

# AGRICULTURE

This section presents statistics on agricultural land, farms, and specific crops, livestock, dairy products, and poultry. Related information appears in Section 6 (on land use), 11 and 15 (agricultural employment and earnings), 17 (energy used on farms), and 22 (food processing).

There were 4,300 farms in Hawaii as of 1976, with a total area of 2,300,000 acres. Both figures have declined during the past decade. The value of crop sales in 1976 was \$260 million, or 64 percent higher than the total for 1966. Livestock sales amounted to \$62 million, or 67 percent more than the 1966 level. Combined crop and livestock sales ranged from \$37 million in Kauai County to \$101 million on the Big Island. Major crops in 1976 were sugar (\$161 million in sales, up 53 percent over the decade), pineapple (\$53 million, or 42 percent over the 1966 total), and vegetables and melons (\$12 million). Diversified agriculture, defined as all crops other than sugar and pineapple, rose from \$16 million in 1966 to \$46 million in 1976, or approximately 183 percent. About 500 farms sold \$12 million of flowers and nursery products in 1976, chiefly anthuriums, and orchids, ornamentals and trees. Important products of livestock farms as of 1976 included cattle (\$19 million in sales), milk (\$22 million), and eggs (\$12 million). Coffee sales have fluctuated sharply during the past decade, but macadamia nuts and horticultural specialties have increased rapidly. In 1976, Hawaii produced 41 percent of the fresh market vegetables consumed locally, 28 percent of the fresh market fruits, none of the rice, butter, and oleomargarine, all of the milk, and 93 percent of the eggs.

Statistics on Hawaiian agriculture exclude *pakalolo* (marijuana) and other illicit plants. Some authorities have speculated that the income from such illegal production may exceed that from more traditional forms of diversified agriculture.

Important sources for data on agriculture include the quinquennial *United States Census of Agriculture*, most recently conducted at the end of 1974, the annual report on *Statistics of Hawaiian Agriculture* issued by the Hawaii Agricultural Reporting Service, and publications of the Hawaii Agricultural Experiment Station, Hawaiian Sugar Planters' Association, and Pineapple Growers Association of Hawaii. National statistics appear in Section 23 of the *Statistical Abstract of the United States: 1976*.

**Table 290.—AGRICULTURAL SUMMARY: 1900 TO 1974**

Year	Number of farms, by size (in acres)				Farm acreage (thousands)				
	All farms	1 to 9	10 to 49	50 to 259	260 and over	Total acreage	In farms of 260 or more acres	Harvested cropland	Irrigated
1900 .....	2,273	1,209	656	230	178	2,610	2,568	(NA)	724.6
1910 .....	4,320	3,787		533		2,591	(NA)	(NA)	(NA)
1920 .....	5,284	2,734	1,959	374	217	2,702	(NA)	(NA)	(NA)
1930 .....	5,955	3,407	2,051	322	175	2,815	2,727	(NA)	(NA)
1940 .....	4,995	2,870	1,691	263	171	2,486	2,411	184.6	132.7
1950 .....	5,750	3,558	1,669	339	184	2,432	2,350	159.5	117.4
1959 .....	6,242	3,569	1,988	432	253	2,461	2,364	176.4	141.2
1964 .....	4,864	2,603	1,594	416	251	2,354	2,266	167.5	143.9
1969 .....	3,896	2,024	1,281	389	202	2,058	1,982	178.7	145.6
1974 .....	3,020	1,633	872	317	198	2,119	2,060	151.4	141.7
Year	Average age of farm operators (years)	Tenant farmers		Regular hired workers <sup>1</sup>	Average value of land and buildings		Market value of agricultural products sold		
		Percent of all operators	Percent of farm acreage		Per farm (\$1,000)	Per acre (dollars)	Total (\$1,000)	Average per farm (\$1,000)	Percent of farms over \$2,500
1900 .....	(NA)	58.2	1.5	(NA)	26.4	23	(NA)	(NA)	(NA)
1910 .....	(NA)	71.9	(NA)	(NA)	19.2	32	(NA)	(NA)	(NA)
1920 .....	(NA)	70.8	(NA)	(NA)	24.4	48	(NA)	(NA)	(NA)
1930 .....	(NA)	72.5	21.7	(NA)	18.8	40	(NA)	(NA)	(NA)
1940 .....	49.9	70.6	4.6	(NA)	22.6	45	(NA)	(NA)	(NA)
1950 .....	47.8	57.5	1.7	21,597	34.0	80	164,554	28.6	(NA)
1959 .....	49.5	38.7	1.6	14,403	(NA)	(NA)	152,334	24.4	(NA)
1964 .....	51.0	41.1	2.6	12,375	98.9	205	187,505	38.5	46.4
1969 .....	53.1	38.1	18.2	13,200	156.8	297	285,619	73.3	55.6
1974 .....	55.4	36.6	18.2	11,497	340.6	485	609,788	201.9	69.3
Year	Livestock and poultry on farms (thousands)				Quantity of crops harvested				
	Cattle and calves	Hogs and pigs	Sheep and lambs	Chickens 3 mo. old and over <sup>2</sup>	Sugar-cane (1,000 tons)	Pineapples (1,000 tons)	Rice (1,000 lb.)	Coffee (1,000 lb. <sup>3</sup> )	Macadamia nuts (1,000 lb. <sup>4</sup> )
1900 .....	103	8	102	32	2,239	(NA)	33,442	(NA)	(NA)
1910 .....	145	20	77	64	4,240	(NA)	41,828	9,834	(NA)
1920 .....	137	24	43	65	4,863	150	29,572	19,884	(NA)
1930 .....	138	31	32	271	7,471	355	7,582	19,950	5
1940 .....	139	32	26	273	8,535	614	1,902	8,547	181
1950 .....	156	65	14	472	7,889	655	658	4,648	704
1959 .....	205	78	12	806	9,391	1,010	287	10,005	2,015
1964 .....	218	68	12	1,045	10,741	924	—	9,679	7,015
1969 .....	233	52	(D)	1,072	11,258	946	—	2,755	10,323
1974 .....	227	51	12	1,305	8,986	693	—	1,819	17,08

Footnotes on next page.

Footnotes to Table 290

D Data withheld to avoid disclosure of information for individual farms.

NA Not available.

<sup>1</sup> Working 150 days or more. Data for 1964, 1969, and 1974 exclude farms with sales less than \$2,500 (which accounted for 152 hired workers in 1964).

<sup>2</sup> Chickens 4 months old and over before 1969.

<sup>3</sup> Parchment.

<sup>4</sup> Husked, unshelled.

Source: U.S. Bureau of the Census, *U.S. Census of Agriculture: 1959*, Vol. I, Part 50; *U.S. Census of Agriculture: 1964*, Vol. I, Part 50; *U.S. Census of Agriculture: 1969*, Vol. I, Part 50; *U.S. Census of Agriculture: 1974*, Vol. I, Part 11.

**Table 291.—AGRICULTURAL SUMMARY, BY COUNTIES: 1974**

County	Number of farms, by size (in acres)					Farm acreage (thousands)			
	All farms	1 to 9	10 to 49	50 to 259	260 and over	Total acreage	Total cropland	Harvested cropland	Irrigated
State total	3,020	1,633	872	317	198	2,119	351.6	151.4	141.7
Hawaii .....	1,641	801	546	182	112	1,315	143.2	56.5	9.7
Honolulu .....	697	513	122	36	26	136	51.2	23.9	34.8
Kauai .....	248	113	81	34	20	270	49.8	24.2	38.3
Maui .....	434	206	123	65	40	398	107.4	46.9	59.0
County	Average size of farm (acres)	Average age of farm operators (years)	Tenant operators: percent of total	Regular hired workers <sup>1</sup>	Average value of land and buildings		Market value of agricultural products sold		
					Per farm (\$1,000)	Per acre (dollars)	Total (\$1,000)	Average per farm (\$1,000)	Percent of farms over \$2,500
State total	702	55.4	36.6	11,497	340.6	485	609,788	201.9	69.3
Hawaii .....	801	55.6	36.4	3,662	330.3	412	214,816	130.9	67.9
Honolulu .....	195	55.4	41.3	2,507	272.4	1,398	135,134	193.9	76.8
Kauai .....	1,089	54.9	38.3	1,980	397.4	365	102,298	412.5	66.1
Maui .....	917	55.2	28.8	3,348	456.3	497	157,539	363.0	64.3
County	Livestock and poultry on farms (thousands)			Market value of machinery and equipment (\$1,000)	Quantity of crops harvested				
	Cattle and calves	Hogs and pigs	Chickens 3 mo. old and over		Coffee, parchment (1,000 lb.)	Macadamia (1,000 lb.)	Papayas (1,000 lb.)	Pineapples (1,000 tons)	Sugarcane (1,000 tons)
State total	227.5	51.0	1,305	97,279	1,819	17,087	37,184	693	8,986
Hawaii .....	137.0	7.7	195	26,675	1,813	16,922	33,579	} 165 }	3,484
Honolulu .....	29.3	32.4	1,014	20,802	} 6 }	(D)	1,594		1,397
Kauai .....	18.4	1.8	} 97 }	15,969		77	1,229		2,036
Maui .....	42.7	9.2		33,833		(D)	782		527

D Data withheld to avoid disclosure information for individual farms.

<sup>1</sup> Working 150 days or more on farms with sales of \$2,500 and over.

Source: U.S. Bureau of the Census, *U.S. Census of Agriculture: 1974*, Vol. 1, Part 11.

**Table 292.—NUMBER OF FARMS, FARM ACREAGE, AND VALUE OF CROP AND LIVESTOCK SALES:  
1966 TO 1976**

Year and county	Number of farms	Area in farms <sup>1</sup> (1,000 acres)	Value of sales (\$1,000)				
			Crops and livestock	Sugar (un-processed cane)	Pineapples (fresh equivalent)	Other crops	Livestock
1966 .....	4,900	2,400	196,107	105,200	37,400	16,105	37,402
1967 .....	4,800	2,360	198,293	106,000	38,500	16,334	37,459
1968 .....	4,700	2,330	203,051	111,200	35,900	18,066	37,885
1969 .....	4,600	2,310	199,101	104,900	35,500	19,214	39,487
1970 .....	4,500	2,300	213,689	110,600	39,500	21,941	41,648
1971 .....	4,400	2,300	221,692	115,800	40,300	22,539	43,053
1972 .....	4,300	2,300	232,497	117,300	43,900	25,055	46,242
1973 .....	4,300	2,300	265,771	141,900	39,600	29,002	55,269
1974 .....	4,300	2,300	575,477	442,300	40,300	34,968	57,909
1975 .....	4,300	2,300	377,552	237,000	41,600	40,688	58,264
1976 .....	4,300	2,300	322,323	161,400	53,000	45,608	62,315
COUNTIES:							
1976							
Hawaii .....	2,550	1,340	101,224	59,500	—	23,424	18,300
Kauai .....	350	282	37,212	33,200	—	2,310	1,702
Maui .....	500	526	86,021	40,600	30,300	7,886	7,235
Honolulu .....	900	152	97,866	28,100	22,700	11,988	35,078

<sup>1</sup> Includes land not in crop and pasture, such as farm house lots, roads, woodlots, etc.  
Source: Hawaii Agricultural Reporting Service, *Statistics of Hawaiian Agriculture* (annual).

**Table 293.—ACREAGE IN CROP AND PASTURE, NUMBER OF CROP FARMS, VOLUME OF CROP MARKETINGS, AND VALUE OF CROP SALES, BY COUNTY: 1966 AND 1976**

Subject	State total		Counties, 1976			
	1966	1976	Hawaii	Kauai	Maui	Honolulu
<b>Acres (1,000 acres):</b>						
Sugarcane .....	237.5	221.6	94.4	46.0	46.9	34.3
Pineapples (land used for pineapple) .....	64.5	48.0	—	—	32.0	16.0
Vegetables and melons .....	3.8	3.6	1.1	0.1	1.1	1.3
Fruits (excluding pineapples) .....	3.1	5.0	3.5	0.3	0.5	0.7
Coffee .....	4.6	2.4	2.4	—	—	—
Macadamia nuts .....	6.7	10.3	10.2	(D)	(D)	(D)
Miscellaneous crops .....	1.0	5.1	1.0	0.5	0.8	2.8
<b>Number of crop farms:</b>						
Sugar .....	788	520	509	5	3	3
Pineapples .....	71	16	—	—	14	2
Vegetables and melons .....	640	527	176	48	81	222
Fruits (excluding pineapples) .....	560	628	394	70	33	131
Coffee .....	840	780	780	—	—	—
Macadamia nuts .....	240	439	434	3	1	1
Taro .....	150	124	43	48	31	2
Flower and nursery .....	520	500	255	20	65	160
<b>Volume of crop marketings:</b>						
Sugar (unprocessed cane; 1,000 tons) .....	10,970	9,172	3,916	1,833	1,990	1,433
Pineapple (fresh equivalent; 1,000 tons) .....	1,006	680	—	—	457	223
Vegetables and melons (1,000 lb.) .....	56,707	63,410	22,520	2,450	23,390	15,020
Fruits (excluding pineapples; 1,000 lb.) .....	36,087	65,670	46,170	3,770	8,670	7,060
Coffee (parchment; 1,000 lb.) .....	8,040	2,020	2,020	—	—	—
Macadamia nuts (in shell; 1,000 lb.) .....	8,726	18,880	18,800	(D)	(D)	(D)
Taro (1,000 lb.) .....	8,990	7,350	1,845	4,420	1,085	
<b>Value of crop sales (\$1,000):</b>						
Sugar (unprocessed cane) .....	105,200	161,400	59,500	33,200	40,600	28,100
Pineapples (fresh equivalent) .....	37,400	53,000	—	—	30,300	22,700
Vegetables and melons .....	6,158	12,217	3,831	608	3,873	3,905
Fruits (excluding pineapples) .....	2,541	7,979	5,678	578	614	1,109
Coffee (parchment) .....	2,058	2,283	2,283	—	—	—
Macadamia nuts (in shell) .....	1,832	6,307	6,279	(D)	(D)	(D)
Taro .....	561	889	264	491	134	
Field crops (not estimated separately) .....	141	3,975	66	505	1,910	1,494
Horticultural specialties .....	2,700	11,828	4,919	93	1,345	5,471
Forest products .....	114	150	104	7	10	9

D Withheld to avoid disclosure of individual operations.

Source: Hawaii Agricultural Reporting Service, *Statistics of Hawaiian Agriculture* (annual).

**Table 294.—VEGETABLES, MELONS, FRUITS, COFFEE, NUTS, AND TARO: 1976**

Crop <sup>1</sup>	Acreage harvested <sup>2</sup>	Yield per acre (1,000 lb.)	Production (1,000 lb.)	Farm price (cents per lb.)	Value of sales (\$1,000)
<b>Vegetables and melons:</b>					
Snap beans .....	130	8.5	1,100	45.5	501
Chinese cabbage .....	260	24.9	6,465	10.8	698
Head cabbage .....	410	30.0	12,300	9.9	1,218
Celery .....	49	43.3	2,120	16.4	348
Cucumbers .....	260	18.5	4,800	17.8	854
Daikon .....	145	22.1	3,200	10.9	349
Eggplant .....	35	32.0	1,120	29.8	334
Ginger root .....	18	36.1	650	61.8	402
Lettuce (head, semi-head) .....	520	16.5	8,600	19.1	1,643
Dry onions .....	215	13.4	2,875	24.9	716
Green onions .....	90	10.4	940	50.1	471
Tomatoes .....	200	23.5	4,700	26.4	1,241
Watercress .....	36	48.8	1,755	23.9	420
<b>Fruits:</b>					
Bananas .....	550	9.1	5,030	15.5	780
Papayas <sup>3</sup> .....	1,930	25.9	50,037	( <sup>4</sup> )	6,134
Coffee .....	2.0	1.0	2,020	113.0	2,283
Macadamia nuts .....	6,300	3.0	18,880	33.4	6,307
Taro .....	460	...	7,350	12.1	889

<sup>1</sup> Data shown for crops with sales in excess of \$300,000.

<sup>2</sup> Acreage bearing for macadamia nuts; acreage in crop for taro.

<sup>3</sup> Fresh weight basis.

<sup>4</sup> Fresh market, 13.5; processed, 3.8.

Source: Hawaii Agricultural Reporting Service, *Statistics of Hawaiian Agriculture, 1976*.

**Table 295.—NUMBER OF LIVESTOCK FARMS, VOLUME OF LIVESTOCK MARKETINGS,  
AND VALUE OF LIVESTOCK SALES, BY COUNTY: 1966 AND 1976**

Subject	State total		Counties, 1976			
	1966	1976	Hawaii	Kauai	Maui	Honolulu
<b>Number of livestock farms:</b>						
Cattle (incl. beef and dairy) .....	1,400	900	380	150	250	120
Hogs .....	890	640	90	80	130	340
Milk .....	190	80	30	5	20	25
Eggs .....	530	70	28	7	9	26
Broilers .....	36	11	—	2	—	9
Honey .....	38	22	3	4	4	11
<b>Volume of livestock marketings:</b>						
Beef (1,000 lb. dressed weight) .....	29,228	32,320	20,600	2,278	7,675	1,767
Pork (1,000 lb. dressed weight) .....	8,874	7,772	1,158	338	1,826	4,450
Milk (million lb.) .....	148.6	145.8	(D)	(D)	(D)	120.1
Eggs (million) .....	187	218	21.2	15.6		181.2
Broilers and chickens (1,000 lb. <sup>1</sup> ) .....	4,958	6,121	(D)	(D)	(D)	5,667
Honey (1,000 lb.) .....	348	714	(D)	(D)	(D)	(D)
<b>Value of livestock sales (\$1,000):</b>						
Cattle <sup>2</sup> .....	10,861	18,511	11,599	1,372	4,592	948
Hogs <sup>2</sup> .....	3,976	6,663	957	308	1,630	3,768
Milk .....	12,338	21,943	(D)	(D)	(D)	18,075
Eggs .....	8,088	11,808	1,328	959		9,521
Broilers and chickens .....	2,011	2,977	(D)	(D)	(D)	2,745
Others .....	128	413	316	22	54	21

D Withheld to avoid disclosure of individual operations.

<sup>1</sup> Ready-to-cook weight.

<sup>2</sup> Excludes interfarm sales.

Source: Hawaii Agricultural Reporting Service, *Statistics of Hawaiian Agriculture* (annual).

**Table 296.—FLOWERS AND NURSERY PRODUCTS, BY ISLAND: 1976**

Island and year	Number of farms	Area					Wholesale value (\$1,000)	Out-of-State shipments (\$1,000)
		Total (acres)	Greenhouse (1,000 sq. ft.)	Artificial shade structure (1,000 sq. ft.)	Natural shade area (acres)	Open field (acres)		
<b>State total:</b>								
1974 .....	465	877	577	8,074	131	547	8,211	4,359
1975 .....	502	1,005	682	8,280	156	643	9,767	5,392
1976 .....	500	1,137	830	10,155	172	713	11,828	6,730
<b>Islands, 1976:</b>								
Hawaii .....	255	668	520	7,450	135	350	4,919	(NA)
Kauai .....	20	12	15	60	2	8	93	(NA)
Maui .....	65	94	90	95	10	80	1,345	(NA)
Oahu .....	160	363	205	2,550	25	275	5,471	(NA)

NA Not available.

Source: Hawaii Agricultural Reporting Service, *Hawaii Flowers and Nursery Products, Annual Summary* (June 3, 1977).



**Table 297.—FLOWERS AND NURSERY PRODUCTS, BY KIND OF FLOWER: 1976**

Kind of flower	Number of farms	Number of flowers sold		Wholesale value (\$1,000)
		Unit	Number	
<b>Cut flowers:</b>				
Anthuriums .....	140	1,000 dozens	1,425	2,500
Birds of paradise .....	25	Do.	25	32
Carnations .....	4	Do.	30	43
Chrysanthemums, pompon .....	13	1,000 bunches	395	235
Chrysanthemums, other .....	5	1,000 dozens	15	45
Gingers .....	19	Do.	(NA)	75
Proteas, sunburst cordifolium .....	6	1,000 stems	53	35
Proteas, other .....	6	Do.	10	7
Roses .....	3	1,000 dozens	350	495
Others .....	26	Do.	(NA)	177
<b>Cut orchids:</b>				
Cattleyas .....	22	1,000 flowers	74	55
Cymbidiums .....	16	Do.	485	136
Dendrobiums, sprays .....	30	1,000 dozens	50	195
Others .....	35	1,000 flowers	(NA)	47
<b>Lei flowers:</b>				
Carnations .....	16	Million flowers	31.9	748
Vanda Miss Joaquin .....	22	Do.	39.0	475
Plumerias .....	12	Do.	45.8	360
Tuberoses .....	4	Do.	12.5	223
Pikake .....	8	1,000 strands	110	107
<b>Cut foliage:</b>				
Ti leaves .....	28	Million leaves	10.3	212
Other greens .....	21	Do.	18.1	136
<b>Potted plants:</b>				
Chrysanthemums .....	12	1,000 pots	145	368
Orchids .....	54	Do.	204	530
Potted foliage .....	31	Do.	(NA)	1,550
Other potted plants .....	50	Do.	(NA)	627
Ornamentals and trees .....	85	Do.	(NA)	1,544
Other nursery products .....	20	...	(NA)	871

NA Not available.

Source: Hawaii Agricultural Reporting Service, *Hawaii flowers and Nursery Products, Annual Summary* (June 3, 1977).

**Table 298.—MARKET SUPPLY OF SPECIFIED FOODS: 1966 TO 1976**

Commodity and year	Total market supply <sup>1</sup>			Per capita market supply <sup>2</sup>	Percent from Hawaii
	Total	Inshipments	Hawaii		
Fresh market vegetables:					
1966 .....	99,569	51,422	48,147	137.4	48.4
1975 .....	132,641	73,803	58,838	142.9	44.4
1976 .....	144,918	85,173	59,745	151.6	41.2
Fresh market melons:					
1966 .....	7,527	3,102	4,425	10.4	58.8
1975 .....	9,025	6,615	2,410	9.7	26.7
1976 .....	10,751	9,221	1,530	11.2	14.2
Fresh market fruits:					
1966 .....	46,564	24,887	21,677	64.3	46.6
1975 .....	63,518	43,251	20,267	68.4	31.9
1976 .....	69,533	49,779	19,754	72.7	28.4
Eggs:					
1966 .....	16,422	839	15,583	22.7	94.9
1975 .....	18,897	1,497	17,400	20.4	92.1
1976 .....	19,596	1,396	18,200	20.5	92.9

<sup>1</sup> Eggs in 1,000 dozens; other commodities in 1,000 pounds.

<sup>2</sup> Eggs in dozens; other commodities in pounds. Based on estimated de facto population (see table 3).

Source: Hawaii Agricultural Reporting Service, *Statistics of Hawaiian Agriculture* (annual).

**Table 299.—LAND USE PRODUCTIVITY RATINGS FOR MAJOR ISLANDS: 1968**

Island and land use	Agricultural productivity rating (acres)					
	Total <sup>1</sup>	A (very good)	B (good)	C (moderate)	D (poor)	E (very poor)
Six islands .....	4,050,176	68,037	128,833	312,558	783,817	2,668,515
Island:						
Kauai .....	354,112	10,038	30,276	28,458	30,525	249,276
Oahu .....	388,928	24,584	32,286	21,986	19,728	228,218
Molokai .....	167,104	702	—	4,519	40,405	120,309
Lanai .....	89,280	—	—	4,849	20,219	63,777
Maui .....	466,432	32,713	20,067	38,467	99,806	268,726
Hawaii .....	2,584,320	—	46,204	214,279	573,134	1,738,209
Land use:						
Pineapple .....	69,276	—	16,204	22,131	29,038	1,903
Sugarcane .....	262,377	65,776	71,354	82,760	40,230	2,257
Diversified agriculture .....	33,569	2,261	6,497	14,218	6,205	4,388
Grassland grazing .....	492,905	—	22,905	116,641	175,186	178,173
Wooded grazing .....	657,629	—	4,313	37,776	175,767	439,773
Idle agricultural land .....	13,585	—	994	3,139	4,545	4,907
Forest .....	289,039	—	1,729	7,864	58,877	220,569
Forest reserve .....	1,190,954	—	1,603	14,596	237,389	937,366
Recreation .....	17,248	—	798	657	4,630	11,163
Game management .....	87,585	—	—	2,302	17,565	67,718
National park .....	229,423	—	—	5,191	26,554	197,678
Military .....	38,048	—	1,637	3,280	3,624	29,507
Undeveloped subdivision .....	76,814	—	799	2,003	4,198	69,814
Pali and barren land .....	503,308	—	—	—	9	503,299
Quarry .....	1,462					
Water .....	8,063					
Urban: military .....	17,658					
Urban: civilian .....	61,233					

<sup>1</sup> Includes quarry, water, and urban, which were not rated for productivity.

Source: Arthur Y. Ching, and Tamotsu Sahara, *Land Use and Productivity Rating, State of Hawaii, 1968*, L.S.B. Circular No. 15 (University of Hawaii, Land Study Bureau, July 1969), pp. 20-21.