)	Direct and Indirect Impact ($1000)	Direct, Indirect, and Induced Impact ($1000)
Estimated Increase in Output (in 1991 dollars)				
Selected vegetables	61,379	14,083	75,462	108,536
Selected fruits and melons	6,086	1,396	7,482	10,762
Total	67,465	15,479	82,944	119,298
Estimated Increase in Income (in 1991 dollars)				
Selected vegetables	19,132	3,249	22,381	33,127
Selected fruits and melons	1,897	322	2,219	3,285
Total	21,029	3,571	24,600	36,412
Estimated Increase in Employment (in 1991)				
Selected vegetables	1,334	148	1,482	1,967
Selected fruits and melons	132	15	147	195
Total	1,466	173	1,629	2,162

were for watermelon, banana, lettuce, tomato and head cabbage, while ginger root, sweet corn, daikon, and green pepper had the largest increases. These changes are reflected in a 492 acre increase in vegetables and a 387 acre decrease in fruits and melons from 1988. Overall, total area harvested for the selected crops increased by 105 acres.

The land area harvested in 1991 was 6,752 acres. An additional 11,624 acres would be needed to grow the selected fruits and vegetables to replace imports in 1991. This is about 520 acres more than was previously estimated for 1988. The most additional acreage is required by potatoes, lettuce, dry onions, and broccoli. The estimated farmgate value of the additional production of fresh fruits and vegetables is $67.5 million (Table 3). With the existing 1991 production, the total farmgate value of the selected crops would be $106.8 million. The additional amount represents about 25% of the $271.3 million farmgate value of Hawaii's diversified agriculture in 1991.

The additional output will also result in more employment and personal household income within diversified agriculture. Income would increase by an estimated $21 million, and there would be 1,466 more jobs in diversified agriculture. These are direct contributions to Hawaii's economy from diversified agriculture.[1]

[1] See EFS #7, "Estimated impact on Hawaii's economy of replacing selected fresh vegetable and fruit imports" for a brief discussion of terms and input-output analysis. EFS #14, "What is Value Added?" discusses some related concepts.

The direct impacts of the additional production will generate economic activity in the off-farm industries linked to agriculture. The combined results of these indirect effects and the direct effects are an increase in output of $82.9 million, an increase in personal household income of $24.6 million, and an increase in employment of 1,629 jobs.

As in the previous 1988 analysis, it is assumed that import replacement does not alter the total market supply of the crops and that the new production will follow the same distribution and marketing channels previously used by imports. There is no increase in demand for the sectors beyond the point where imports are replaced.[2]

More economic activity will be generated as the additional personal income from the direct and indirect impacts are spent in Hawaii. With these induced effects, the combined (direct + indirect + induced) increase in output is estimated at $119.3 million. The combined increase in personal income is $36.4 million, and the combined increase in employment is 2,162 jobs.

SUMMARY AND DISCUSSION

As noted in the previous fact sheet, there are several assumptions behind the analysis. It is assumed that the state has the necessary resources and the infrastructure to handle the additional crop production, and that local produce are acceptable substitutes for imports. However, limited resources and high production costs (including problems associated with pests and diseases, among others), make it unlikely that all imports will be replaced. Further considerations such as the "pocket market"[3] phenomenon, market imperfections, and production and marketing windows also often make it impractical and infeasible for Hawaii growers to provide 100% of the local supply for any fruit or vegetable. Targeting a production level is further complicated by import:locally produced ratios and total supplies that can change considerably over time.

As was the case in 1988, it should be recognized that a few crops account for most of the impacts that are generated. For example, broccoli, dry onions, lettuce, and potatoes account for nearly half of the additional acreage. If oranges were added to the list, another 2,500 acres could be into production. Apples could also add substantial acreage. A change in any of these crops would cause substantial changes in the economic impacts of import substitution.

In sum, the analysis estimates the *maximum* potential economic impacts of import replacement of *selected* vegetables and fruits. Factors such as limited resources, strong overseas competition and the pocket market phenomenon are barriers to achieving the maximum impacts. An assessment of whether particular crops are economically feasible or whether Hawaii has the necessary resources and infrastructure warrants more in-depth analysis.

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[2] See EFS #14 for a discussion of backward and forward linkages.

[3] Referring to the tendency of prices to become and remain severely depressed because of a lack of secondary markets (exports or processing) or other means to dispose of overproduction.

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