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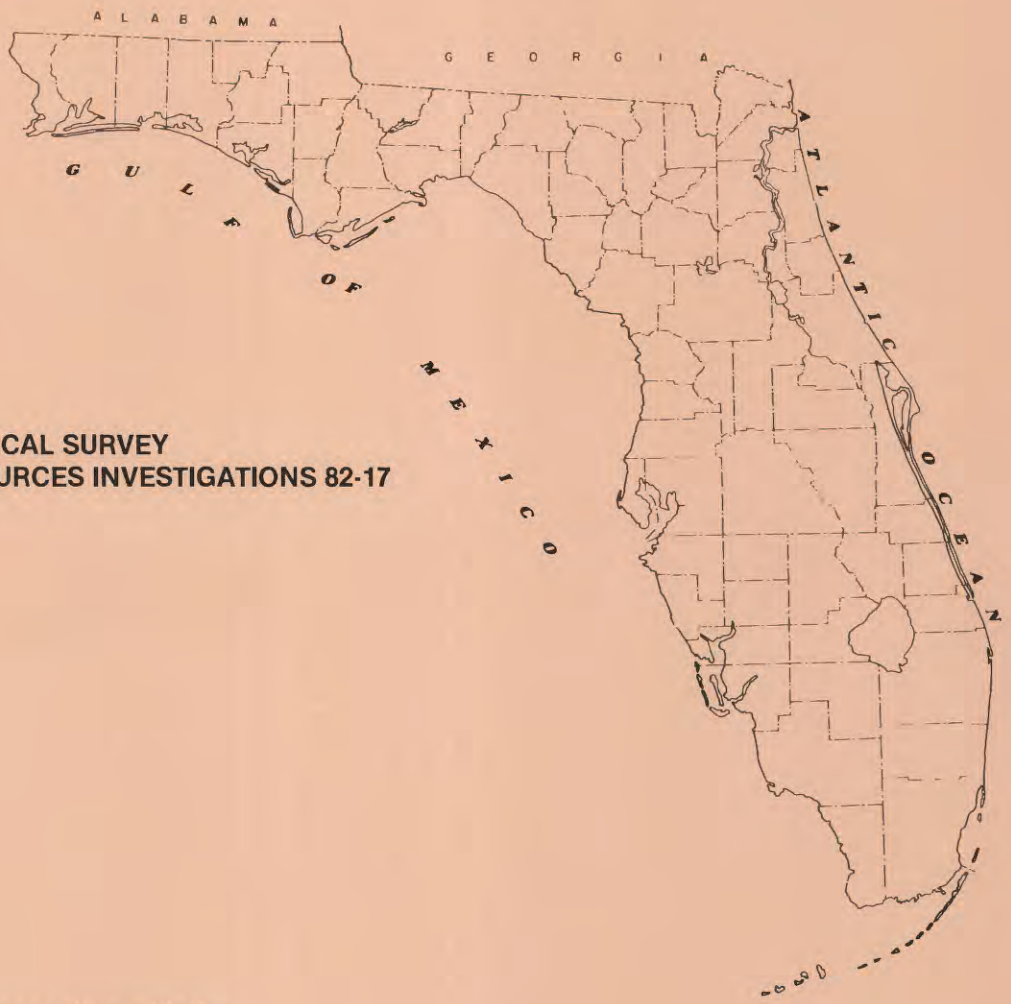
THE BENCHMARK FARM PROGRAM—A METHOD FOR ESTIMATING IRRIGATION WATER USE IN SOUTHWEST FLORIDA



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Crop types include citrus, cucumbers, pasture, peanuts, sod, strawberries, tomatoes, and watermelons. Water used for irrigation by golf courses, nurseries, and tropical fish farms are also included. Water-application rates per growing season ranged from no irrigation on several citrus and pasture sites to 239.7 inches per acre for a nursery site. The report also includes rainfall data for 12 stations throughout the study area.

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Tallahassee, Florida

1982

UNITED STATES DEPARTMENT OF THE INTERIOR

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GEOLOGICAL SURVEY

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ABBREVIATIONS AND CONVERSION FACTORS

Factors for converting inch-pound units to International System (SI) units and abbreviation of units

Multiply	By	To obtain
inch (in)	25.4	millimeter (mm)
acre	0.004047	square kilometer (km^2)
inch per acre (in/acre)	62.76	millimeter per hectare (mm/ha)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
square mile (mi^2)	2.590	square kilometer (km^2)
gallon (gal)	3.785	liter (L)
gallon per minute (gal/min)	0.6309	liter per second (L/s)
gallon per hour (gal/h)	3.7854	liter per second (L/s)

THE BENCHMARK FARM PROGRAM--A METHOD FOR ESTIMATING IRRIGATION WATER USE IN SOUTHWEST FLORIDA

By A. D. Duerr and J. T. Trommer

ABSTRACT

The benchmark farm program is a method of selected sampling of irrigation water-use data to provide a base for estimating water use in an area. Irrigation water-use data are summarized in this report for 74 farms in southwest Florida. Most data are for 1978-80, but 18 farms have data from the early 1970's. Data include site number and location, season and year, crop type, irrigated acres, irrigation system, monitoring method, and inches of water applied per acre.

Crop types include citrus, cucumbers, pasture, peanuts, sod, strawberries, tomatoes, and watermelons. Water used for irrigation by golf courses, nurseries, and tropical fish farms are also included. Water-application rates per growing season ranged from no irrigation on several citrus and pasture sites to 239.7 inches per acre for a nursery site. The report also includes rainfall data for 12 stations throughout the study area.

INTRODUCTION

Southwest Florida has undergone rapid population growth during the last decade. This growth has increased competition among users of water for all purposes. The 1970 and 1975 water-use inventories (Pride, 1973; Leach, 1978) indicated a need for annual updates of water-use data. The need is particularly important in areas of rapidly increasing population where industries have been established or expanded, where agricultural irrigation has expanded, and where thermoelectric power generation has increased. Water-use data are used in quantitative water-resources investigations, such as predicting water-level declines, saltwater encroachment, and in determining future demands for water.

In 1976, the Southwest Florida Water Management District entered into a cooperative agreement with the U.S. Geological Survey to collect water-use data annually within the water management district. Water-use data for 1977 are included in a statewide report by Leach and Healy (1980) and data for 1978 and 1979 are currently (1981) being compiled for release. Reports by Duerr and Trommer (1981a; 1981b) present 1979 and 1980 water-use data for southwest Florida.

Irrigation water-use data are included in each of the above reports. The irrigation water-use category includes water that is derived from ground-water and surface-water sources. It does not include water supplied by a public-supply system. Irrigation water-use data are not easily obtained and are the

least accurate of all water-use categories. One reason for this is that water withdrawn for irrigation is not required to be metered or reported to the Southwest Florida Water Management District, whereas industrial and public-supply water withdrawals must be reported. Estimates of use are difficult to make because of variability in use seasonally and areally depending on weather and soil conditions.

In 1978, the benchmark farm program evolved from the water-use project and previous studies as a method for collecting more accurate irrigation water-use data. The benchmark farms are representative farms growing various crops that are closely monitored to help establish monthly water-application rates. These application rates are applied to the total crop acreage in the water management district to calculate total irrigation water use. Tropical fish ponds and golf courses are classified as crops in this report.

The benchmark farms include 18 citrus groves that were inventoried in 1970 as part of an earlier cooperative project between the U.S. Geological Survey and the Southwest Florida Water Management District. Two reports (Robertson and Mills, 1974; Robertson and others, 1978) on ground-water withdrawals in the upper Peace River and upper Alafia River basins resulted from that earlier study. The groves were reinventoried in 1978 and added to the current network of benchmark farms.

The purpose of this report is to present irrigation water-use data for selected farms and to show how these data are used to estimate total water use for irrigating various crops in southwest Florida. The study area includes all of the Southwest Florida Water Management District and is about 10,000 mi^2 in size (fig. 1). The initial emphasis on benchmark farm locations was in Hillsborough, Manatee, and Polk Counties. As the program continues, new farms are being added in surrounding counties (fig. 2).

Water-use data presented are shown as inches of water applied per acre per month. There is considerable variability in application rates. All farms withdraw ground water from highly productive limestone aquifers except farms at sites 58 and 77, which withdraw ground water from shallow sand aquifers, and farms at sites 54 and 75, which withdraw surface water (fig. 2). Rainfall data for 12 stations were collected to help interpret variability in water application throughout the study area.

CRITERIA FOR SELECTING A BENCHMARK FARM

Current efforts in developing a network of benchmark farms are directed toward monitoring a variety of crops. Broad areal coverage is also desirable. To meet these needs several farms may be selected for possible inclusion in the benchmark farm program.

When permission of an owner (irrigator) is obtained for use of his well in the benchmark farm program, several criteria must be met before the farm can be selected for inclusion in the study. First, the farm has to be representative of other farms in the study area so that the water-use data will have transfer value. Factors such as crop type, soil type, topography, and type of irrigation system must be similar to those used at other farms. Irrigation pumpage

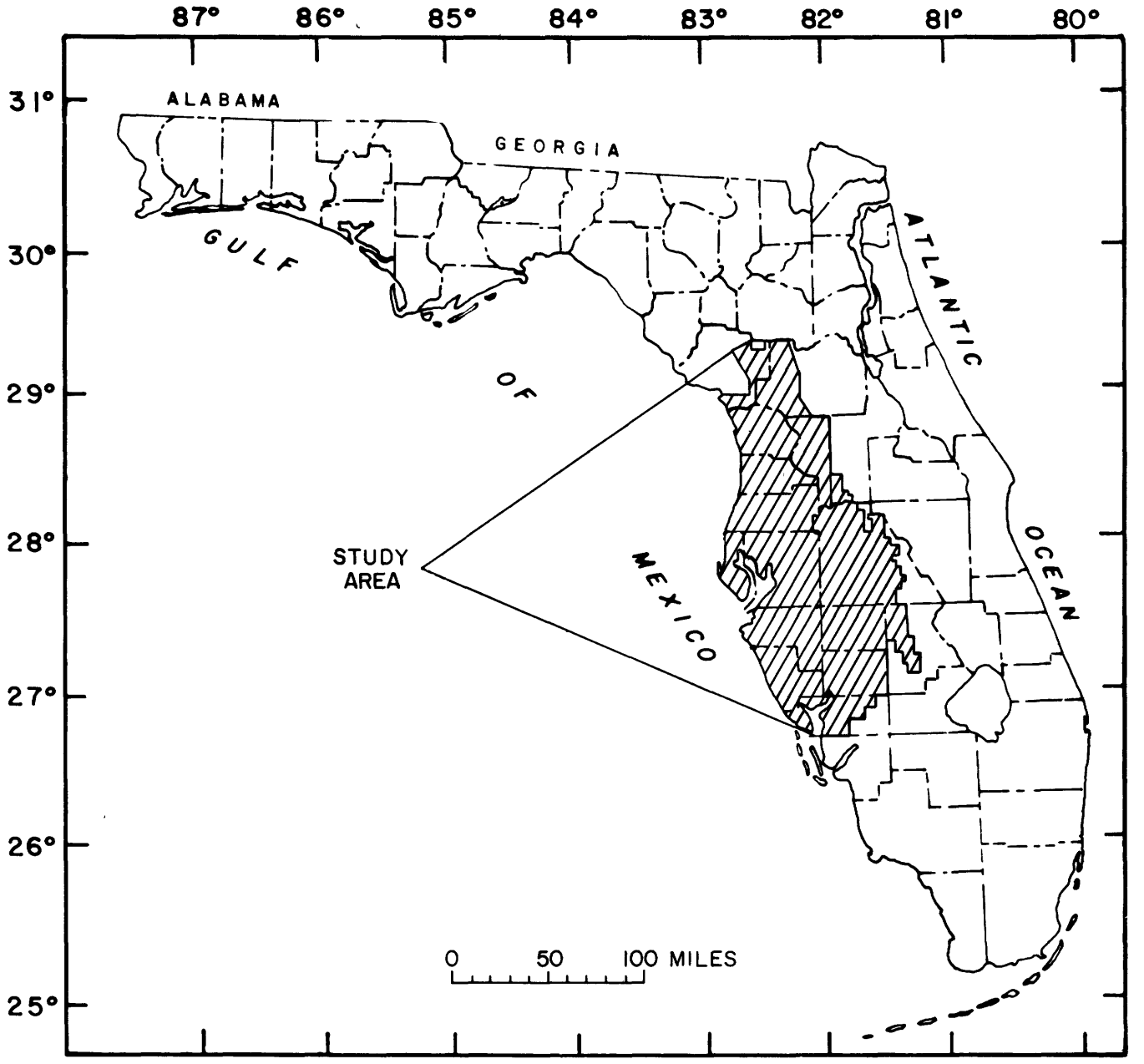


Figure 1.--Location of study area.

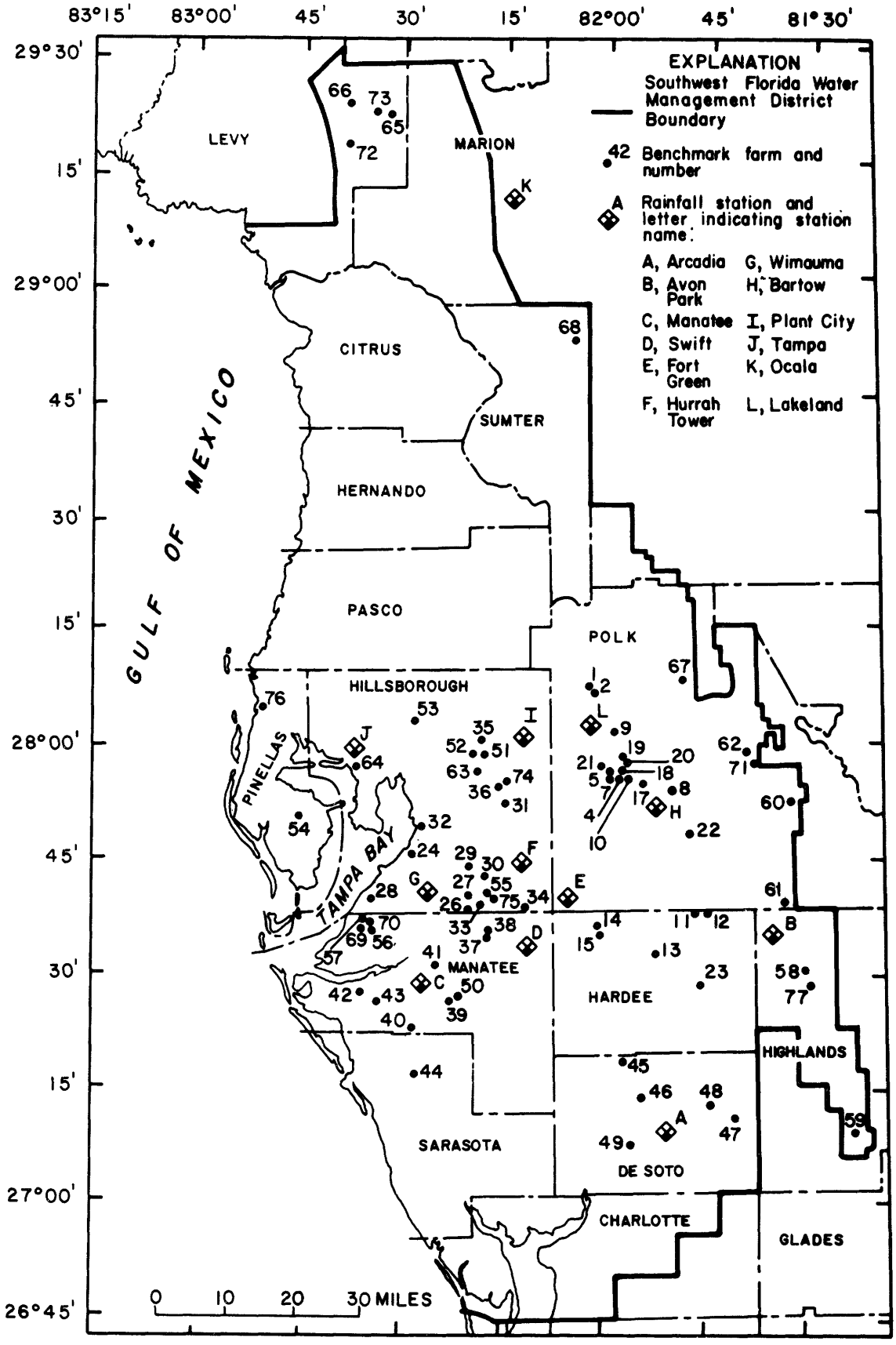


Figure 2.--Location of benchmark farms and rainfall stations.

must be measurable. Pump discharge must be nonturbulent in order to obtain accurate discharge measurements using a sonic flow meter. Sections of discharge pipe that are level, above ground, and free from elbows, flanges, and tees are best for maintaining nonturbulent flow.

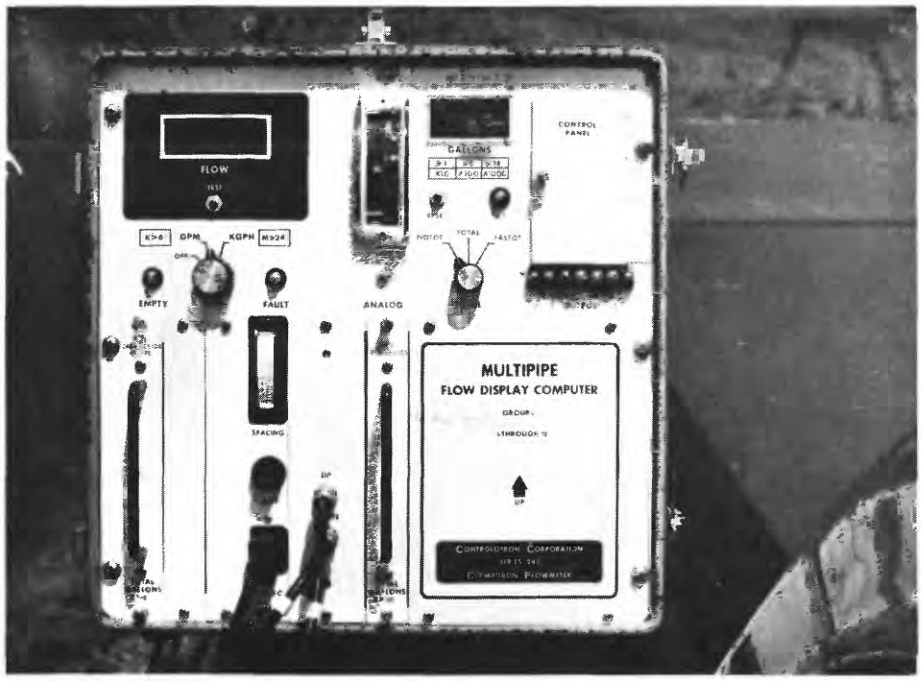
The study identifies water use by specific crops. Hence, the irrigation source (ground or surface water) must irrigate one crop exclusively unless a method exists for distinguishing the amount of water applied to different crops from the same source. If a pump is electrically powered, meter readings are used to estimate irrigation pumpage. The meter must register only power consumed by the pump.

ESTABLISHING A BENCHMARK FARM

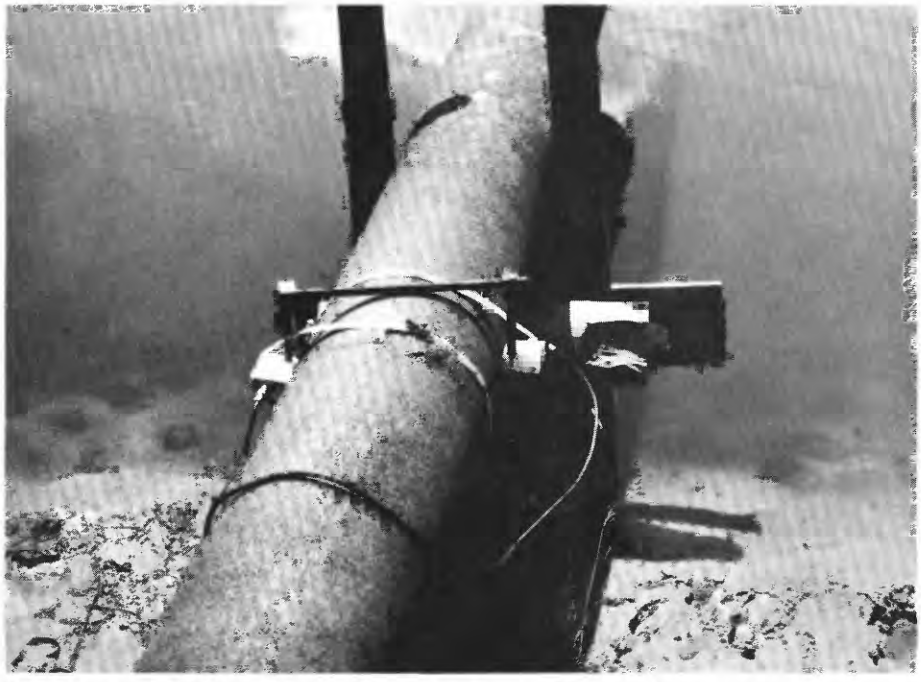
After a farm is selected for monitoring, it is assigned a site number, and data about the farm, crop, water source, and pump are collected and stored in computer files. Farm data include location and description. Crop data include type, growing season, number of irrigated acres, and type of irrigation system. Well data include location, depth, casing, and diameter.

Pump data include make, horsepower, power source, and pumping (discharge) rate. The pumping rate, in gallons per minute or gallons per hour, is determined by either the trajectory method (Anderson, 1973, p. 156), a saddle (in-line) flow meter, or a sonic flow meter. The trajectory method estimates the pumping rate by measuring the vertical and horizontal distance of flow from an open discharge pipe. It is the least accurate of the three methods. Several saddle flow meters have been supplied and installed by the Southwest Florida Water Management District and directly record total gallons pumped. However, the relative expense and difficulties in installation of these meters have limited their use to existing installations. Pumping rates determined by a sonic flow meter enable accurate discharge measurements without cutting or drilling a hole in the discharge pipe. The sonic flow meter and sonic flowmeter transducers attached to pump discharge pipe are shown in figure 3.

After a pump is rated, the time of operation or amount of electrical power used must be determined to compute water usage. For electric pumps, field measurements are made to determine the amount of water that is pumped per kilowatt hour of electrical energy used. Subsequent data on energy usage, based on meter readings, are then applied to compute the amount of water used. If the pump is powered by a diesel engine, a vibration-time totalizer (VTT) is installed on the pump. The VTT is activated by pump vibration and records pumping time in hours. For sites monitored by saddle flow meters, discharge is measured directly from meter readings. Saddle flow meter, electric meter, and vibration-time totalizer used for recording pumpages are shown in figure 4. Some pumps that are powered by diesel engines are equipped with built-in clocks that record engine running time. The clocks are read periodically and used as back-up for the other methods of measurement, particularly the VTT's, which sometimes fail because of moisture penetration.



A. Sonic flow meter.



B. Sonic flow-meter transducers attached.

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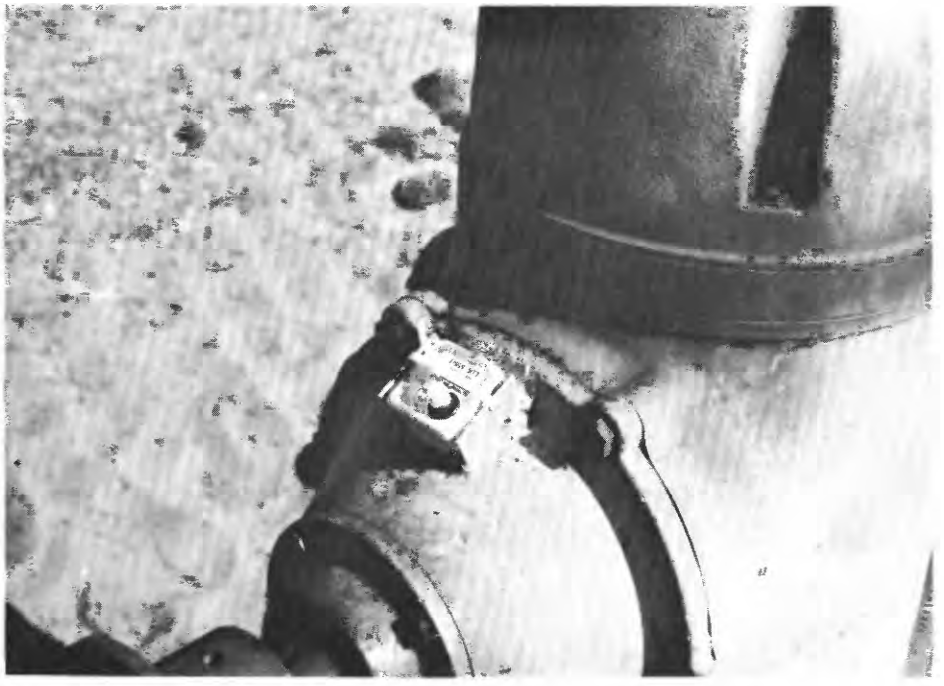
Figure 3.--Sonic flow meter used for measuring pump discharge.

A. Saddle flow meter.

B. Electric meter.



C. Vibration-time totalizer.

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Figure 4.--Saddle flow meter, electric meter and vibration-time totalizer used for recording pumpage.

DATA COLLECTION AND CALCULATION

Data are collected monthly from the benchmark farms. Vibration-time totalizers and electric meters are read to determine pumping time or electrical power usage. Pumping time is multiplied by the pumping rate to determine the volume of water pumped per month. Similarily, power usage is converted to volume of water pumped. Readings from saddle flow meters provide pumpage volumes directly. The volume pumped per month at each farm is divided by the number of acres irrigated to obtain the amount of water applied in inches per acre.

IRRIGATION SYSTEMS

Irrigation systems used at the benchmark farms represent the common types found in southwest Florida. Photographs of some of the systems are shown in figures 5-7. Definitions of the systems as used in this report are listed below:

Seepage: Water is conveyed from the source and distributed to the crop through open ditches (also called flood or open-ditch irrigation, fig. 5a).

Semiclosed: Water is conveyed from the source through closed pipe and distributed to the crop through open ditches between crop rows (fig. 5b).

Closed pipe: Water is conveyed from the source and distributed to the crop through closed pipe (fig. 5c). This system is used almost exclusively for fish farms.

Drip: Water is conveyed from the source through closed pipe and distributed to the crop by dripping at land surface near each plant through special emitters set in small diameter plastic pipe or tubing (fig. 6a).

Jet: Water is conveyed from the source through closed pipe and distributed to the crop at land surface near each plant through small spray emitters (jets) set in small diameter plastic pipe or tubing (fig. 6b).

Overhead: Water is conveyed from the source through closed pipe and distributed to the crop through nozzles 15 to 20 feet above land surface (fig. 6c).

Sprinkler: Water is conveyed from the source through closed pipe and distributed to the crop through nozzles 1 to 2 feet above land surface (fig. 7a).

Volume gun: Water is conveyed from the source through closed pipe or hose and distributed to the crop through a large rotating nozzle (fig. 7b).

Subirrigation: Water is conveyed from the source through closed pipe and distributed to the crop through underground tile.

Travel gun: A volume gun that travels the length of the crop row while irrigating.

A. Seepage.

B. Semiclosed.

C. Closed pipe.

Figure 5.--Seepage, semiclosed, and closed-pipe irrigation systems.

A. Drip.

B. Jet.

C. Overhead

Figure 6.--Drip, jet, and overhead irrigation systems.

A. Sprinkler.

B. Volume gun.

Figure 7.--Sprinkler and volume-gun irrigation systems.

DATA PRESENTED

Table 1 presents records of 74 benchmark farms in southwest Florida. Data include site number, county, township and range, year, season, crop, acres, irrigation system, monitoring method, and inches of water applied per acre per season. Most data are for 1978-80, but data for 18 citrus sites go back to the early 1970's. Sites are listed numerically and generally follow the order of their inclusion into the benchmark farm program. Data are presented for 36 citrus groves, 1 cucumber farm, 4 golf courses, 3 nurseries, 6 pastures, 1 peanut farm, 3 sod farms, 8 strawberry farms, 9 tomato farms, 2 tropical fish farms, and 2 watermelon farms (site 51 grows both strawberries and tomatoes). Although water-application rates shown in table 1 are annual or season totals, most data were collected monthly as reported in table 2. The monthly data are segregated by crop and irrigation system. Monthly subtotals are not shown where data were collected bimonthly, quarterly, or seasonally. Rounding procedures caused slight differences in the inches per acre totals between tables 1 and 2. Although data in the tables are reported to the nearest 0.01 in/acre, most data are probably accurate only within 10 percent.

Table 3 shows water-use data for 1980 as segregated by crop. Each crop is grouped by irrigation system, and low, mean, and high application rates are listed. Mean rates are calculated by summing the rates for each site and dividing by the number of sites. Weighted means based on farm acreage were not used. Composite mean rates are presented for crops that have more than one type of irrigation system. More details on individual crops are presented in the next section.

Figures 8-10 present rainfall at 12 stations. Data include station name, year, month, and inches of rainfall. Station locations are shown in figure 2. Figures 11-13 present rainfall at selected stations and water applied (pumpage) at nearby benchmark farm sites. Generally, pumpage varies inversely with rainfall. For example, monthly comparisons of rainfall with citrus irrigation records in figure 13 show that pumpage for citrus irrigation is less during months when rainfall is greater.

WATER-APPLICATION RATES BY USE IN 1980

Water-application rates for each crop monitored in 1980 are discussed in this section. During the spring season, mean water-application rates ranged from 3.8 in/acre for cucumbers irrigated by a sprinkler system to 51.0 in/acre for tomatoes irrigated by semiclosed systems (table 3). During the fall season, mean water-application rates ranged from 3.8 in/acre for watermelons irrigated by a sprinkler system to 57.0 in/acre for tomatoes irrigated by semiclosed systems. Of the annual crops, peanuts irrigated with a volume gun system used the least water, averaging 3.1 in/acre. Nurseries with sprinkler systems had the highest average water usage, 172.2 in/acre.

TABLE 1.--RECORDS OF BENCHMARK FARMS.

SEASON : ANNUAL,JANUARY THROUGH DECEMBER; SPRING,JANUARY THROUGH JUNE; FALL,JULY THROUGH DECEMBER.
STRAWBERRIES : EACH CROP IS PLANTED IN THE FALL AND HARVESTED IN THE SPRING.
MONITORING METHOD : KWH,KILOWATT HOURS; CLOCK,ELECTROCHEMICAL TIMER; METER,IN-LINE SADDLE FLOW METER.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
1	POLK	27S-23E	70	ANNUAL	CITRUS	75	OVERHEAD	KWH	14.68
			71	ANNUAL	CITRUS	75	OVERHEAD	KWH	14.30
			72	ANNUAL	CITRUS	100	OVERHEAD	KWH	16.25
			73	ANNUAL	CITRUS	100	OVERHEAD	KWH	8.68
			74	ANNUAL	CITRUS	100	OVERHEAD	KWH	13.84
			75	ANNUAL	CITRUS	95	OVERHEAD	KWH	9.74
			76	ANNUAL	CITRUS	95	OVERHEAD	KWH	10.88
			77	ANNUAL	CITRUS	95	OVERHEAD	KWH	8.64
			78	ANNUAL	CITRUS	95	OVERHEAD	KWH	14.17
			79	ANNUAL	CITRUS	95	OVERHEAD	KWH	6.55
			80	ANNUAL	CITRUS	95	OVERHEAD	KWH	3.71
2	POLK	27S-23E	70	ANNUAL	CITRUS	350	OVERHEAD	KWH	15.20
			71	ANNUAL	CITRUS	350	OVERHEAD	KWH	13.93
			72	ANNUAL	CITRUS	400	OVERHEAD	KWH	14.29
			73	ANNUAL	CITRUS	400	OVERHEAD	KWH	8.66
			74	ANNUAL	CITRUS	400	OVERHEAD	KWH	10.65
			75	ANNUAL	CITRUS	400	OVERHEAD	KWH	9.72
			76	ANNUAL	CITRUS	400	OVERHEAD	KWH	16.28
			77	ANNUAL	CITRUS	851	OVERHEAD	KWH	6.21
			78	ANNUAL	CITRUS	851	OVERHEAD	KWH	7.29
			79	ANNUAL	CITRUS	851	OVERHEAD	KWH	4.00
			80	ANNUAL	CITRUS	851	OVERHEAD	KWH	2.10
4	POLK	29S-24E	70	ANNUAL	CITRUS	10	OVERHEAD	KWH	19.65
			71	ANNUAL	CITRUS	10	OVERHEAD	KWH	16.64
			72	ANNUAL	CITRUS	30	OVERHEAD	KWH	17.74
			73	ANNUAL	CITRUS	30	OVERHEAD	KWH	19.49
			74	ANNUAL	CITRUS	30	OVERHEAD	KWH	39.02
			75	ANNUAL	CITRUS	130	OVERHEAD	KWH	3.92
			76	ANNUAL	CITRUS	130	OVERHEAD	KWH	3.81
			77	ANNUAL	CITRUS	130	OVERHEAD	KWH	4.71
			78	ANNUAL	CITRUS	130	OVERHEAD	KWH	4.56
			79	ANNUAL	CITRUS	130	OVERHEAD	KWH	2.40
			80	ANNUAL	CITRUS	130	OVERHEAD	KWH	2.44
5	POLK	29S-24E	70	ANNUAL	CITRUS	20	OVERHEAD	KWH	12.52
			71	ANNUAL	CITRUS	20	OVERHEAD	KWH	17.21
			72	ANNUAL	CITRUS	20	OVERHEAD	KWH	41.25
			73	ANNUAL	CITRUS	20	OVERHEAD	KWH	8.95
			74	ANNUAL	CITRUS	20	OVERHEAD	KWH	24.41
			75	ANNUAL	CITRUS	20	OVERHEAD	KWH	19.87
			76	ANNUAL	CITRUS	20	OVERHEAD	KWH	15.46
			77	ANNUAL	CITRUS	30	OVERHEAD	KWH	7.18
			78	ANNUAL	CITRUS	30	OVERHEAD	KWH	12.06

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
			79	ANNUAL	CITRUS	10	OVERHEAD	KWH	16.40
			80	ANNUAL	CITRUS	10	OVERHEAD	KWH	10.14
6	POLK	29S-24E	70	ANNUAL	CITRUS	50	OVERHEAD	KWH	11.95
			71	ANNUAL	CITRUS	50	OVERHEAD	KWH	15.77
			72	ANNUAL	CITRUS	50	OVERHEAD	KWH	11.96
			73	ANNUAL	CITRUS	50	OVERHEAD	KWH	24.00
			74	ANNUAL	CITRUS	50	OVERHEAD	KWH	24.82
			75	ANNUAL	CITRUS	50	OVERHEAD	KWH	11.59
			76	ANNUAL	CITRUS	50	OVERHEAD	KWH	17.16
			77	ANNUAL	CITRUS	70	OVERHEAD	KWH	10.34
			78	ANNUAL	CITRUS	74	OVERHEAD	KWH	16.50
			79	ANNUAL	CITRUS	74	JET	KWH	8.70
			80	ANNUAL	CITRUS	74	JET	KWH	6.80
7	POLK	29S-24E	70	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	1.75
			71	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	6.89
			72	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	18.78
			73	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	0.00
			74	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	10.14
			75	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	2.63
			76	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	1.40
			77	ANNUAL	CITRUS	15	TRAVEL. GUN	KWH	17.30
			78	ANNUAL	CITRUS	15	TRAVEL. GUN	KWH	8.43
			79	ANNUAL	CITRUS	15	TRAVEL. GUN	KWH	3.83
			80	ANNUAL	CITRUS	15	TRAVEL. GUN	KWH	0.00
8	POLK	29S-25E	70	ANNUAL	CITRUS	60	SEEPAGE	KWH	9.92
			71	ANNUAL	CITRUS	60	SEEPAGE	KWH	15.98
			72	ANNUAL	CITRUS	60	SEEPAGE	KWH	17.07
			73	ANNUAL	CITRUS	60	SEEPAGE	KWH	6.63
			74	ANNUAL	CITRUS	60	SEEPAGE	KWH	7.94
			75	ANNUAL	CITRUS	60	SEEPAGE	KWH	2.82
			76	ANNUAL	CITRUS	60	SEEPAGE	KWH	11.16
			77	ANNUAL	CITRUS	40	SEEPAGE	KWH	11.87
			78	ANNUAL	CITRUS	30	SEEPAGE	KWH	8.67
			79	ANNUAL	CITRUS	30	JET	KWH	1.94
			80	ANNUAL	CITRUS	43	JET	KWH	10.98
9	POLK	28S-24E	70	ANNUAL	CITRUS	15	OVERHEAD	KWH	19.86
			71	ANNUAL	CITRUS	15	OVERHEAD	KWH	16.27
			72	ANNUAL	CITRUS	15	OVERHEAD	KWH	25.62
			73	ANNUAL	CITRUS	15	OVERHEAD	KWH	28.96
			74	ANNUAL	CITRUS	15	OVERHEAD	KWH	26.62
			75	ANNUAL	CITRUS	15	OVERHEAD	KWH	9.93
			76	ANNUAL	CITRUS	15	OVERHEAD	KWH	17.44
			77	ANNUAL	CITRUS	34	OVERHEAD	KWH	7.11
			78	ANNUAL	CITRUS	34	OVERHEAD	KWH	10.24
			79	ANNUAL	CITRUS	34	OVERHEAD	KWH	5.60
			80	ANNUAL	CITRUS	34	OVERHEAD	KWH	0.81

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
10	POLK	29S-24E	70	ANNUAL	CITRUS	10	TRAVEL. GUN	KWH	14.77
			71	ANNUAL	CITRUS	20	TRAVEL. GUN	KWH	21.28
			74	ANNUAL	CITRUS	20	TRAVEL. GUN	KWH	80.12
			77	ANNUAL	CITRUS	55	TRAVEL. GUN	KWH	9.04
			78	ANNUAL	CITRUS	55	TRAVEL. GUN	KWH	7.85
			79	ANNUAL	CITRUS	55	TRAVEL. GUN	KWH	7.33
			80	ANNUAL	CITRUS	55	TRAVEL. GUN	KWH	0.01
11	HARDEE	33S-26E	78	ANNUAL	PASTURE	100	SEEPAGE	KWH	4.17
			79	ANNUAL	PASTURE	100	SEEPAGE	KWH	0.77
			80	ANNUAL	PASTURE	100	SEEPAGE	KWH	3.28
12	HARDEE	33S-26E	78	ANNUAL	PASTURE	50	SEEPAGE	KWH	1.70
			79	ANNUAL	PASTURE	50	SEEPAGE	KWH	1.43
			80	ANNUAL	PASTURE	50	SEEPAGE	KWH	1.33
13	HARDEE	33S-25E	70	ANNUAL	CITRUS	40	OVERHEAD	KWH	18.62
			71	ANNUAL	CITRUS	40	OVERHEAD	KWH	13.65
			72	ANNUAL	CITRUS	40	OVERHEAD	KWH	30.11
			73	ANNUAL	CITRUS	40	OVERHEAD	KWH	15.90
			74	ANNUAL	CITRUS	40	OVERHEAD	KWH	49.23
			75	ANNUAL	CITRUS	40	OVERHEAD	KWH	25.66
			76	ANNUAL	CITRUS	40	OVERHEAD	KWH	39.56
			77	ANNUAL	CITRUS	44	OVERHEAD	KWH	10.39
			78	ANNUAL	CITRUS	44	OVERHEAD	KWH	32.58
			79	ANNUAL	CITRUS	44	OVERHEAD	KWH	24.98
			80	ANNUAL	CITRUS	44	OVERHEAD	KWH	19.03
14	HARDEE	33S-24E	70	ANNUAL	CITRUS	20	TRAVEL. GUN	CLOCK	8.45
			71	ANNUAL	CITRUS	20	TRAVEL. GUN	CLOCK	16.90
			72	ANNUAL	CITRUS	20	TRAVEL. GUN	CLOCK	29.29
			80	ANNUAL	CITRUS	100	TRAVEL. GUN	CLOCK	19.45
15	HARDEE	33S-24E	70	ANNUAL	CITRUS	20	SEEPAGE	KWH	11.03
			71	ANNUAL	CITRUS	20	SEEPAGE	KWH	14.66
			72	ANNUAL	CITRUS	20	SEEPAGE	KWH	17.12
			73	ANNUAL	CITRUS	20	SEEPAGE	KWH	10.59
			74	ANNUAL	CITRUS	20	SEEPAGE	KWH	6.08
			75	ANNUAL	CITRUS	20	SEEPAGE	KWH	6.62
			76	ANNUAL	CITRUS	20	SEEPAGE	KWH	7.97
			77	ANNUAL	CITRUS	20	SEEPAGE	KWH	4.42
			78	ANNUAL	CITRUS	20	SEEPAGE	KWH	1.87
			79	ANNUAL	CITRUS	20	SEEPAGE	KWH	6.69
			80	ANNUAL	CITRUS	20	SEEPAGE	KWH	1.08

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
17	POLK	29S-24E	72	ANNUAL	CITRUS	30	OVERHEAD	KWH	15.12
			73	ANNUAL	CITRUS	30	OVERHEAD	KWH	16.06
			74	ANNUAL	CITRUS	30	OVERHEAD	KWH	18.97
			75	ANNUAL	CITRUS	30	OVERHEAD	KWH	8.20
			76	ANNUAL	CITRUS	30	OVERHEAD	KWH	6.70
			77	ANNUAL	CITRUS	30	OVERHEAD	KWH	7.42
			78	ANNUAL	CITRUS	30	OVERHEAD	KWH	6.48
			79	ANNUAL	CITRUS	30	OVERHEAD	KWH	0.40
			80	ANNUAL	CITRUS	30	OVERHEAD	KWH	0.00
18	POLK	29S-24E	72	ANNUAL	CITRUS	20	OVERHEAD	KWH	15.61
			73	ANNUAL	CITRUS	20	OVERHEAD	KWH	10.47
			74	ANNUAL	CITRUS	20	OVERHEAD	KWH	12.94
			75	ANNUAL	CITRUS	20	OVERHEAD	KWH	7.80
			76	ANNUAL	CITRUS	20	OVERHEAD	KWH	7.66
			77	ANNUAL	CITRUS	20	OVERHEAD	KWH	8.85
			78	ANNUAL	CITRUS	20	OVERHEAD	KWH	9.08
			79	ANNUAL	CITRUS	20	OVERHEAD	KWH	7.75
			80	ANNUAL	CITRUS	20	OVERHEAD	KWH	8.02
19	POLK	29S-24E	73	ANNUAL	CITRUS	30	DRIP	KWH	4.32
			74	ANNUAL	CITRUS	30	DRIP	KWH	9.65
			75	ANNUAL	CITRUS	30	DRIP	KWH	8.37
			76	ANNUAL	CITRUS	30	DRIP	KWH	23.55
			77	ANNUAL	CITRUS	30	DRIP	KWH	20.53
			78	ANNUAL	CITRUS	30	DRIP	KWH	19.47
			79	ANNUAL	CITRUS	30	DRIP	KWH	19.54
			80	ANNUAL	CITRUS	30	DRIP	KWH	10.13
20	POLK	29S-24E	73	ANNUAL	CITRUS	20	OVERHEAD	KWH	9.95
			74	ANNUAL	CITRUS	20	OVERHEAD	KWH	27.73
			75	ANNUAL	CITRUS	20	OVERHEAD	KWH	14.08
			76	ANNUAL	CITRUS	20	OVERHEAD	KWH	16.84
			77	ANNUAL	CITRUS	20	OVERHEAD	KWH	13.71
			78	ANNUAL	CITRUS	20	OVERHEAD	KWH	14.02
			79	ANNUAL	CITRUS	20	OVERHEAD	KWH	8.70
			80	ANNUAL	CITRUS	20	OVERHEAD	KWH	6.51
21	POLK	29S-24E	72	ANNUAL	CITRUS	20	OVERHEAD	KWH	2.85
			73	ANNUAL	CITRUS	20	OVERHEAD	KWH	5.68
			74	ANNUAL	CITRUS	20	OVERHEAD	KWH	17.02
			75	ANNUAL	CITRUS	20	OVERHEAD	KWH	10.99
			76	ANNUAL	CITRUS	20	OVERHEAD	KWH	17.48
			77	ANNUAL	CITRUS	20	OVERHEAD	KWH	16.87
			78	ANNUAL	CITRUS	20	OVERHEAD	KWH	6.38
			79	ANNUAL	CITRUS	20	OVERHEAD	KWH	9.10
			80	ANNUAL	CITRUS	20	OVERHEAD	KWH	6.35

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
22	POLK	30S-26E	71	ANNUAL	CITRUS	60	TRAVEL. GUN	KWH	1.49
			72	ANNUAL	CITRUS	60	TRAVEL. GUN	KWH	5.04
			73	ANNUAL	CITRUS	60	TRAVEL. GUN	KWH	6.02
			74	ANNUAL	CITRUS	60	TRAVEL. GUN	KWH	8.82
			75	ANNUAL	CITRUS	70	TRAVEL. GUN	KWH	4.93
			76	ANNUAL	CITRUS	70	TRAVEL. GUN	KWH	2.74
			77	ANNUAL	CITRUS	70	TRAVEL. GUN	KWH	1.34
			78	ANNUAL	CITRUS	70	TRAVEL. GUN	KWH	1.92
			79	ANNUAL	CITRUS	70	TRAVEL. GUN	KWH	1.84
			80	ANNUAL	CITRUS	70	TRAVEL. GUN	KWH	3.55
23	HARDEE	34S-26E	79	ANNUAL	NURSERY	8	SPRINKLER	METER	97.90
			80	ANNUAL	NURSERY	12	SPRINKLER	METER	104.85
24	HILLSBOROUGH	31S-19E	79	SPRING	TOMATOES	40	SEMI-CLOSED	METER	67.24
			80	SPRING	TOMATOES	75	SEMI-CLOSED	METER	39.61
25	HILLSBOROUGH	32S-20E	79	FALL	TOMATOES	67	SEMI-CLOSED	KWH	48.59
26	HILLSBOROUGH	32S-20E	79	SPRING	TOMATOES	130	SEMI-CLOSED	METER	27.85
			79	FALL	TOMATOES	140	SEMI-CLOSED	METER	19.83
			80	SPRING	TOMATOES	150	SEMI-CLOSED	METER	45.29
			80	FALL	TOMATOES	120	SEMI-CLOSED	METER	34.85
27	HILLSBOROUGH	32S-19E	79	SPRING	TOMATOES	120	SEMI-CLOSED	METER	30.09
			79	FALL	TOMATOES	100	SEMI-CLOSED	METER	35.99
			80	SPRING	TOMATOES	125	SEMI-CLOSED	METER	52.91
			80	FALL	TOMATOES	120	SEMI-CLOSED	METER	33.16
28	HILLSBOROUGH	32S-18E	79	ANNUAL	NURSERY	22	SUB-IRRIG.	METER	160.84
			80	ANNUAL	NURSERY	25	SUB-IRRIG.	METER	94.55
29	HILLSBOROUGH	31S-20E	78	ANNUAL	CITRUS	110	DRIP	KWH	3.09
			79	ANNUAL	CITRUS	122	DRIP	KWH	4.06
			80	ANNUAL	CITRUS	122	DRIP	KWH	7.67
30	HILLSBOROUGH	31S-21E	78	ANNUAL	CITRUS	30	JET	KWH	6.47
			79	ANNUAL	CITRUS	30	JET	KWH	4.81
			80	ANNUAL	CITRUS	30	JET	KWH	18.15
31	HILLSBOROUGH	30S-21E	78	ANNUAL	CITRUS	55	OVERHEAD	KWH	50.01
			79	ANNUAL	CITRUS	55	OVERHEAD	KWH	11.64

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
32	HILLSBOROUGH	30S-19E	79	ANNUAL	TROP. FISH	8	CLOSED PIPE	KWH	66.47
			80	ANNUAL	TROP. FISH	8	CLOSED PIPE	KWH	100.63
33	HILLSBOROUGH	32S-21E	79	ANNUAL	TROP. FISH	13	CLOSED PIPE	KWH	41.24
			80	ANNUAL	TROP. FISH	13	CLOSED PIPE	KWH	43.77
34	HILLSBOROUGH	32S-22E	79	ANNUAL	PASTURE	210	SEEPAGE	CLOCK	1.35
			80	ANNUAL	PASTURE	210	SEEPAGE	CLOCK	0.00
35	HILLSBOROUGH	28S-21E	79	FALL	STRAWBERRIES	3	SPRINKLER	METER	26.63
			80	SPRING	STRAWBERRIES	3	SPRINKLER	METER	33.75
			80	FALL	STRAWBERRIES	4	SPRINKLER	METER	45.81
			81	SPRING	STRAWBERRIES	4	SPRINKLER	METER	47.85
36	HILLSBOROUGH	29S-21E	79	FALL	STRAWBERRIES	6	SPRINKLER	METER	13.19
			80	SPRING	STRAWBERRIES	6	SPRINKLER	METER	15.53
			80	FALL	STRAWBERRIES	6	SPRINKLER	METER	23.01
			81	SPRING	STRAWBERRIES	6	SPRINKLER	METER	27.23
37	MANATEE	33S-20E	79	SPRING	TOMATOES	100	SEMI-CLOSED	CLOCK	13.67
			79	FALL	TOMATOES	50	SEMI-CLOSED	CLOCK	58.83
			80	SPRING	TOMATOES	90	SEMI-CLOSED	CLOCK	59.90
			80	FALL	TOMATOES	50	SEMI-CLOSED	CLOCK	41.40
38	MANATEE	33S-20E	79	FALL	STRAWBERRIES	15	SPRINKLER	CLOCK	23.11
			80	SPRING	STRAWBERRIES	15	SPRINKLER	CLOCK	39.10
			80	FALL	STRAWBERRIES	20	SEMI-CLOSED	CLOCK	49.37
			81	SPRING	STRAWBERRIES	20	SEMI-CLOSED	CLOCK	39.48
39	MANATEE	35S-20E	79	FALL	TOMATOES	34	SEMI-CLOSED	CLOCK	50.98
			80	SPRING	TOMATOES	47	SEMI-CLOSED	CLOCK	46.34
			80	FALL	TOMATOES	40	SEMI-CLOSED	CLOCK	60.46
40	MANATEE	35S-19E	79	SPRING	TOMATOES	100	SEMI-CLOSED	METER	43.70
			80	SPRING	TOMATOES	100	SEMI-CLOSED	METER	62.76
41	MANATEE	34S-20E	79	ANNUAL	PASTURE	250	SEEPAGE	CLOCK	18.84
			80	ANNUAL	PASTURE	250	SEEPAGE	CLOCK	20.05
42	MANATEE	35S-18E	79	ANNUAL	CITRUS	25	JET	KWH	9.82
			80	ANNUAL	CITRUS	25	JET	KWH	6.20
43	MANATEE	35S-18E	79	ANNUAL	CITRUS	28	JET	KWH	5.66
			80	ANNUAL	CITRUS	28	JET	KWH	6.14

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
44	SARASOTA	37S-19E	80	ANNUAL	CITRUS	350	DRIP	METER	7.90
45	DE SOTO	36S-24E	80	ANNUAL	CITRUS	120	SEEPAGE	CLOCK	18.43
46	DE SOTO	37S-25E	80	ANNUAL	CITRUS	54	OVERHEAD	KWH	4.36
47	DE SOTO	38S-27E	78	ANNUAL	PASTURE	311	SEEPAGE	KWH	9.65
			79	ANNUAL	PASTURE	511	SEEPAGE	KWH	4.04
			80	ANNUAL	PASTURE	511	SEEPAGE	KWH	9.45
48	DE SOTO	37S-26E	78	ANNUAL	PASTURE	320	SEEPAGE	KWH	0.40
			79	ANNUAL	PASTURE	320	SEEPAGE	KWH	1.15
			80	ANNUAL	PASTURE	640	SEEPAGE	KWH	3.15
49	DE SOTO	38S-24E	80	ANNUAL	CITRUS	320	SEEPAGE	CLOCK	4.08
50	MANATEE	35S-20E	79	FALL	TOMATOES	15	SEMI-CLOSED	METER	53.51
			80	SPRING	TOMATOES	12	SEMI-CLOSED	METER	50.17
			80	FALL	TOMATOES	13	SEMI-CLOSED	METER	115.02
51	HILLSBOROUGH	28S-21E	79	FALL	STRAWBERRIES	4	SPRINKLER	KWH	31.23
			80	SPRING	STRAWBERRIES	4	SPRINKLER	KWH	13.55
			80	FALL	TOMATOES	4	SPRINKLER	KWH	12.24
52	HILLSBOROUGH	28S-21E	79	FALL	STRAWBERRIES	6	SPRINKLER	CLOCK	35.57
			80	SPRING	STRAWBERRIES	6	SPRINKLER	CLOCK	32.09
			80	FALL	STRAWBERRIES	18	SPRINKLER	CLOCK	16.50
			81	SPRING	STRAWBERRIES	18	SPRINKLER	CLOCK	20.49
53	HILLSBOROUGH	28S-19E	79	ANNUAL	GOLF COURSE	100	SPRINKLER	CLOCK	42.27
			80	ANNUAL	GOLF COURSE	100	SPRINKLER	CLOCK	45.75
54	PINELLAS	30S-16E	79	ANNUAL	GOLF COURSE	44	SPRINKLER	KWH	59.74
			80	ANNUAL	GOLF COURSE	44	SPRINKLER	KWH	51.05
55	HILLSBOROUGH	32S-21E	79	FALL	STRAWBERRIES	25	SPRINKLER	CLOCK	11.43
			80	SPRING	STRAWBERRIES	25	SPRINKLER	CLOCK	6.80
			80	FALL	STRAWBERRIES	23	SPRINKLER	CLOCK	13.90
			81	SPRING	STRAWBERRIES	23	SPRINKLER	CLOCK	17.31
56	MANATEE	33S-18E	80	ANNUAL	SOD	205	VOLUME GUN	KWH	33.95
57	MANATEE	33S-18E	78	ANNUAL	SOD	755	VOLUME GUN	KWH	49.17
			79	ANNUAL	SOD	755	VOLUME GUN	KWH	56.24
			80	ANNUAL	SOD	755	VOLUME GUN	KWH	55.24

TABLE 1.--RECORDS OF BENCHMARK FARMS--CONTINUED.

SITE NO.	COUNTY	TOWNSHIP-RANGE	YEAR	SEASON	CROP	ACRES	IRRIGATION SYSTEM	MONITORING METHOD	INCHES PER ACRE
58	HIGHLANDS	34S-29E	80	ANNUAL	CITRUS	20	JET	METER	12.99
59	HIGHLANDS	38S-30E	80	ANNUAL	CITRUS	192	OVERHEAD	METER	3.10
60	POLK	30S-28E	80	ANNUAL	CITRUS	35	OVERHEAD	METER	32.82
61	POLK	32S-28E	80	ANNUAL	CITRUS	20	OVERHEAD	METER	6.56
62	POLK	29S-27E	80	ANNUAL	CITRUS	160	OVERHEAD	METER	3.95
63	HILLSBOROUGH	29S-21E	79	ANNUAL	GOLF COURSE	85	SPRINKLER	KWH	40.21
			80	ANNUAL	GOLF COURSE	85	SPRINKLER	KWH	41.04
64	HILLSBOROUGH	28S-18E	79	ANNUAL	GOLF COURSE	90	SPRINKLER	KWH	52.13
65	LEVY	13S-19E	80	SPRING	CUCUMBERS	20	SPRINKLER	METER	3.76
66	LEVY	13S-18E	80	SPRING	WATERMELONS	28	SPRINKLER	METER	5.92
			80	FALL	WATERMELONS	25	SPRINKLER	METER	3.83
67	POLK	27S-26E	80	ANNUAL	CITRUS	127	OVERHEAD	METER	8.74
68	SUMTER	19S-23E	80	SPRING	WATERMELONS	60	TRAVEL. GUN	METER	8.55
69	MANATEE	33S-18E	80	ANNUAL	NURSERY	5	SPRINKLER	KWH	239.69
70	MANATEE	33S-18E	80	ANNUAL	SOD	100	VOLUME GUN	CLOCK	50.18
71	POLK	29S-28E	80	ANNUAL	CITRUS	40	JET	METER	10.25
72	LEVY	13S-18E	80	ANNUAL	PEANUTS	50	VOLUME GUN	METER	3.13
74	HILLSBOROUGH	29S-21E	80	FALL	STRAWBERRIES	24	SPRINKLER	CLOCK	12.72
			81	SPRING	STRAWBERRIES	24	SPRINKLER	CLOCK	22.64
75	HILLSBOROUGH	32S-21E	80	FALL	STRAWBERRIES	13	SPRINKLER	CLOCK	20.28
			81	SPRING	STRAWBERRIES	13	SPRINKLER	CLOCK	27.51
76	PINELLAS	28S-15E	79	ANNUAL	CITRUS	30	DRIP	KWH	16.85
			80	ANNUAL	CITRUS	30	DRIP	KWH	16.99
77	HIGHLANDS	34S-29E	80	ANNUAL	CITRUS	20	OVERHEAD	KWH	15.89

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS

CITRUS , DRIP IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE												
			ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
19	POLK															
		73	30	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	4.33
		74	30	1.13	1.26	0.42	0.00	2.85	1.01	0.00	0.00	0.00	0.00	0.00	2.98	9.65
		75	30	2.39	0.00	0.00	0.00	2.22	0.76	0.00	0.00	0.00	0.00	1.51	1.48	8.36
		76	30	1.83	6.20	4.55	2.19	2.27	1.00	0.00	0.00	1.91	0.36	0.94	2.31	23.56
		77	30	0.72	0.00	0.68	2.09	4.07	4.40	0.00	5.09	0.75	0.25	1.11	1.38	20.54
		78	30	3.15	0.70	0.00	1.31	3.31	3.22	1.88	0.00	0.10	1.35	1.35	3.09	19.46
		79	30	4.72	0.23	1.98	2.26	3.36	0.62	0.45	4.87	1.05	0.00	0.00	0.00	19.54
		80	30	0.00	0.00	0.00	2.93	2.60	1.46	0.56	1.58	0.00	0.00	0.00	1.01	10.14
29	HILLSBOROUGH															
		78	110	0.00	0.00	0.09	0.55	0.77	0.01	0.00	0.00	0.23	0.00	0.25	1.20	3.10
		79	122	0.44	0.00	0.00	0.54	0.59	0.61	0.33	0.49	0.00	0.01	0.22	0.82	4.05
		80	122	0.08	0.62	0.95	0.11	1.58	0.96	0.40	0.39	0.00	0.92	1.33	0.32	7.66
44	SARASOTA															
		80	350	0.02	0.41	0.57	1.05	1.66	1.31	0.55	1.36	0.00	0.00	0.97	0.00	7.90
76	PINELLAS															
		79	30	0.84	2.38	2.53	1.79	2.48	0.93	0.94	1.91	0.43	0.00	0.00	2.62	16.85
		80	30	2.04	0.99	1.38	1.93	1.46	1.63	1.98	1.85	0.06	0.77	0.07	2.84	17.00

CITRUS , JET IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE												
			ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
6	POLK															
		79	74	0.83	0.26	0.85	3.79	2.75	0.00	0.00	0.04	0.12	0.00	0.00	0.05	8.69
		80	74	0.16	0.49	0.44	0.32	1.78	0.12	0.55	0.94	0.00	0.07	1.94	0.00	6.81
8	POLK															
		79	30	0.00	0.00	0.00	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94
		80	43	0.00	0.01	0.21	0.55	1.68	4.10	0.00	0.00	0.00	4.00	0.41	0.00	10.96
30	HILLSBOROUGH															
		78	30	0.00	0.00	0.12	1.03	2.33	0.56	0.00	0.00	0.00	0.02	1.18	1.23	6.47
		79	30	0.59	0.00	0.00	1.05	0.50	1.27	0.08	0.05	0.00	0.00	0.83	0.44	4.81
		80	30	0.15	0.48	0.75	0.68	3.77	3.00	2.84	0.19	0.00	1.96	4.34	0.00	18.16

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CITRUS , JET IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
42	MANATEE															
		79	25	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	9.61
		80	25	0.00	0.00	0.50	0.49	0.70	1.72	0.70	0.13	0.00	0.54	1.03	0.38	6.19
43	MANATEE															
		79	28	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	5.67
		80	28	0.00	0.00	0.20	0.39	1.04	1.03	1.66	0.00	0.00	0.00	0.57	1.25	6.14
58	HIGHLANDS															
		80	20	0.55	0.79	1.38	1.05	1.27	2.43	2.27	0.52	0.34	0.69	0.00	1.70	12.99
71	POLK															
		80	40	0.00	0.00	0.00	0.00	2.82	1.18	0.89	0.34	2.70	1.04	0.96	0.33	10.26

CITRUS , OVERHEAD IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1	POLK															
		70	75	0.56	0.00	0.00	0.44	6.82	0.50	0.00	1.69	0.00	0.00	2.09	2.57	14.67
		71	75	0.25	0.31	5.13	2.07	4.00	0.28	0.18	0.00	0.04	2.03	0.00	0.00	14.29
		72	100	2.93	0.00	0.00	0.00	6.36	0.00	0.00	0.00	0.00	6.96	0.00	0.00	16.25
		73	100	0.00	0.00	1.01	0.00	0.00	3.80	0.00	0.00	0.98	0.00	0.00	2.89	8.68
		74	100	0.00	0.04	0.00	4.68	1.50	0.00	0.00	0.00	1.45	1.90	2.47	1.79	13.83
		75	95	0.16	0.00	0.00	3.21	1.58	2.98	0.00	0.00	0.00	0.00	0.00	1.81	9.74
		76	95	0.93	1.46	0.72	2.56	2.37	0.00	0.00	0.00	0.00	2.07	0.76	0.00	10.87
		77	95	0.00	0.00	0.00	3.17	2.51	1.10	0.00	0.00	0.00	0.76	1.10	0.00	8.64
		78	95	0.05	0.00	0.00	3.65	2.51	1.71	0.00	0.00	0.72	1.41	4.11	0.00	14.16
		79	95	0.00	0.15	0.15	3.21	0.57	0.57	0.58	0.00	0.00	0.00	1.21	0.11	6.55
		80	95	0.00	0.00	0.00	1.08	1.79	0.00	0.00	0.00	0.00	0.00	0.84	0.00	3.71
2	POLK															
		70	350	0.24	0.09	0.08	0.00	7.79	0.65	0.20	0.49	0.27	0.19	0.09	5.11	15.20
		71	350	2.05	2.52	0.67	2.38	4.62	0.08	0.41	0.09	0.11	0.19	0.73	0.08	13.93
		72	400	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	14.30
		73	400	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	8.66
		74	400	0.12	0.07	0.84	0.56	0.58	0.63	0.11	0.05	0.88	1.60	3.15	2.06	10.65
		75	400	0.08	0.03	0.06	2.17	2.82	1.91	0.54	0.07	0.06	0.05	0.08	1.85	9.72
		76	400	2.26	2.36	1.38	3.34	3.39	0.06	0.13	0.09	0.08	1.11	1.64	0.45	16.29

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CITRUS • OVERHEAD IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE												
				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2	POLK - CONTINUED															
		77	851	0.04	0.02	0.04	2.12	1.67	0.80	0.24	0.05	0.04	0.58	0.45	0.16	6.21
		78	851	0.03	0.02	0.03	2.08	1.17	0.23	0.07	0.04	0.12	0.75	1.85	0.90	7.29
		79	851	0.19	0.04	0.03	2.41	0.14	0.50	0.30	0.04	0.04	0.01	0.28	0.03	4.01
		80	851	0.03	0.02	0.02	0.09	0.90	0.05	0.06	0.03	0.05	0.34	0.47	0.03	2.09
4	POLK															
		70	10	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	19.65
		71	10	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	16.64
		72	30	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	17.74
		73	30	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	19.49
		74	30	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	39.02
		75	130	1.01	0.01	0.00	0.48	1.69	0.66	0.00	0.00	0.02	0.00	0.01	0.05	3.93
		76	130	0.00	0.25	1.20	1.52	0.75	0.00	0.00	0.02	0.00	0.07	0.00	0.00	3.81
		77	130	0.00	0.00	0.00	0.28	2.05	1.63	0.73	0.01	0.00	0.00	0.00	0.00	4.70
		78	130	0.00	0.00	0.32	0.08	2.01	0.08	0.01	0.02	0.02	0.35	0.21	1.47	4.57
		79	130	0.21	0.00	0.01	0.71	1.29	0.03	0.03	0.10	0.00	0.00	0.00	0.01	2.39
		80	130	0.01	0.00	0.00	0.31	0.47	0.30	0.36	0.58	0.01	0.01	0.38	0.01	2.44
5	POLK															
		70	20	0.00	0.00	0.00	0.00	1.38	6.20	0.63	0.50	0.19	0.25	0.13	3.25	12.53
		71	20	0.06	0.13	0.13	3.51	8.39	3.00	0.75	0.50	0.31	0.13	0.19	0.13	17.23
		72	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	41.25
		73	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	8.94
		74	20	2.50	0.13	2.69	3.44	2.44	3.07	0.19	0.56	0.44	0.25	2.25	6.45	24.41
		75	20	0.06	0.06	0.13	7.01	6.70	3.91	0.38	0.81	0.19	0.13	0.19	0.31	19.88
		76	20	0.31	0.25	8.58	2.44	2.25	0.38	0.56	0.31	0.13	0.06	0.13	0.06	15.46
		77	30	0.04	0.04	0.04	0.67	2.30	2.75	0.75	0.29	0.21	0.04	0.04	0.00	7.17
		78	30	0.00	0.00	0.04	0.75	4.92	0.92	0.08	0.17	0.08	0.67	0.63	3.80	12.06
		79	10	11.39	0.00	0.00	2.00	2.50	0.13	0.13	0.25	0.00	0.00	0.00	0.00	16.40
		80	10	0.13	0.00	0.13	0.25	4.38	0.38	0.25	2.38	0.13	0.00	2.13	0.00	10.16
6	POLK															
		70	50	0.00	0.00	0.00	0.00	3.29	4.09	2.50	0.00	0.00	0.00	0.00	2.07	11.95
		71	50	1.20	2.23	0.00	1.07	10.01	1.26	0.00	0.00	0.00	0.00	0.00	0.00	15.77
		72	50	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	11.98
		73	50	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	24.00
		74	50	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	24.82
		75	50	0.00	0.00	0.00	5.06	5.93	0.61	0.00	0.00	0.00	0.00	0.00	0.00	11.60
		76	50	0.00	0.00	4.43	7.02	4.61	0.01	0.00	0.00	0.00	0.00	1.10	0.00	17.17
		77	70	0.00	0.00	0.00	0.03	5.53	2.38	0.00	0.00	0.00	0.00	0.98	1.42	10.34
		78	74	0.00	0.88	0.24	1.98	2.14	0.46	1.47	0.72	1.39	2.65	2.00	2.57	16.50
9	POLK															
		70	15	0.00	0.00	0.00	0.00	7.26	2.75	0.08	2.59	0.00	0.00	2.92	4.26	19.86

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CITRUS , OVERHEAD IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
9	POLK - CONTINUED															
		71	15	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	16.27
		72	15	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	25.62
		73	15	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	28.96
		74	15	0.00	5.01	4.76	0.08	6.01	1.42	0.00	0.08	0.17	0.33	4.42	4.34	26.62
		75	15	0.00	0.00	0.00	3.67	6.18	0.00	0.08	0.00	0.00	0.00	0.00	0.00	9.93
		76	15	0.00	0.92	4.84	6.09	5.01	0.08	0.00	0.50	0.00	0.00	0.00	0.00	17.44
		77	34	0.00	0.00	0.00	2.98	1.95	1.69	0.00	0.04	0.44	0.00	0.00	0.00	7.10
		78	34	0.00	0.11	0.00	4.16	1.55	0.22	0.00	0.11	0.04	0.00	2.03	2.03	10.25
		79	34	1.36	0.00	0.00	4.01	0.00	0.04	0.00	0.07	0.00	0.04	0.07	0.00	5.59
		80	34	0.00	0.00	0.00	0.00	0.63	0.00	0.11	0.00	0.04	0.04	0.00	0.00	0.82
13	HARDEE															
		70	40	0.00	2.16	0.19	0.09	9.08	2.88	0.25	0.00	0.00	0.06	0.00	3.91	18.62
		71	40	3.10	2.03	2.03	2.10	2.91	0.00	0.13	0.03	0.00	1.22	0.09	0.00	13.64
		72	40	2.10	6.42	0.00	0.00	8.73	0.03	1.56	0.41	0.00	3.66	5.66	1.53	30.10
		73	40	0.00	0.00	0.00	0.00	0.03	8.58	0.00	0.03	0.00	0.00	0.00	7.26	15.90
		74	40	1.25	9.98	10.39	10.23	6.01	0.00	0.00	0.00	0.00	0.00	7.32	4.04	49.22
		75	40	0.00	0.00	3.22	8.01	14.40	0.00	0.00	0.00	0.00	0.00	0.03	0.00	25.66
		76	40	13.46	4.50	9.08	12.17	0.13	0.00	0.00	0.00	0.00	0.00	0.09	0.03	39.56
		77	44	0.00	1.99	0.00	3.13	3.93	1.20	0.00	0.00	0.00	0.00	0.11	0.03	10.39
		78	44	0.00	0.00	0.00	2.65	10.27	0.03	0.00	0.00	0.00	0.00	4.34	11.30	32.59
		79	44	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	24.98
		80	44	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	19.03
17	POLK															
		72	30	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	15.12
		73	30	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	16.05
		74	30	0.00	2.16	1.63	2.66	3.54	2.82	0.00	0.00	0.00	0.00	4.16	2.00	18.97
		75	30	0.00	0.00	1.97	2.19	4.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.20
		76	30	0.00	0.41	2.16	2.13	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.70
		77	30	0.00	0.00	0.00	2.16	3.85	1.41	0.00	0.00	0.00	0.00	0.00	0.00	7.42
		78	30	0.00	0.00	0.00	0.00	4.54	0.00	0.00	0.00	0.00	0.00	0.03	1.91	6.48
		79	30	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
		80	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	POLK															
		72	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	15.61
		73	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	10.47
		74	20	0.00	2.05	0.47	1.51	3.82	0.00	0.00	0.00	0.00	0.00	4.01	1.06	12.92
		75	20	0.00	0.04	2.00	2.07	2.05	1.54	0.00	0.00	0.05	0.00	0.06	0.00	7.81
		76	20	0.08	0.97	2.05	2.00	2.01	0.50	0.00	0.00	0.00	0.00	0.04	0.00	7.65
		77	20	0.00	0.00	0.00	1.80	2.66	2.92	1.30	0.00	0.00	0.00	0.14	0.01	8.83
		78	20	0.00	0.00	0.00	1.77	3.47	0.00	0.00	0.00	0.00	1.08	1.93	0.83	9.08
		79	20	1.09	0.00	0.00	2.41	4.13	0.00	0.00	0.00	0.00	0.00	0.12	0.00	7.75

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CITRUS , OVERHEAD IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
18	POLK - CONTINUED															
		80	20	0.00	0.00	0.00	0.00	1.81	0.00	2.68	0.64	0.00	0.51	2.38	0.00	8.02
20	POLK															
		73	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	9.95
		74	20	0.00	0.00	5.38	4.63	10.77	0.06	0.00	0.00	0.00	0.00	3.69	3.19	27.72
		75	20	0.00	0.00	2.69	4.07	7.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.08
		76	20	0.00	4.82	4.32	4.69	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.83
		77	20	0.00	0.00	0.00	0.00	11.52	2.19	0.00	0.00	0.00	0.00	0.00	0.00	13.71
		78	20	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	0.00	0.00	0.00	5.32	14.02
		79	20	0.00	0.00	0.00	4.44	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.70
		80	20	0.00	0.00	0.00	0.00	0.00	0.38	0.00	1.88	0.00	0.00	4.26	0.00	6.52
21	POLK															
		72	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	2.85
		73	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	5.68
		74	20	0.00	0.00	5.45	2.40	3.06	0.00	3.03	0.03	0.04	0.00	0.00	3.03	17.04
		75	20	0.00	0.00	0.00	4.95	3.04	2.99	0.00	0.00	0.00	0.00	0.00	0.00	10.98
		76	20	0.00	1.48	3.12	6.52	6.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.48
		77	20	0.00	0.00	0.00	0.00	0.00	13.88	0.00	0.00	0.00	0.00	0.00	2.99	16.87
		78	20	0.00	0.00	0.00	0.10	2.00	0.00	0.00	0.00	0.00	0.00	1.34	2.95	6.39
		79	20	0.00	0.00	0.00	3.05	6.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.10
		80	20	0.00	0.00	0.00	0.00	0.00	2.96	0.71	0.00	0.00	0.00	0.00	2.68	6.35
31	HILLSBOROUGH															
		78	55	3.19	0.72	2.77	8.90	0.00	11.02	0.00	0.63	6.81	3.78	8.28	3.91	50.01
		79	55	0.00	0.00	0.00	7.66	0.03	0.17	0.00	0.03	0.00	0.89	1.95	0.92	11.65
46	DE SOTO															
		80	54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	2.42	0.56	0.33	4.37
59	HIGHLANDS															
		80	192	0.27	0.02	0.47	0.41	0.38	0.43	0.01	0.13	0.10	0.56	0.32	0.00	3.10
60	POLK															
		80	35	0.00	0.00	0.00	7.31	6.68	5.74	2.77	1.17	2.13	7.02	0.00	0.00	32.82
61	POLK															
		80	20	0.00	0.00	1.60	0.37	1.51	1.05	0.00	0.00	0.89	1.14	0.00	0.00	6.56
62	POLK															
		80	160	0.00	0.00	0.08	0.51	0.09	0.09	0.12	0.24	0.21	1.33	1.14	0.13	3.94
67	POLK															
		80	127	0.00	0.00	0.54	0.98	1.41	0.41	0.98	0.00	0.00	2.34	2.07	0.00	8.73

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CITRUS , OVERHEAD IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
77	HIGHLANDS															
		80	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	15.89

CITRUS , SEEPAGE IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
8	POLK															
		70	60	0.00	0.00	0.00	2.18	4.21	0.00	0.00	0.01	0.00	0.00	0.00	3.53	9.93
		71	60	3.08	1.25	2.84	4.41	2.63	1.09	0.00	0.00	0.00	0.68	0.00	0.00	15.98
		72	60	3.06	0.00	0.00	2.49	4.31	1.99	0.00	0.00	0.00	4.80	0.41	0.00	17.06
		73	60	0.00	0.00	0.00	0.09	1.41	0.92	0.00	0.00	0.00	0.00	1.89	2.32	6.63
		74	60	0.00	2.59	1.00	0.88	0.03	0.00	0.00	0.00	0.00	0.00	0.52	2.92	7.94
		75	60	0.00	1.26	0.00	0.06	1.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.81
		76	60	2.03	3.43	0.46	2.45	2.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	11.17
		77	40	0.00	0.00	0.00	3.68	7.75	0.23	0.09	0.00	0.00	0.11	0.00	0.00	11.86
		78	30	0.30	0.49	0.06	2.89	0.00	0.00	0.00	0.00	0.00	0.69	2.44	1.79	8.66
15	HARDEE															
		70	20	0.00	0.04	0.02	0.00	6.10	2.30	0.00	0.00	0.00	0.00	2.27	0.30	11.03
		71	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	14.66
		72	20	2.97	0.09	0.00	0.00	3.88	2.59	0.00	0.00	0.00	4.86	2.71	0.01	17.11
		73	20	0.00	0.00	0.00	0.00	0.00	2.60	1.56	0.00	0.00	0.03	3.82	2.59	10.60
		74	20	0.00	0.54	3.24	0.07	0.56	0.00	0.00	0.01	0.00	0.01	1.65	0.01	6.09
		75	20	0.00	0.00	0.00	2.48	3.99	0.01	0.00	0.00	0.01	0.00	0.14	0.00	6.63
		76	20	0.82	0.17	1.64	3.03	2.30	0.00	0.00	0.00	0.00	0.01	0.00	0.00	7.97
		77	20	0.00	0.00	0.00	2.30	2.10	0.00	0.00	0.00	0.02	0.00	0.00	0.00	4.42
		78	20	0.00	0.04	0.03	0.10	1.66	0.00	0.00	0.00	0.00	0.02	0.01	0.00	1.86
		79	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	6.69
		80	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	1.08
45	DE SOTO															
		80	120	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	18.44
49	DE SOTO															
		80	320	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	4.08

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CITRUS , TRAVEL. GUN IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
7	POLK															
		70	10	0.00	0.00	0.00	0.00	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	1.75
		71	10	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	6.89
		72	10	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	18.78
		73	10	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	0.00
		74	10	0.00	0.00	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	10.14
		75	10	0.00	0.00	0.00	0.00	2.50	0.00	0.00	0.00	0.13	0.00	0.00	0.00	2.63
		76	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.39	0.00	0.00	0.00	0.00	1.39
		77	15	0.00	0.00	0.00	0.26	8.57	6.25	2.04	0.17	0.00	0.00	0.00	0.00	17.29
		78	15	0.00	0.00	0.00	0.00	6.84	0.00	0.00	0.00	0.00	0.00	0.00	1.59	8.43
		79	15	2.66	0.00	0.00	0.00	1.16	0.00	0.01	0.00	0.00	0.00	0.00	0.00	3.83
		80	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	POLK															
		70	10	0.00	0.00	0.13	0.13	2.38	11.77	0.00	0.13	0.00	0.13	0.13	0.00	14.80
		71	20	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	21.27
		74	20	4.76	0.69	6.20	17.59	17.28	7.70	0.00	0.00	0.00	0.00	8.58	17.34	80.14
		77	55	0.02	0.00	0.00	0.02	5.10	3.71	0.18	0.00	0.00	0.00	0.00	0.00	9.03
		78	55	0.00	0.00	0.00	0.00	4.55	0.00	0.07	0.00	0.00	0.00	0.00	3.23	7.85
		79	55	0.02	0.00	0.00	3.16	4.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.32
		80	55	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01
14	HARDEE															
		70	20	0.00	0.00	0.00	0.00	3.76	1.50	0.19	0.00	0.00	0.00	1.31	1.69	8.45
		71	20	1.13	1.88	1.13	3.94	8.64	0.00	0.19	0.00	0.00	0.00	0.00	0.00	16.91
		72	20	6.01	4.51	0.00	0.56	9.01	9.01	0.19	0.00	0.00	0.00	0.00	0.00	29.29
		80	100	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	19.45
22	POLK															
		71	60	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	1.49
		72	60	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	5.03
		73	60	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	6.02
		74	60	0.29	1.37	1.47	0.84	1.39	0.57	0.07	0.04	0.09	0.25	1.45	0.99	8.82
		75	70	0.00	0.08	0.06	1.32	2.31	0.24	0.05	0.05	0.14	0.12	0.16	0.40	4.93
		76	70	0.66	0.41	0.15	0.79	0.28	0.06	0.06	0.07	0.05	0.08	0.07	0.06	2.74
		77	70	0.06	0.07	0.06	0.52	0.35	0.08	0.06	0.03	0.04	0.03	0.03	0.02	1.35
		78	70	0.05	0.04	0.03	0.43	0.13	0.10	0.09	0.05	0.17	0.24	0.24	0.35	1.92
		79	70	0.04	0.03	0.35	0.95	0.06	0.19	0.03	0.03	0.03	0.02	0.08	0.03	1.84
		80	70	0.02	0.05	0.13	0.04	0.56	0.37	0.14	0.13	0.07	1.12	0.59	0.33	3.55

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

CUCUMBERS , SPRINKLER IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE													
			SPRING SEASON								FALL SEASON					
			ACRES	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	ACRES	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
65	LEVY	80	20	0.00	0.00	0.88	1.91	0.96	0.00	3.75	*	*	*	NO FALL CROP		*	*	*

GOLF COURSE , SPRINKLER IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE												
			ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
53	HILLSBOROUGH	79	100	1.15	0.23	5.19	3.16	2.13	13.64	1.52	1.03	4.54	0.66	1.64	7.39	42.28
		80	100	1.15	1.49	9.14	1.34	2.71	11.58	2.30	1.80	1.81	4.33	1.51	6.60	45.76
54	PINELLAS	79	44	3.10	9.04	4.04	0.00	2.70	4.88	4.56	5.38	4.89	7.54	5.03	8.58	59.74
		80	44	7.41	1.61	2.32	4.51	5.27	4.83	5.17	4.99	3.67	3.14	4.69	3.43	51.04
63	HILLSBOROUGH	79	85	2.07	0.47	0.47	5.36	6.39	6.18	6.47	1.70	0.66	0.68	6.27	3.48	40.20
		80	85	2.08	0.98	0.82	1.15	4.85	4.65	4.08	1.28	2.39	6.05	10.04	2.67	41.04
64	HILLSBOROUGH	79	90	1.77	2.32	2.88	7.66	4.80	7.32	5.48	5.02	0.87	3.26	6.71	4.04	52.13

NURSERY , SPRINKLER IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE												
			ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
23	HARDEE	79	8	2.85	5.06	7.46	1.75	18.41	11.60	9.21	11.05	13.81	8.70	4.79	3.22	97.91
		80	12	3.93	8.62	7.70	6.81	6.43	7.76	8.12	10.40	8.47	10.07	8.83	17.70	104.84

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

NURSERY , SPRINKLER IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
69	MANATEE															
		80	5	0.23	0.32	8.06	6.64	39.86	25.54	40.15	40.73	41.14	6.25	21.62	9.14	239.68

NURSERY , SUB-IRRIG. IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
28	HILLSBOROUGH															
		79	22	5.19	27.70	16.60	22.76	19.05	11.93	0.00	11.28	7.35	13.66	13.12	12.20	160.84
		80	25	11.18	21.92	13.14	20.46	17.16	0.44	5.22	3.30	0.43	0.20	0.84	0.27	94.56

PASTURE , SEEPAGE IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
11	HARDEE															
		78	100	0.00	0.00	0.00	0.00	3.80	0.00	0.00	0.28	0.00	0.00	0.00	0.09	4.17
		79	100	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	0.77
		80	100	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	3.28
12	HARDEE															
		78	50	0.00	0.00	0.00	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.70
		79	50	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	1.43
		80	50	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	1.33
34	HILLSBOROUGH															
		79	210	0.00	1.21	0.00	0.00	0.00	0.03	0.00	0.10	0.00	0.00	0.00	0.00	1.34
		80	210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	MANATEE															
		79	250	0.00	0.00	3.68	5.30	0.51	0.07	4.61	2.74	0.29	0.55	0.20	0.88	18.83
		80	250	1.04	0.00	0.00	4.39	7.12	1.74	0.00	5.27	0.00	0.00	0.00	0.49	20.05

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

PASTURE , SEEPAGE IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
47	DE SOTO															
		78	311	0.00	0.00	0.00	0.00	7.18	2.47	0.00	0.00	0.00	0.00	0.00	0.00	9.65
		79	511	0.54	0.00	0.00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.04
		80	511	0.00	0.22	0.80	0.21	2.33	2.60	0.00	1.29	0.00	0.00	0.69	1.32	9.46
48	DE SOTO															
		78	320	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.31	0.40
		79	320	0.50	0.00	0.00	0.00	0.38	0.00	0.25	0.00	0.00	0.00	0.00	0.02	1.15
		80	640	0.39	0.00	0.00	0.09	0.58	1.07	0.00	0.00	0.00	0.00	1.03	0.00	3.16

PEANUTS , VOLUME GUN IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
72	LEVY															
		80	50	0.00	0.00	0.00	0.00	0.00	1.15	1.17	0.81	0.00	0.00	0.00	0.00	3.13

SOD , VOLUME GUN IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	ACRES	WATER APPLIED, IN INCHES PER ACRE JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
56	MANATEE															
		80	205	2.31	2.09	3.75	4.03	4.79	3.67	2.57	1.34	1.68	2.26	1.55	3.92	33.96
57	MANATEE															
		78	755	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	49.17
		79	755	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	56.24
		80	755	*	*	*	*	SUBTOTALS	NOT	AVAILABLE	*	*	*	*	*	55.24
70	MANATEE															
		80	100	0.00	2.73	4.11	5.13	7.47	6.46	1.33	1.52	3.16	6.00	6.63	5.64	50.18

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

STRAWBERRIES , SEMI-CLOSED IRRIGATION SYSTEM

SITE NO.	COUNTY	YEAR	ACRES	WATER APPLIED, IN INCHES PER ACRE								
				SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL
38	MANATEE												
		80-81	20	0.00	10.51	16.72	22.15	23.46	0.00	10.94	5.08	0.00	88.86

STRAWBERRIES , SPRINKLER IRRIGATION SYSTEM

SITE NO.	COUNTY	YEAR	ACRES	WATER APPLIED, IN INCHES PER ACRE								
				SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOTAL
35	HILLSBOROUGH												
		79-80	3	0.00	11.66	11.78	3.19	5.89	12.52	8.96	6.38	0.00	60.38
		80-81	4	0.00	34.66	5.87	5.27	17.61	6.19	16.87	7.18	0.00	93.65
36	HILLSBOROUGH												
		79-80	6	0.00	8.59	2.58	2.03	3.68	7.55	1.90	2.39	0.00	28.72
		80-81	6	0.00	15.96	3.06	3.98	10.43	3.26	5.95	7.59	0.00	50.23
38	MANATEE												
		79-80	15	0.00	13.54	3.50	6.07	6.30	13.42	4.67	14.71	0.00	62.21
51	HILLSBOROUGH												
		79-80	4	0.00	9.31	16.86	5.06	5.74	5.93	1.87	0.00	0.00	44.77
52	HILLSBOROUGH												
		79-80	6	0.00	0.00	18.94	16.62	12.37	19.72	0.00	0.00	0.00	67.65
		80-81	18	0.00	12.63	0.64	3.22	11.99	0.77	3.22	4.51	0.00	36.98
55	HILLSBOROUGH												
		79-80	25	0.00	2.18	7.08	2.18	3.27	1.50	2.04	0.00	0.00	18.25
		80-81	23	0.00	7.25	3.70	2.96	8.58	1.48	2.96	4.29	0.00	31.22
74	HILLSBOROUGH												
		80-81	24	0.00	6.61	3.64	2.48	14.87	2.97	3.30	1.49	0.00	35.36
75	HILLSBOROUGH												
		80-81	13	0.00	10.22	5.82	4.24	13.36	4.40	5.82	3.93	0.00	47.79

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

TOMATOES , SEMI-CLOSED IRRIGATION SYSTEM

WATER APPLIED, IN INCHES PER ACRE

SITE NO.	COUNTY	YR.	SPRING SEASON ACRES	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	FALL SEASON ACRES	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
24	HILLSBOROUGH	79	40	*	SUBTOTALS NOT AVAILABLE				*	67.23	*	*	*	NO FALL CROP		*	*	*
		80	75	2.81	4.49	6.28	10.20	12.98	2.84	39.60	*	*	*	NO FALL CROP		*	*	*
25	HILLSBOROUGH	79	*	*	*	NO SPRING CROP		*	*	*	67	*	SUBTOTALS NOT AVAILABLE			*		48.59
26	HILLSBOROUGH	79	130	2.11	4.29	5.40	5.74	8.08	2.22	27.84	140	0.00	3.04	0.94	6.50	4.83	4.52	19.83
		80	150	3.72	7.55	9.49	10.10	14.21	0.23	45.30	120	0.00	5.68	5.26	7.73	6.29	9.90	34.86
27	HILLSBOROUGH	79	120	1.56	4.45	5.82	7.17	8.59	2.49	30.08	100	0.00	4.15	1.45	10.44	9.91	10.04	35.99
		80	125	3.00	8.51	11.14	13.73	16.45	0.07	52.90	120	0.00	6.65	5.02	9.92	8.06	3.52	33.17
37	MANATEE	79	100	*	SUBTOTALS NOT AVAILABLE				*	13.68	50	0.00	6.53	0.00	17.65	28.46	6.19	58.83
		80	90	10.99	8.08	14.79	11.90	11.77	2.38	59.91	50	0.00	0.00	10.60	6.36	12.30	12.13	41.39
39	MANATEE	79	*	*	*	NO SPRING CROP		*	*	*	34	1.53	10.94	0.00	0.51	33.78	4.22	50.98
		80	47	1.51	7.62	13.95	9.94	13.32	0.00	46.34	40	0.00	5.88	10.81	20.72	20.37	2.68	60.46
40	MANATEE	79	100	1.25	4.41	8.37	11.78	11.05	6.85	43.71	*	*	*	NO FALL CROP		*	*	*
		80	100	11.99	11.34	10.45	14.74	13.14	1.10	62.76	*	*	*	NO FALL CROP		*	*	*
50	MANATEE	79	*	*	*	NO SPRING CROP		*	*	*	15	0.00	0.00	0.00	19.69	27.76	6.06	53.51
		80	12	0.00	3.97	11.27	11.75	19.02	4.16	50.17	13	0.00	22.63	39.29	26.61	26.49	0.00	115.02

TOMATOES , SPRINKLER IRRIGATION SYSTEM

WATER APPLIED, IN INCHES PER ACRE

SITE NO.	COUNTY	YR.	SPRING SEASON ACRES	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	FALL SEASON ACRES	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
51	HILLSBOROUGH	80	*	*	*	NO SPRING CROP		*	*	*	4	0.00	3.49	3.62	2.95	1.89	0.29	12.24

TABLE 2. -- WATER APPLIED MONTHLY BY CROP AND IRRIGATION SYSTEM AT BENCHMARK FARMS -- CONTINUED

TROP. FISH , CLOSED PIPE IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE: ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
32	HILLSBOROUGH															
		79	8	4.78	5.28	3.32	10.56	4.73	12.80	7.45	4.23	0.71	1.59	5.41	5.60	66.46
		80	8	5.76	7.07	7.51	6.57	9.64	11.79	4.34	11.49	5.42	11.11	10.51	9.43	100.64
33	HILLSBOROUGH															
		79	13	4.27	5.43	0.00	9.25	2.62	0.26	4.09	5.26	1.78	0.00	0.00	8.28	41.24
		80	13	9.21	13.86	1.77	0.00	0.02	7.34	0.00	4.04	2.47	0.00	5.00	0.06	43.77

WATERMELONS , SPRINKLER IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE — SPRING SEASON: ACRES	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	FALL SEASON: ACRES	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
66	LEVY																	
		80	28	0.00	0.00	0.11	0.58	0.26	4.97	5.92	25	0.00	0.00	0.00	3.83	0.00	0.00	3.83

WATERMELONS , TRAVEL. GUN IRRIGATION SYSTEM

SITE NO.	COUNTY	YR.	WATER APPLIED, IN INCHES PER ACRE — SPRING SEASON: ACRES	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	FALL SEASON: ACRES	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
68	SUMTER																	
		80	60	0.00	0.00	0.98	2.05	3.15	2.37	8.55	*	*	*	NO FALL CROP		*	*	*

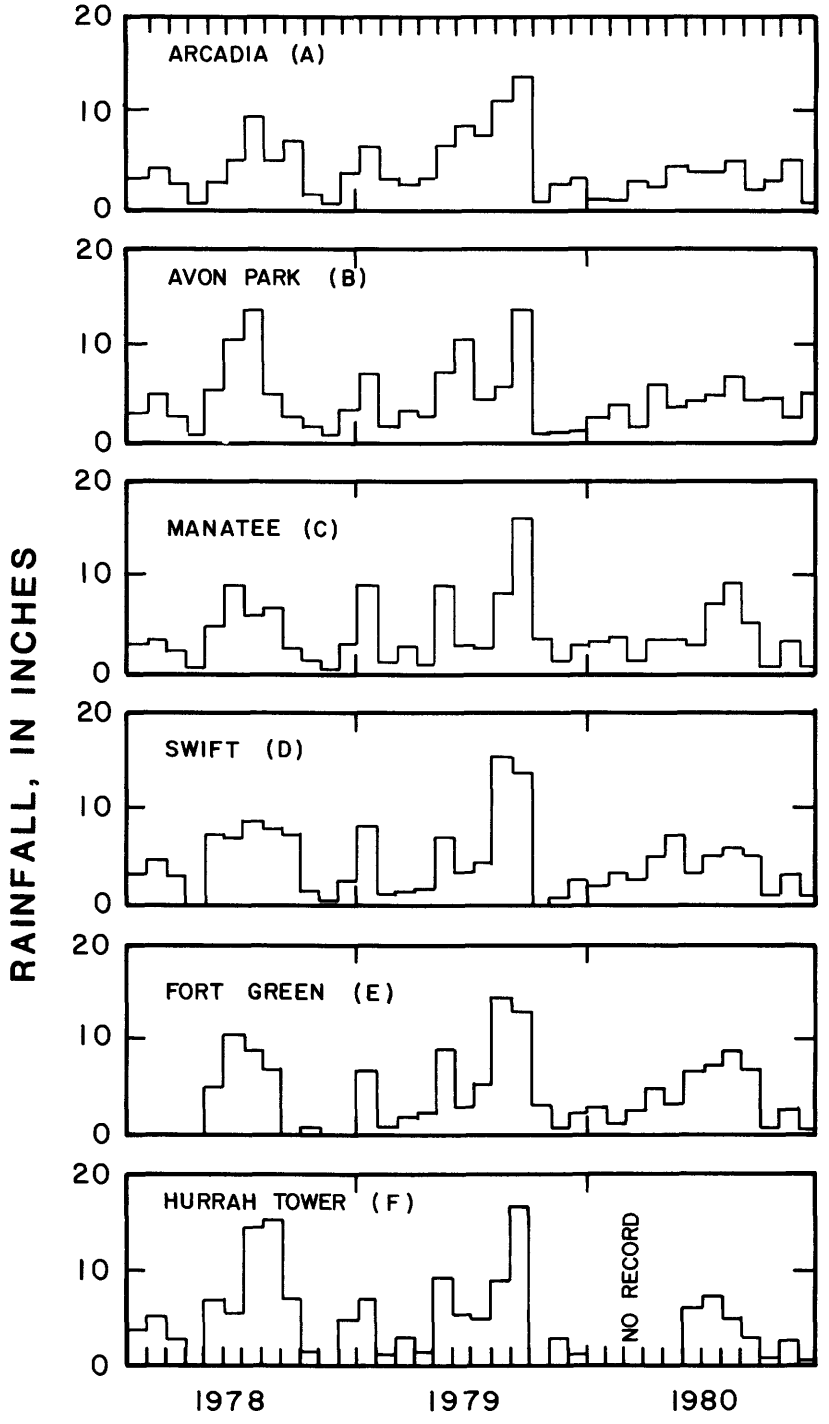


Figure 8.--Rainfall for stations in central and southern parts of the study area, 1978-80.

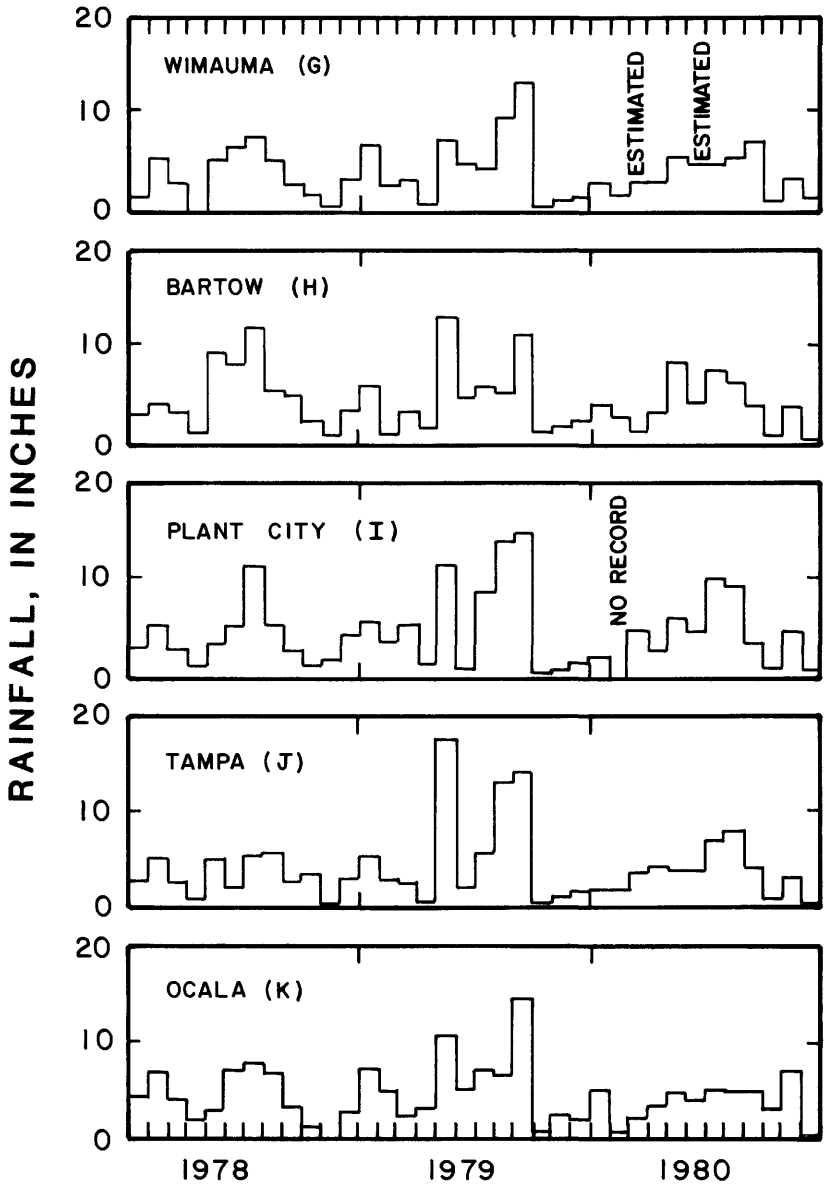


Figure 9.--Rainfall for stations in west-central and northern parts of the study area, 1978-80.

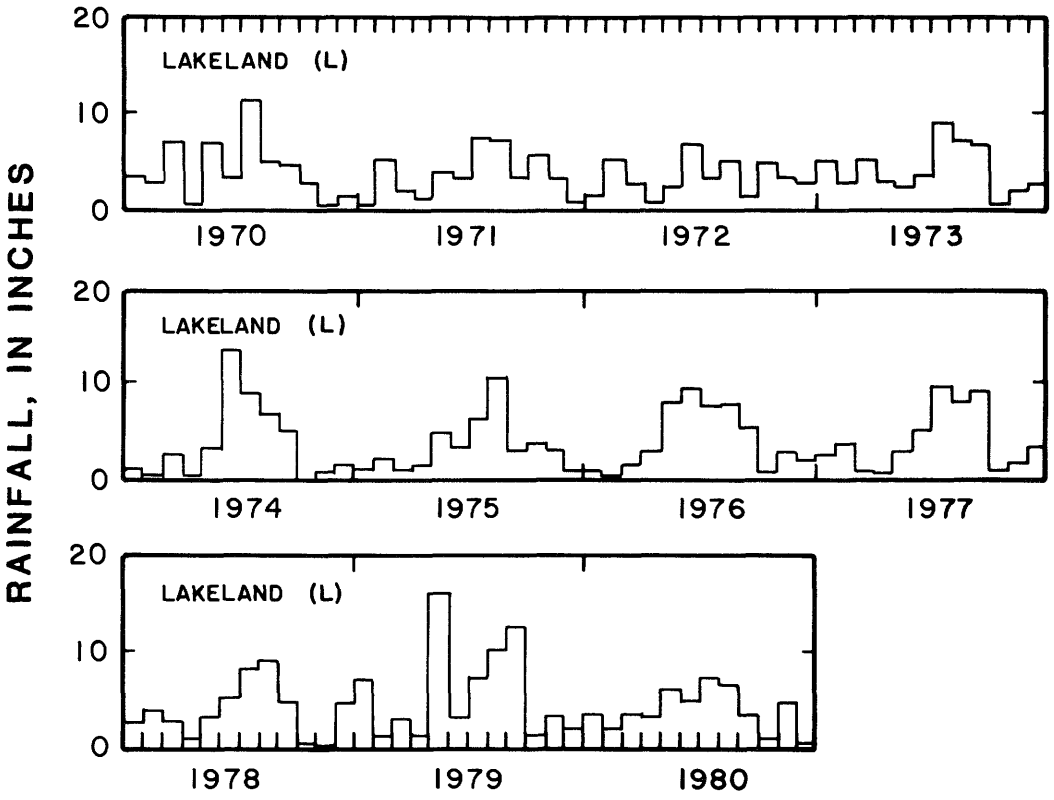


Figure 10.--Rainfall at Lakeland, 1970-80.

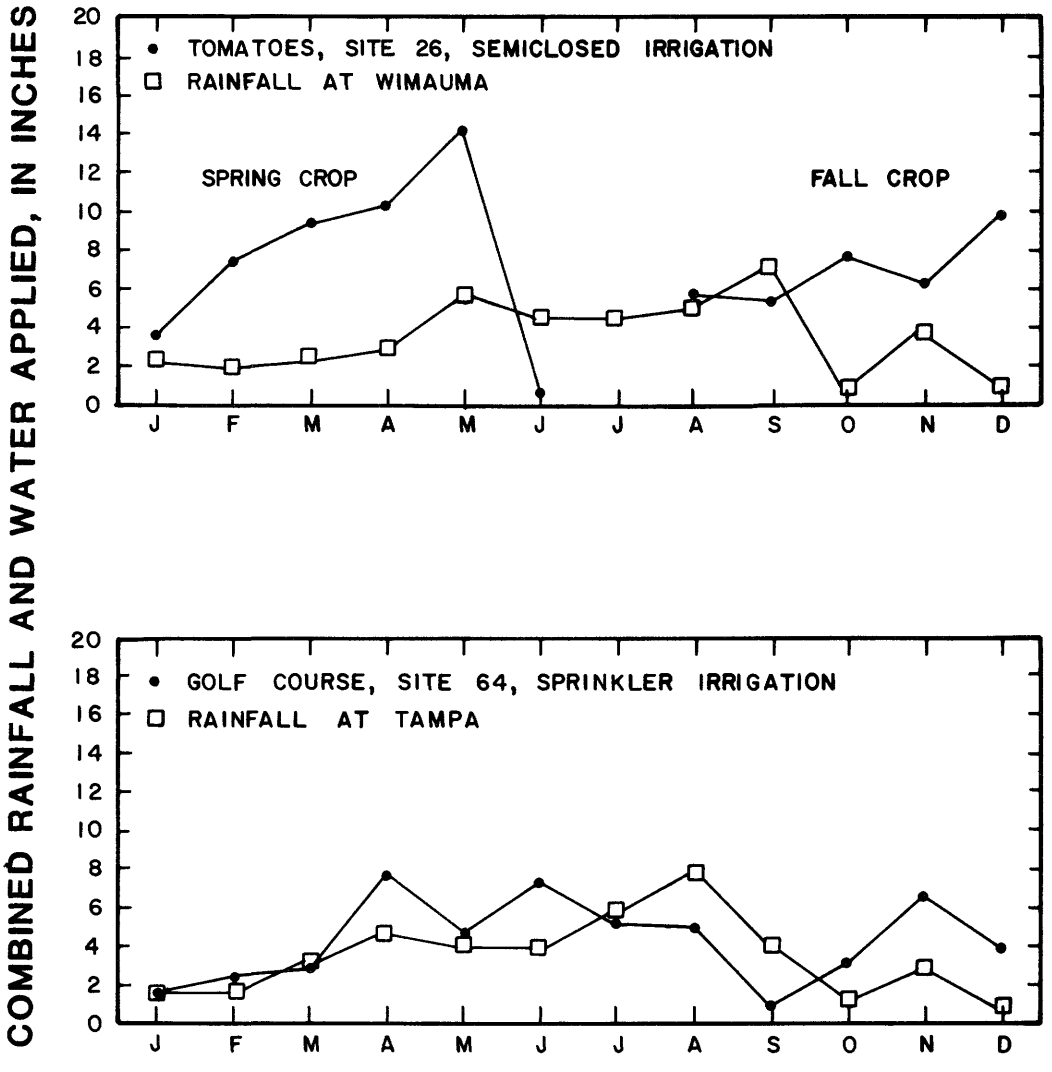


Figure 11.--Rainfall at Wimauma and Tampa and water applied at sites 26 and 64, 1980.

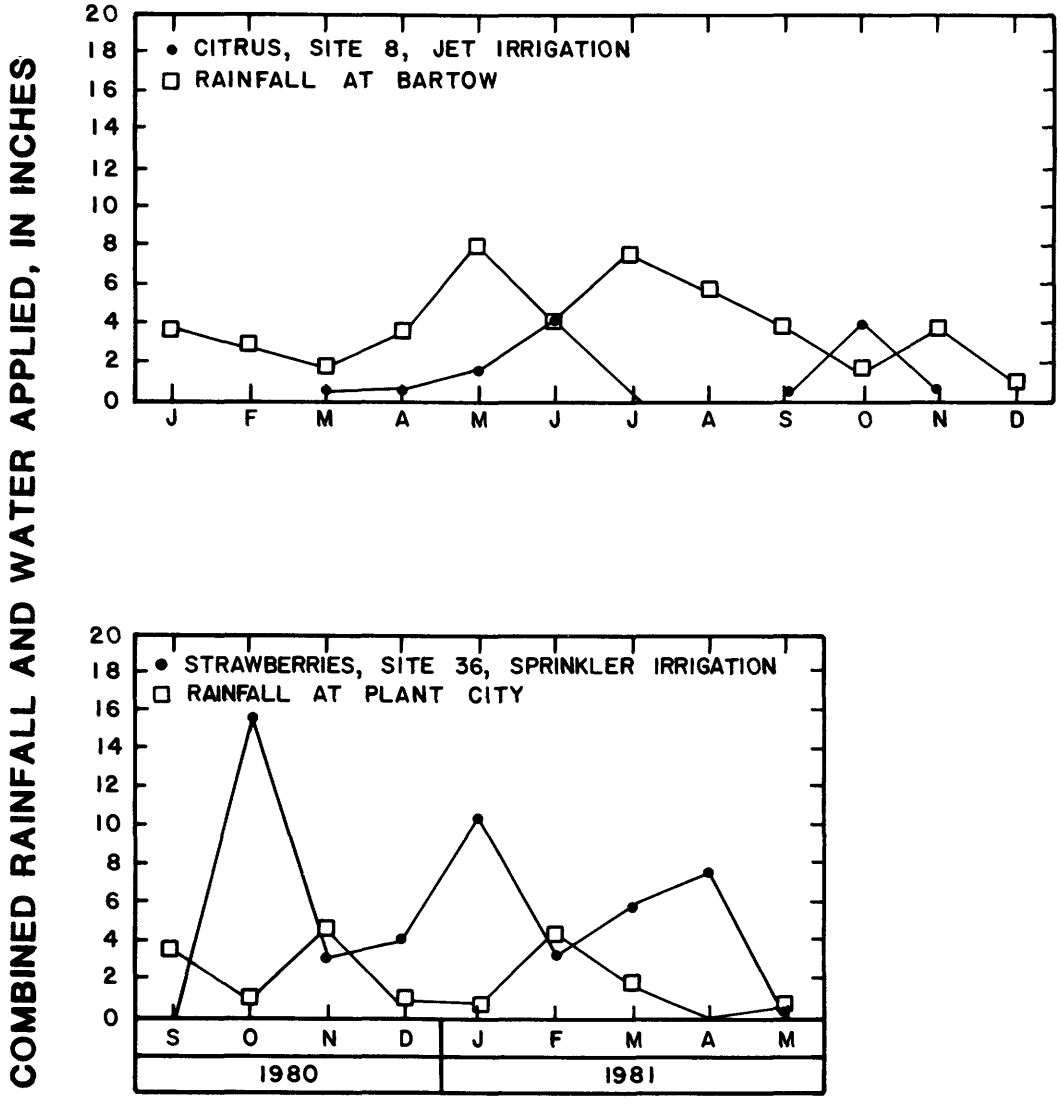


Figure 12.--Rainfall at Bartow and Plant City and water applied at sites 8 and 36, 1980-81.

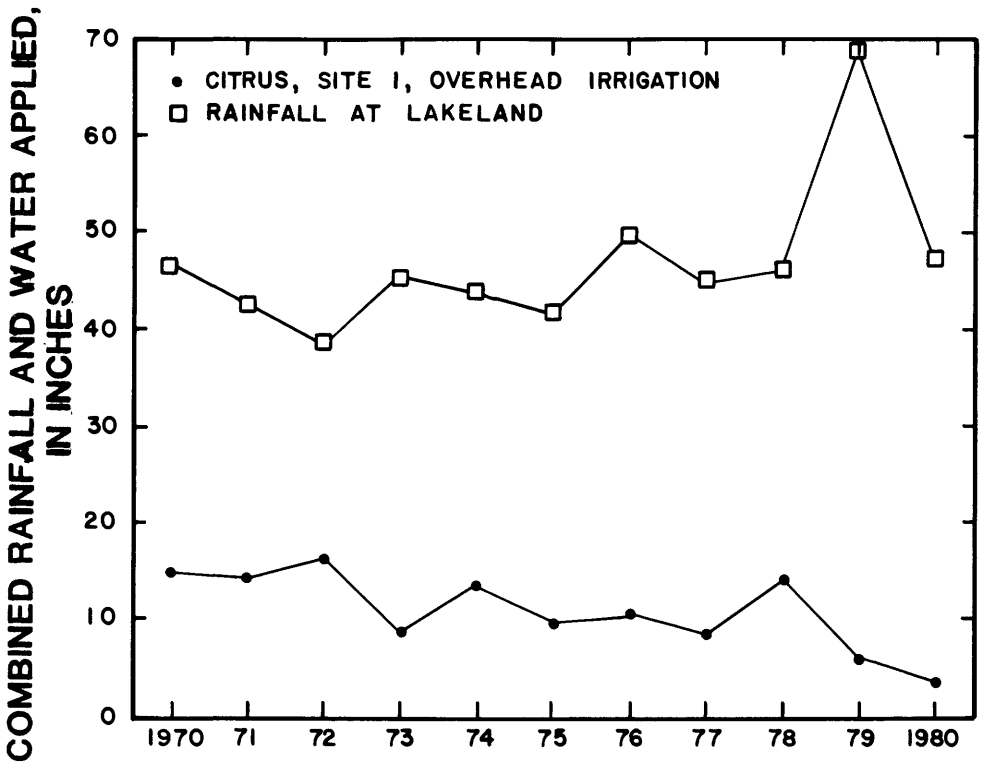


Figure 13.--Rainfall at Lakeland and water applied at site 1, 1970-80.

Citrus

The 1980 composite mean annual water-application rate based on data for 35 citrus groves was 8.4 in/acre (table 3). Drip irrigation for 4 sites averaged 10.7 in/acre, jet irrigation for 7 sites averaged 10.2 in/acre, overhead irrigation for 17 sites averaged 7.9 in/acre, seepage irrigation for 3 sites averaged 7.9 in/acre, and traveling gun irrigation for 4 sites averaged 5.8 in/acre. The largest water use for citrus irrigation during 1980 occurred at site 60 in Polk County (table 2). The annual application rate was 32.8 in/acre using an overhead irrigation system. This site also had the largest monthly application rate in 1980, 7.3 in/acre in April. Water was not applied for citrus irrigation in 1980 at sites 7 and 17 in Polk County.

Cucumbers

One cucumber farm in Levy County was monitored during 1980 for water use. A spring crop irrigated by sprinkler used 3.8 in/acre. All water was applied during March, April, and May.

Golf Courses

Three golf courses using sprinkler irrigation were monitored during 1980. The low, mean, and high application rates were 41.0, 45.9, and 51.0 in/acre, respectively. Monthly rates ranged from 0.8 in/acre in March at site 63 to 11.6 in/acre in June at site 53. Irrigated acreage averaged 4.2 per hole and ranged from 2.4 acres at site 54 to 5.6 acres at site 53.

Nurseries

For three nursery sites, the composite mean annual water-application rate during 1980 was 146.4 in/acre. Monthly rates ranged from 0.2 in/acre in October at site 28 to 41.1 in/acre in September at site 69. For the two sites with sprinkler irrigation systems, the mean annual application rates were 104.8 and 239.7 in/acre. The nursery site with a subirrigation system applied 94.6 in/acre.

Pasture

The mean annual water-application rate during 1980 for six pasture sites with seepage irrigation systems was 6.2 in/acre, including no irrigation for site 34. The sites grew various types of grasses and individual annual application rates ranged from no irrigation for grazing grass to 9.5 in/acre for rye grass and to 20.0 in/acre for clover.

Table 3.--Water use by crop, season, and type of irrigation system, 1980

Season: Annual, January through December; Spring, January through June; Fall, July through December. Spring and fall season totals applicable only to cucumbers, tomatoes, and watermelons. Strawberry season is from September 1980 through April 1981. Rates reported in this table reflect those dates.
Low, mean, and high values show variability of rates among all sites using a specific irrigation system. For example, the low annual rate at four citrus sites using drip irrigation was 7.7 in/acre, the mean rate was 10.7 in/acre, and the high rate was 17.0 in/acre.

Crop	Irrigation system	Number of sites	Water applied, in inches per acre								
			Spring			Fall			Annual		
			Low	Mean	High	Low	Mean	High	Low	Mean	High
Citrus	Drip	4	---	---	---	---	---	---	7.7	10.7	17.0
	Jet	7	---	---	---	---	---	---	6.1	10.2	18.2
	Overhead	17	---	---	---	---	---	---	0	7.9	32.8
	Seepage	3	---	---	---	---	---	---	1.1	7.9	18.4
	Travel gun	4	---	---	---	---	---	---	0	5.8	19.4
	Composite	35	---	---	---	---	---	---	0	8.4	32.8
Cucumbers	Sprinkler	1	3.8	3.8	3.8	---	---	---	---	---	---
Golf course	Sprinkler	3	---	---	---	---	---	---	41.0	45.9	51.0
Nursery	Sprinkler	2	---	---	---	---	---	---	104.8	172.2	239.7
	Subirrigation	1	---	---	---	---	---	---	94.6	94.6	94.6
	Composite	3	---	---	---	---	---	---	94.6	146.4	239.7
Pasture	Seepage	6	---	---	---	---	---	---	0	6.21	20.0
Peanuts	Volume gun	1	---	---	---	---	---	---	3.1	3.1	3.1
Sod	Volume gun	3	---	---	---	---	---	---	34.0	46.5	55.2

Table 3.--Water use by crop, season, and type of irrigation system, 1980--Continued

Crop	Irrigation system	Number of sites	Water applied, in inches per acre								
			Spring			Fall			Annual		
			Low	Mean	High	Low	Mean	High	Low	Mean	High
Strawberries	Semiclosed	1	---	---	---	---	---	---	88.9	88.9	88.9
	Sprinkler	6	---	---	---	---	---	---	31.2	49.2	93.6
	Composite	7	---	---	---	---	---	---	31.2	54.9	93.6
Tomatoes	Semiclosed	7[a]	39.6	51.0	62.8	33.2	57.0	115.0	---	---	---
	Sprinkler	1	---	---	---	12.2	12.2	12.2	---	---	---
	Composite	8	39.6	51.0	62.8	12.2	49.5	115.0	---	---	---
Tropical fish	Closed pipe	2	---	---	---	---	---	---	43.8	72.2	100.6
Watermelons	Sprinkler	1	5.9	5.9	5.9	3.8	3.8	3.8	---	---	---
	Travel gun	1	8.6	8.6	8.6	---	---	---	---	---	---
	Composite	2	5.9	7.2	8.6	3.8	3.8	3.8	---	---	---

[a]Spring season had seven tomato sites, fall season had five tomato sites.

Peanuts

One peanut farm in Levy County was monitored during 1980. An annual crop irrigated with a volume gun system used 3.1 in/acre. All water was applied during June, July, and August.

Sod

The mean annual water-application rate during 1980 for three sod farms with volume gun irrigation was 46.5 in/acre. The low and high rates were 34.0 and 55.2 in/acre, respectively. Monthly rates ranged from no irrigation in January to 7.5 in/acre in May at site 70. Monthly subtotals were not available at site 57.

Sod grown at these sites were certified weed-free St. Augustine grasses. This grass type uses considerably more water than Bahia grasses. Water-application rates for Bahia grass are probably similar to rates applied to pastures.

Strawberries

Strawberries are planted in the fall of one year and harvested in the spring of the following year. The seasons are divided into fall and spring in table 1 and monthly rates are shown in table 2. Data presented in table 3 and discussed in this section are for October 1980 through April 1981.

The composite mean annual water-application rate for seven strawberry farms was 54.9 in/acre. The low, mean, and high rates for six sites with sprinkler irrigation systems were 31.2, 49.2, and 93.6 in/acre, respectively. The farm with a semiclosed irrigation system applied 88.9 in/acre. Semiclosed irrigation systems are not common for strawberry farms. Although they are less likely to spread disease than sprinkler irrigation systems, they have the disadvantage of using more water per acre and being less effective for frost protection.

Monthly rates for the six sprinkler irrigation sites ranged from 0.6 in/acre in November at site 52 to 34.7 in/acre in October at site 35. Of the water applied at site 35, water pumped for frost and freeze protection during December, January, and February was 1.5 in/acre, 17.6 in/acre, and 2.3 in/acre, respectively. Total water-application rates for the three months were 5.3 in/acre, 17.6 in/acre, and 6.2 in/acre (table 2).

Tomatoes

The low, mean, and high spring season water-application rates during 1980 for seven tomato farms with semiclosed irrigation systems were 39.6, 51.0, and 62.8 in/acre, respectively. Monthly rates ranged from no irrigation in June at site 39 and in January at site 50 to 19.0 in/acre in May at site 50.

The composite mean fall season water-application rate for six tomato farms was 49.5 in/acre. The low, mean, and high fall rates for five tomato farms with semiclosed irrigation were 33.2, 57.0, and 115.0 in/acre, respectively. The unusually high rate, 115.0 in/acre at site 50, was attributed to its location on a well-drained sand ridge. Monitoring of this site continued because its spring crop was located on more favorable topography. Monthly rates for the five farms with semiclosed irrigation ranged from no irrigation during several months at all sites to 39.3 in/acre in September at site 50. The farm with sprinkler irrigation applied 12.2 in/acre during the fall season.

Tropical Fish

The low, mean, and high annual water-application rates during 1980 for two tropical fish farms with closed-pipe irrigation systems were 43.8, 72.2, and 100.6 in/acre, respectively. Monthly rates ranged from no irrigation in April, July, and October at site 33 to 13.9 in/acre in February, also at site 33. All water used by the fish farms was ground water. The water was used to maintain constant pond levels and to minimize temperature variations in summer and winter.

Watermelons

The spring water-application rate for watermelons during 1980 was 5.9 in/acre for a site with a sprinkler irrigation system and 8.6 in/acre for a site with a travel-gun irrigation system. Water was applied from March through June at both sites. The largest monthly rate was 5.0 in/acre in June at site 66 (sprinkler irrigation). This site also had a fall crop, which applied 3.8 in/acre in October. Both watermelon sites were in Levy County. Higher water-application rates probably existed in the central and southern parts of the study area.

ESTIMATING TOTAL IRRIGATION WATER USE

Data from the benchmark farm program serve as a basis for estimating the 1980 water-application rates applied throughout the entire study area. Mean water-application rates given for each crop (table 3) may be misleading when extremely high or low application rates caused by unusual conditions occurred at one or two sites. Rates were adjusted from those shown in table 3 where unusual pumpage was believed to have occurred. Adjustments were made considering factors such as rainfall, soil type, economic conditions, data obtained from County Extension Services, and consumptive water-use permits issued by the Southwest Florida Water Management District. For example, in 1980, water applied at fish farm sites 32 and 33 totaled 100.6 and 43.8 in/acre, respectively (table 2), for a mean rate of 72.2 in/acre (table 3). Site 32 was underlain by well-drained, sandy soil and required more water to maintain pond levels than site 33. Therefore, the unusually high rate at site 32 was disregarded and the 1980 water-application rate for fish farms was adjusted to 40 in/acre in accordance with the rate for site 33 and the rates permitted by the Southwest Florida Water Management District.

Adjusted 1980 application rates are presented in figure 14. Adjusted monthly rates are presented in table 4. The rates shown are generalized and vary from area to area and crop to crop. The adjusted rates for each area (county or drainage basin) are applied to estimated irrigated acres for each crop to estimate total irrigation water applied (Duerr and Trommer, 1981b). Estimates of irrigated acreage are obtained from the U.S. Soil Conservation Service, County Extension Services, Southwest Florida Water Management District, Florida Crop and Livestock Reporting Service, and field observations.

The mean water-application rate for four benchmark tomato farms in Manatee County during the spring of 1980 was calculated as 54.8 in/acre. Applying an adjusted rate of 50 in/acre (table 4) to the estimated 5,500 irrigated acres of tomatoes in the county, a total of 22,900 acre-ft (20.4 Mgal/d) of water was used for tomato irrigation in Manatee County in the spring of 1980. Similar calculations are made for each crop in each county.

SUMMARY

Irrigation water-use data are summarized for 74 benchmark farms in southwest Florida. Monthly water-application rates are given for 11 different crops. Data for 18 citrus farms go back to the early 1970's. In 1980, water-application rates ranged from no irrigation for several citrus and pasture sites to 239.7 in/acre for a nursery.

The water-application rates determined from the benchmark farm data are used as a guide for estimating total 1980 irrigation water use in the Southwest Florida Water Management District. Total irrigation data are shown in a separate report by Duerr and Trommer (1981b).

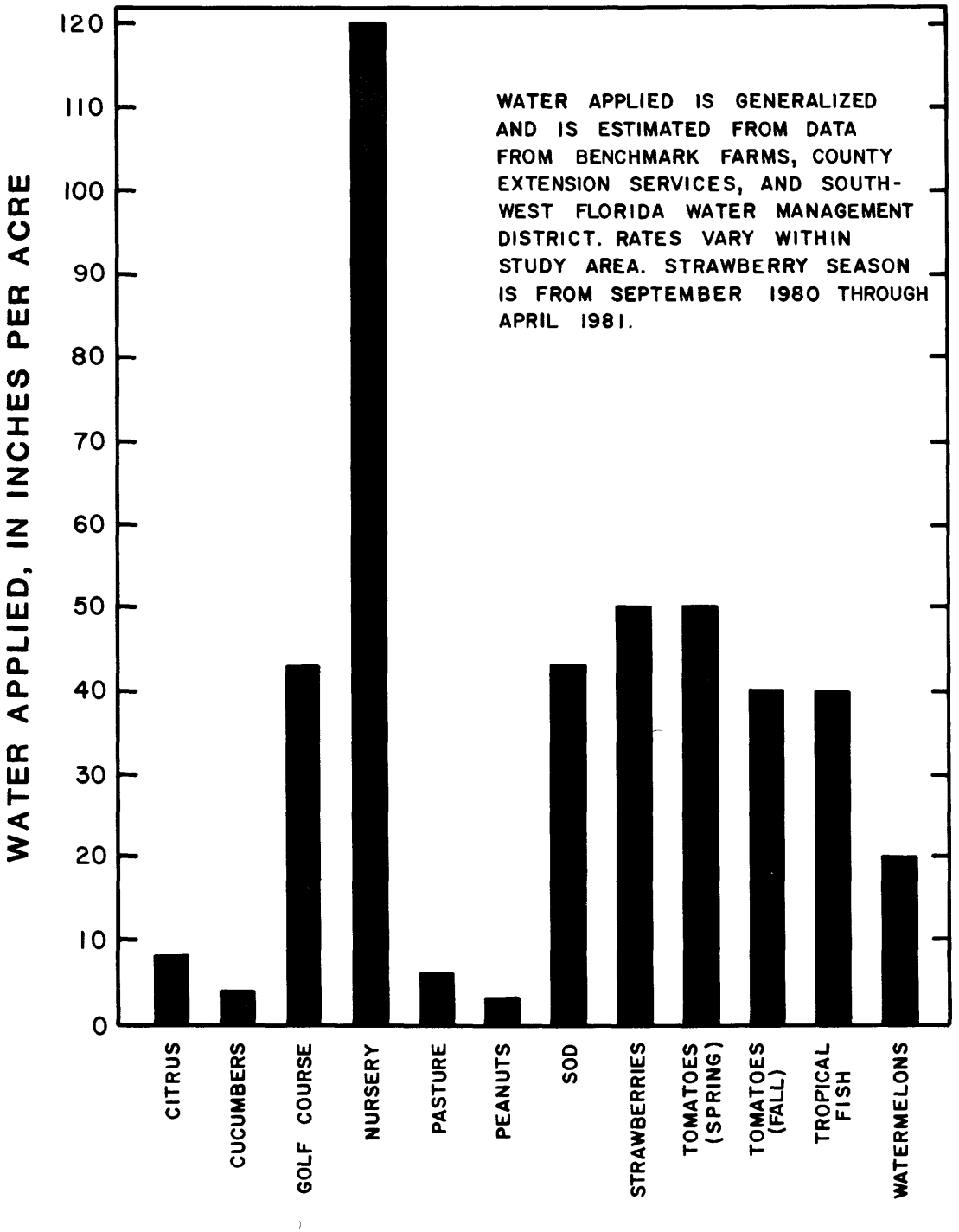


Figure 14.--Adjusted water-application rates by crop, 1980.

Table 4.--Crop calendar and adjusted monthly water-application rates by crop, 1980

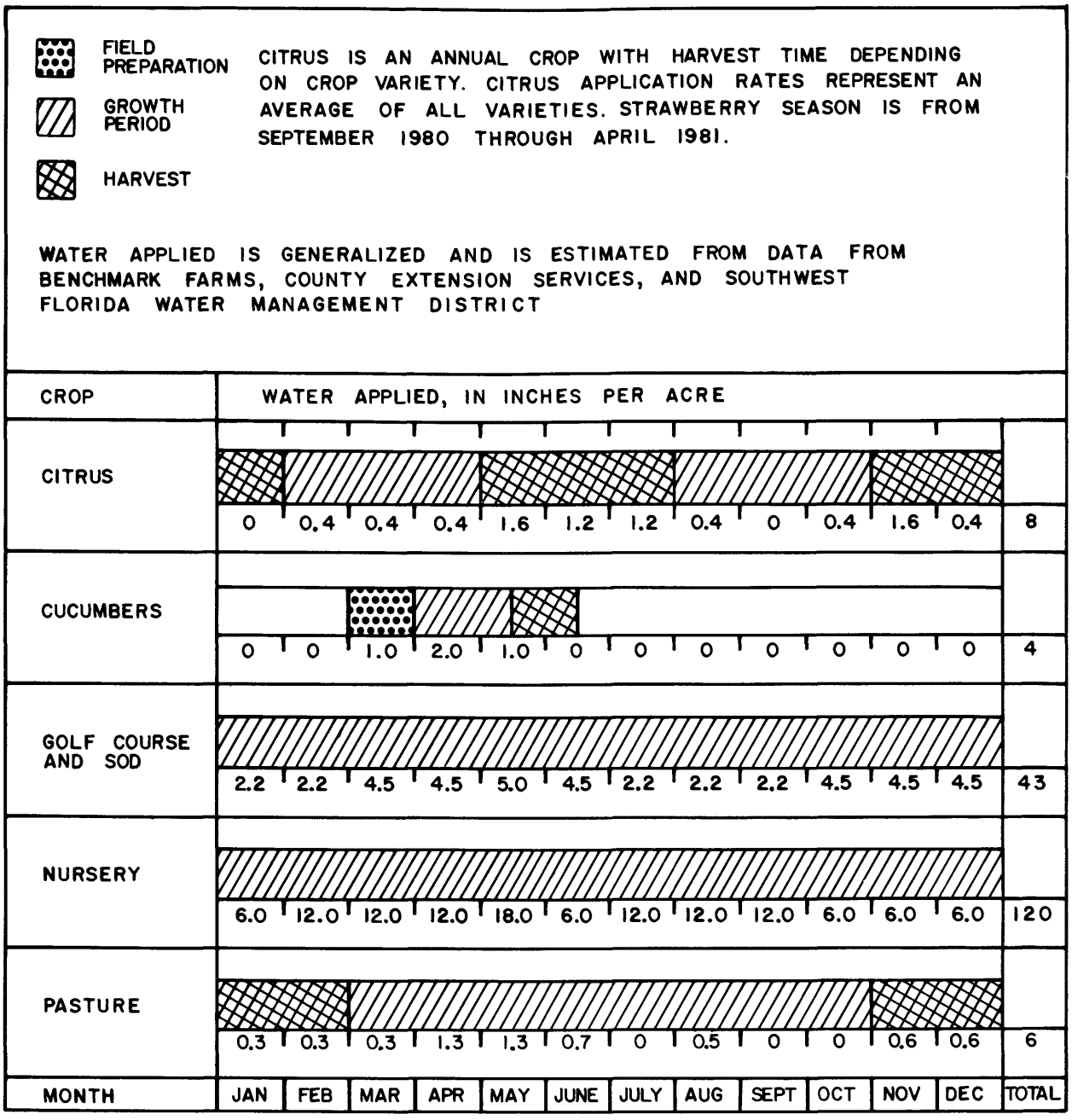
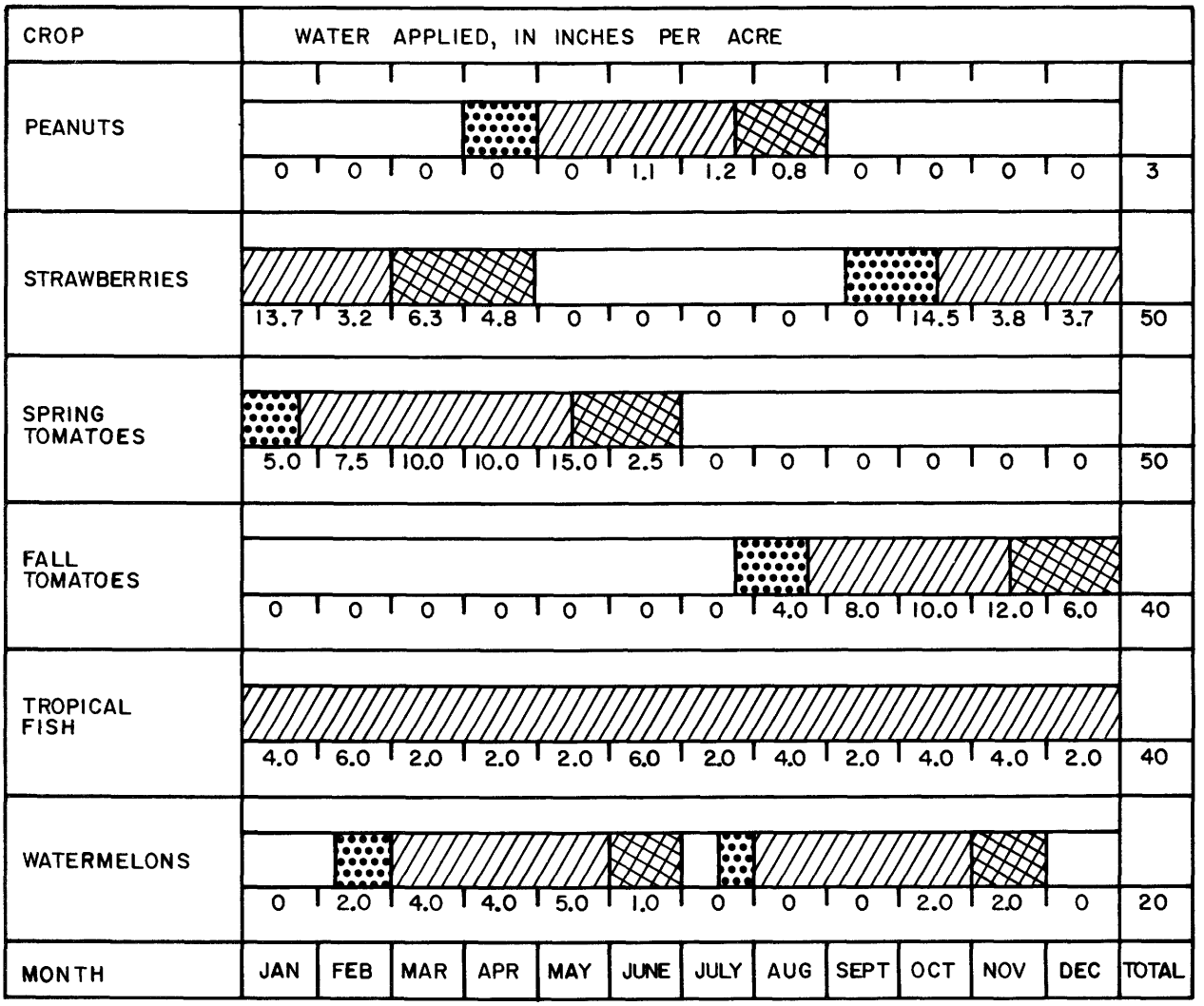


Table 4.--Crop calendar and adjusted monthly water-application rates by crop, 1980--Continued



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