Many Harvests from Arizona Crops

Arizona's irrigated fields are among the most productive agricultural lands in the world.

In upland cotton and in alfalfa, the state's two biggest crops by acreage, Arizona yields per acre are double the national average and higher than any other state's. Durum wheat is another major Arizona crop when the price is up, as it is this year and was in 1976. Yields per acre here are two and one-half times the national average (see Table 1).

Climate is one reason for the state's high yields. Southern Arizona, with most of the state's cropland, gets sunshine for 85 to 90 percent of the possible hours per year, more than anywhere else in the country except adjacent parts of California. Crop plants turn that direct sunshine into useful products. The growing season lasts almost year round in the agricultural areas of Maricopa, Pinal and Yuma counties. That has given farmers valuable flexibility in timing the use of their fields. Reliable irrigation, coupled with low rainfall, has provided them with valuable control over water.

Another factor in our high productivity is the rate at which Arizona farmers adopt advances in productive practices and crop varieties. Compared to farms elsewhere, Arizona farms are large in acreage and income. Per-farm net income in Arizona averaged $36,907 annually from 1968 to 1978. That was the highest in the country and more than 30 percent higher than the second-highest state average. Their large scale helps Arizona farms afford the investments necessary to keep at the forefront of agricultural technology.

Less than one out of 50 acres of Arizona is farmed. In some crops, though, the state ranks high in total production as well as in

Table 1.

Yields per acre: Arizona and U.S. average.*

Crop	Arizona	U.S.	Ariz. rank among states
Upland Cotton	1,008 pounds	497 pounds	1
Alfalfa Hay	6.4 tons	3.1 tons	1
Durum Wheat	72.1 bushels	29.1 bushels	2

*Figures are averages of 1977, 1978 and 1979 harvests.

yield per acre. It is among the top five states for production of cotton, vegetables, citrus fruits and grapes (see Table 2).

Table 2

Value of Production, Arizona and U.S.
(In $1,000,000s of 1978 production)

Crop	Ariz.	U.S.	Ariz. percent of U.S. total	Ariz. rank among states
Upland Cotton	297.3	3,022.0	9.8	4
Pima Cotton	23.7	41.8	56.7	1
Vegetables	130.5	3,636.1	3.6	4
All Hay	82.9	6,579.7	1.3	28
All Citrus	45.8	1,592.7	2.9	3
All Wheat	28.3	5,280.5	0.5	20
Sorghum	15.0	1,444.5	1.0	11
Corn	14.4	14,889.0	0.1	32
Grapes	13.5	997.2	1.4	5
Barley	6.0	843.6	0.7	15

Prices and Supply

How does this productivity affect Arizona consumers?

National and international marketing patterns dominate the modern food and fiber industries. This means that, except for a few products, changes elsewhere influence consumer prices in Arizona more than local changes in production and demand do. How close a supermarket is to the farm that produced the food on the shelves has less effect on consumers' prices than it did in years past. Prices for more heavily processed products, such as bread or cotton jeans, are even further insulated from such geographical effects. Transportation costs have not climbed high enough to change this picture much yet, but could encourage more localized marketing in the future.

Conversely, the same marketing patterns that make local agriculture's effects less deep also make those effects broader. Arizona does its share in stabilizing the supply and prices of agricultural products nationwide and in contributing to the national balance of trade. The state's unique growing conditions help some farmers grow products that fit into specific niches in the American food supply, most notably off-season vegetables. For crops grown in other states, too, the variety of production areas helps offset poor years in one area or another. A long heat wave parched much Texas cotton this year, for example. The price rise that resulted would likely have been significantly higher if Arizona cotton were not available.

Besides helping to supply food and fiber for the state, the country and the world, Arizona agriculture provides jobs and other economic benefits.

Jobs and Income

Cash receipts for Arizona agricultural products in 1979 totaled $1.7 billion. More than half of that, $905 million, was for crops, rather than for livestock and animal products. Even after adjustment for inflation, cash receipts for Arizona crops have climbed 27 percent in the past decade.

The people who benefit economically from this level of production can be grouped into three categories: those with direct farm jobs or income, those with other jobs or income related to agriculture in the state, and the general public.

In 1979, 28,000 people worked on Arizona farms and ranches. This included 16,000 who were farm operators or members of their families, and 12,000 who were hired workers. The hired workers earned an average of $3.42 per hour. The operators and families figure includes only those household members who worked 15 hours or more per week without receiving cash wages.

Total personal income for Arizonans working in agriculture has averaged $369 million annually for the past three years. Figure 1 shows agricultural income in relation to other income sources. In rural communities, the dependence upon agriculture is much higher.

Some of the non-farm income in the state does come from the production inputs sold to farms, such as machinery, credit and supplies, and from the processing and selling of agricultural products. Arizona agricultural producers spent about $1.2 billion on production expenses in 1978. A large but unmeasured share of these costs was paid to Arizonans in non-farm jobs.

Many of the jobs in food and fiber industries, such as in grocery wholesaling and retailing, would exist whether farm products were grown in Arizona or elsewhere. The number of Arizona jobs related specifically to Arizona farm products has not been calculated. Products grown here also become the raw materials for related jobs in other states and countries.

Processors and first handlers added 25 percent to the value of Arizona agricultural products in 1975. This group includes meat processors, cotton ginners, canners, and workers in harvesting, sorting and packing where farm employees do not perform these tasks. It does not include grocery wholesalers or retailers. For just crops, excluding animal products, these types of workers added $184 million in value, or 32 percent, to the $567 million that farmers were paid for their crops that year.

Figure 1. Major sources of Arizona personal income (in millions of dollars). The total is $13.25 billion.

Figures are averages of 1977, 1978 and 1979 incomes. Source: U.S. Department of Commerce, *Survey of Current Business.*

Important Exports

Besides the Arizonans whose incomes depend directly or indirectly on agriculture, the whole population gains some economic benefits from the strength of agriculture in the state. A chief benefit is the large contribution of Arizona agriculture to the net export balance of the United States in agricultural commodities. This contributes greatly to the strength of the dollar in international exchange, which makes it easier for U.S. consumers to buy foreign-made goods at lower prices and in the process achieve higher standards of living.

From the 1920s into the 1960s, the U.S. capability of producing more food and fiber than the nation consumed was primarily a problem of managing the surplus to protect farmers. That situation has changed

dramatically with increasing worldwide demand. Now, that extra production capacity is the United States' best lever against a weak dollar that would aggravate the problem of costly petroleum imports. In fiscal 1980, the agricultural trade surplus of $23 billion cut the non-agricultural trade deficit of $51 billion down to a net deficit of $28 billion.

Key Arizona crops, including cotton and wheat, are among the U.S. crops exported in large quantity. Thirty-nine percent of U.S. cotton is exported, including 90 percent of Arizona-grown cotton. Twenty percent of Arizona lemons were exported over a recent five-year period.

Property taxes are another way agriculture benefits the general public. In 1978, property taxes on Arizona farms totaled $28 million. The benefits that farms gain from the taxing jurisdictions must be subtracted from that figure to show the net benefit to the non-farm public.

Cotton's Role

As Table 2 shows, cotton's importance tops that of other Arizona crops in value of production and share of total U.S. production as well as in acreage. Cotton has high value per acre, so it can pay for the high costs of irrigation and pest control necessary for production in Arizona.

Table 3 traces the historical growth of the Arizona cotton industry. The jump in the early 1950s resulted from high prices and the dropping of acreage limits set by federal price-support programs. The acreage limits were restored after the Korean War, but have had virtually no impact since the early 1970s. Exports support cotton prices now. In 1979 and 1980, cotton acreage again passed 600 million. In the period from 1975 to 1979, cotton represented 42 percent of the value of Arizona's total crop production.

Table 3

Cotton Production in Arizona

Years	Ariz. & U.S. production	Rank among states	Cotton as % Ariz. irrigated crops
1935-39	1.6	13	33.4
1945-49	2.3	13	28.3
1951-53	5.8	6	54.6
1955-59	5.8	5	31.6
1965-69	5.9	5	24.8
1975-79	8.7	4	35.7

Vegetables are another high-value crop, but their prices fluctuate more rapidly and more widely than cotton prices. This higher risk factor demands that vegetable growers have the capital strength to withstand bad seasons. High-value tree and vine crops also require capital and 1980, cotton acreage again passed 600 thousand. In the period from 1975 to 1979, cotton represented 42 percent of the value of Arizona's total crop production.

Many of the lower-value crops shown in Table 4, including small grains, sorghum, safflower and sugarbeets, are often grown in rotation or double-crop systems with cotton. Crops that might not return the full costs of production can be profitable when the grower's fixed costs, such as machinery and real estate, are already covered by another crop.

Alfalfa is sometimes rotated with cotton, too. As a multi-year crop, however, it must bear fixed costs of production for itself. The rotation aids in pest and disease control and soil fertility.

Table 5 shows the geographical patterns of irrigated agriculture in Arizona. Recent acreage gains have been on Indian reservations, along the Colorado River and in groundwater pumping areas in western Maricopa and in Cochise and Graham counties.

Energy costs and state water allocations will probably minimize future establishment of any new groundwater-irrigated cropland. The same forces, plus urban growth, are also apt to stop irrigation pumps on some existing cropland. On the other hand, for the rest of this cen-

Table 4

Thousands of Acres of Selected Crops Planted in Arizona 1935-1979

	1935-39	1945-49	1951-53†	1955-59	1965-69	1975-79
All Cotton	212	240	652	377	292	491
All Wheat	43	29	20	82	49	227
Sorghum	39	72	49	159	219	98
Barley	59	164	153	193	173	58
Corn	37	32	35	40	31	52
All Hay*	214	273	244	265	235	246
Vegetables**		93	88	95	92	66
Safflower*					36	14
Citrus (bearing acreage)	18	19	17	15	30	55
Sugarbeets***					22	15

† Korean War years.
* Acres harvested.
** Broccoli, cabbage, melons, carrots, celery, cauliflower, lettuce, onions, potatoes; first column includes 1946-1949 only.
*** First column includes 1967-1969 only.

Source: Arizona Crop and Livestock Reporting Service.

tury, surface water from the Central Arizona Project (CAP) and along the Colorado may be turned to use on new acres of cropland. The CAP will provide less water for agriculture than was planned a decade or two ago, and the water will be much more expensive than other surface water already used for irrigation. Current plans, however, may allow new land to be irrigated economically on Indian reservations in Pima and Pinal counties. Further than 20 years ahead, it is harder to predict that new acreage can continue to offset retired cropland.

Table 5

Number of Acres of Irrigated Crops Grown in Arizona in Thousands of Acres

	Apache	Cochise	Coconino	Gila	Graham	Greenlee	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma	State Total
1935-39	10	8	2	2	34	6	355	2	7	23	110	3	9	62	634
1945-49	13	20	3	*	35	6	424	*	9	28	216	*	11	85	849
1951-53	16	47	13	*	37	6	544	*	15	56	297	6	14	148	1195
1955-59	11	83	4	1	36	6	493	6	12	56	283	7	17	181	1194
1965-69	8	106	8	1	56	6	477	6	17	51	227	3	8	207	1179
1975-79	8	132	2	1	60	5	490	11	15	48	268	3	7	310	1359

* Not available.