



ARIZONA

AGRICULTURE

1957



AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF ARIZONA, TUCSON



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Pictures on cover

1. Cantaloups in Yuma Valley near Somerton, May 18, 1956
 Courtesy M. N. Langley
2. Cattle feeding in Yuma Valley
 Courtesy Yuma Daily Sun
3. Hegari on recently developed land near Roll in the Wellton-
 Mohawk Division of the Gila Project
 Courtesy M. N. Langley

Arizona Agriculture

1957

PRODUCTION, INCOME, COSTS

By George W. Barr¹

A near record production on Arizona farms and ranches was achieved in 1956 in spite of cotton acreage limitation, falling water tables and general drouth. The value of crops and livestock produced for sale amounted to 380 million dollars compared with 335 million in 1955.

Cotton for the tenth year in succession led all other crops and livestock with a value of 165 million dollars for lint and seed. Cattle sales, after deducting value of imported cattle, reached 74 million dollars. Some breeding stock had to be liquidated because of the drouth, which swelled sales while bringing losses to the seller.

Values of other crops and livestock products were as follows: Lettuce and other vegetable crops, 61 million dollars; commercial feed grains, 18 million dollars; dairy products, 18 million dollars; alfalfa and other hay, 14 million dollars. (Table 1)

The increased agricultural income of recent years has been real and not just the result of inflation. Expressed in terms of buying power, the 1956 agricultural income was twice that of 1941. (Shaded bars in Figure 1.)

Yuma County's Place

Yuma is now the second county in agricultural importance in Arizona as measured by the value of the agricultural plant. It has attained this position by reason of an ample and reasonably priced supply of irrigation water, through the diversity of its production, and because of its strategic location in regard to markets. Moreover, its agricultural areas are showing a new degree of maturity. Land has been more completely leveled, weed infested ditch banks have disappeared, and insect troubles that in the past plagued the area have been at least partly mastered.

¹Head, Department of Agricultural Economics, and assisted by members of the department: R. E. Seltzer, J. S. St. Clair, A. Vanvig, T. M. Stubblefield, J. C. Headley, N. E. Landgren, R. S. McGlothlin, G. W. Campbell, O. D. Hubbard, A. L. Roberts, M. L. Cotner, J. G. Hosley, H. L. Runyan, M. V. Cannon, and M. M. Bonnin. The Federal Crop and Livestock Reporting Service, Phoenix Office headed by Evan Jones, furnished data for Table 8 and provided other information. This is the 27th annual agricultural summary issued by the University.

TABLE 1. VALUE OF CROPS AND LIVESTOCK PRODUCED IN ARIZONA FOR SALE (IN MILLIONS OF DOLLARS)

Commodity	1956	1955	Average 1946-55
Cotton lint and cottonseed	\$165	\$137	\$126.6
Cattle and Calves	74	66	56.2
Lettuce and other vegetable crops ^a	61	52	47.5
Commercial feed grains ^b	18	18	11.3
Dairy products	18	17	13.0
Alfalfa and other hay ^b	14	16	11.4
Sheep, lambs, and wool	5	5	5.0
Citrus fruits ^a	5	4	3.8
Eggs, chickens, and turkeys	4	4	5.0
Seed crops	4	3	4.0
Miscellaneous crops, including wheat and grapes	8	9	8.3
Miscellaneous livestock and livestock products	2	2.5	1.9
Federal Government payments	2 ^c	1.5	1.6
Total value	380	335	295.6

^aYear ended August 31, 1956.

^bIn addition to the quantities of the 1956 crop sold or to be sold, hay fed by Arizona producers had an estimated value of seven million dollars; grain crops and silage fed by the producer, five million dollars; and dairy, poultry, and other products consumed by producer families, four million dollars.

^cIncludes A.C.P. \$1,500,000 and Soil Bank payments \$295,000. Drouth relief payments are not included.

Yuma leads the counties of Arizona in the production of cantaloups, alfalfa seed, Bermuda-grass seed, in lemon acreage, and is second in production of lettuce, alfalfa hay, grapefruit, oranges, and in cattle feeding.

As the year 1957 opened, the Wellton-Mohawk Division of the Gila Project had reached the halfway mark in the development for irrigation of its 75,000 acres. The diversion of water from the Colorado River for irrigation in this area is indicative of the permanent nature of the project. Contributing also to its security in the future is the planned construction of a flood control dam across the Gila River above this area.

On the Colorado Indian Reservation, south of Parker, 38,000 acres have now been developed for irrigation and plans are under-way for expanding this area to around 100,000 acres, all to receive water by gravity from the Colorado River.

Return for Land

The sale price of agricultural land throughout Arizona has been rising for several years at a more rapid rate than has the net return after all farm expenses are paid.

In cotton growing areas, land is frequently bought and sold or rented on the basis of its cotton allotment, relatively little consideration being given to the remainder of the farm. Budgets shown in this publication demonstrate that production of alfalfa, barley, or grain sorghum is unprofitable unless the cotton crop bears the major portion of all the farm's interest and taxes or rent.

Of the state's 1,150,000 acres irrigated in 1956, some 465,000 were in Maricopa County, 275,000 acres in Pinal, and 175,000 acres in Yuma. (Table 8) Following the government's acreage reduction program announced in 1953, the acreage retired from cotton was replaced with small grains and sorghums in 1954. (Figure 2) Because of water shortages which discouraged double cropping and because the growing of grains and sorghums was found to be unprofitable in areas with a lift of 350 feet or greater, a considerable portion of the land retired from cotton was idle in 1955 and 1956.

The Water Problem

The supply of water for agriculture amounted to about 6.1 million acre-feet in 1956 when measured at the point of diversion from the river or at the well where pumped. The river and reservoir portion of this was about constant for each of the last four years.² Decreased flow from the Gila watershed was made up by increased diversions from the Colorado River and by reducing supplies carried in surface reservoirs.

²In 1956 water by diversion from streams and reservoirs totaled about 2,100,000 acre-feet: Colorado River below Parker Dam, 1,200,000; Salt River diversions at Granite Reef Dam less use by City of Phoenix, 700,000; Verde River and Salt River above the dams, 35,000; Agua Fria, 17,800; Gila River above the Salt, 120,000; Little Colorado and others, 50,000.

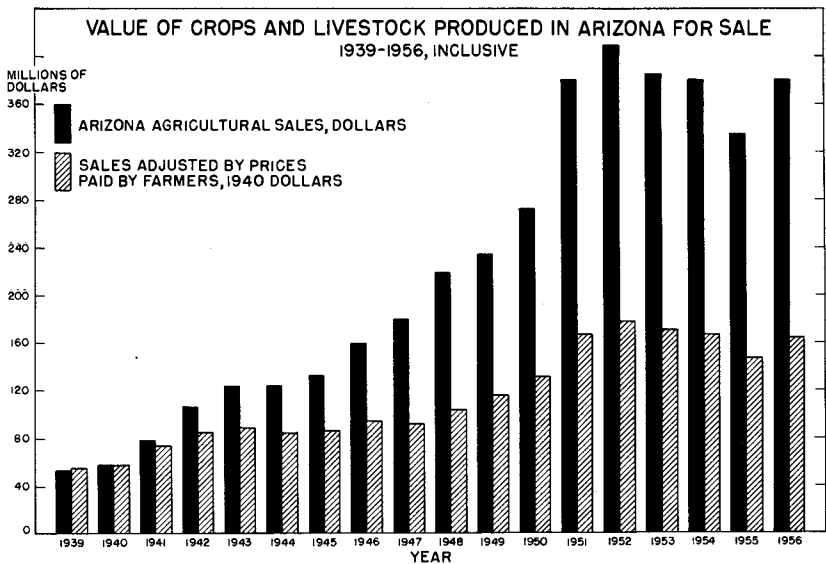


Figure 1 — Larger income from cotton, cattle, and vegetables raised cash income in 1956 to the second highest in history in terms of dollars. The shaded bars correct income for the continuing inflation.

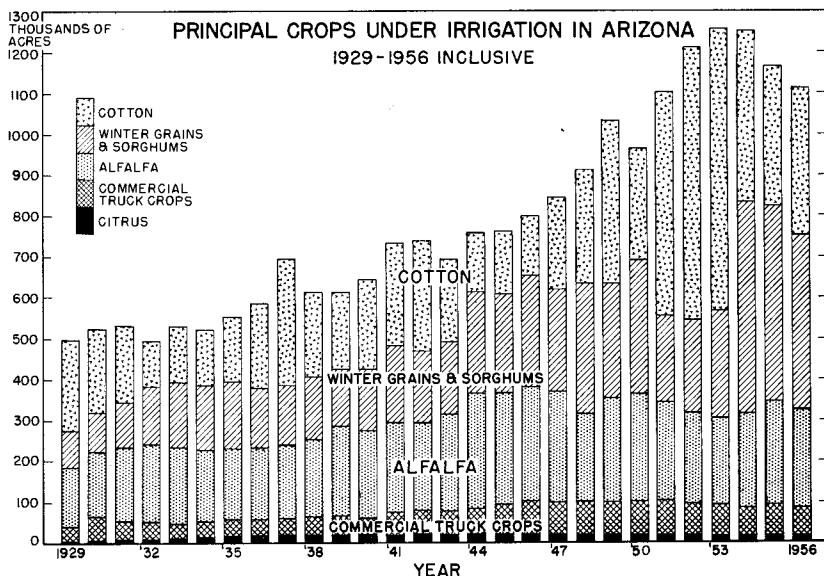


Figure 2 — Cotton was grown on 31 per cent of Arizona's irrigated land in 1956. In 1951 to 1953, before acreage was restricted, irrigation, cotton was grown on 50 per cent of the irrigated area.

About four million acre-feet was pumped from ground water in 1956: roughly half in Maricopa County and about one-fourth in Pinal County. A record amount of electricity and gas was used to pump this water.³

Ground water was lifted on the average about 270 feet in 1956, or twice the lift of 1949. The average lift in Maricopa County in 1956 was 260 feet; in Pinal County 325 feet. Santa Cruz Valley south of Tucson, and Graham and Greenlee Counties, have pumping areas that do not follow the usual pattern because they have been recharged occasionally by stream flow.

Arizona agriculture pins its hopes for 1957 and the years ahead on a continued favorable price for cotton, on greater rainfall for the ranges, and on a renewed attempt to get irrigation water to replace the dwindling ground water supply. The very dry year of 1956 is likely, from the "law of averages," to be followed by years of more plentiful rainfall. In the mountains of central Arizona it was the driest year in the last 33. (Figure 3)

Soil Bank Program

Regulations for the Soil Bank Program as announced on December 20, 1956, are divided into two parts, the acreage reserve and the conservation reserve. In Arizona the acreage reserve applies exclusively to short staple cotton. Payments vary

³Almost 1.5 billion kwh electricity and 6.9 billion cubic feet gas.

by counties and by farms. County average rates per acre for principal cotton counties are Maricopa \$147, Pinal \$135, Yuma \$131, Pima \$126, and Graham \$112. Individual farm rates will be determined by the county committee's appraisal of the farm productivity compared with average productivity in the county.

To qualify, the farmer must reduce 1957 cotton plantings below his allotted acreage and must have a like acreage from which he does not harvest a crop in 1957. The maximum soil bank acreage is 30 per cent of the allotted acreage, or 10 acres—whichever is larger. The maximum total payment to Arizona farmers is \$11,122,700, enough to pay for a reduction of about 80,000 acres. Incidentally, the latter is an acreage which in 1956 produced cotton lint valued at \$26,000,000.

The second part of the Soil Bank Program, the conservation reserve, is a five-year plan which would pay the farmer \$9 per acre per year. It is not likely to result in many contracts in Arizona.

* * * *

Farmers should plan for higher costs. Labor wage rates on Arizona farms increased seven per cent in 1956 over 1955, and 50 per cent in the 10-year period ended with 1956. Materials going into farm machinery, tractors and autos, are seven to 10 per cent higher than a year ago, so farm power and machinery will cost more. A number of custom operation rates are greater than in the preceding year. (Table 7)

COTTON

The 1956 Arizona cotton crop totaled approximately 830,000 bales, of which 26,000 bales were of the American-Egyptian type. Only four states produced more cotton: Texas, Mississippi, Arkansas, and California. The 1956 Arizona upland cotton lint yield, which was in excess of 1,100 pounds per acre, was the highest average yield ever recorded for any state, and makes the eighth consecutive year in which Arizona yield exceeded that

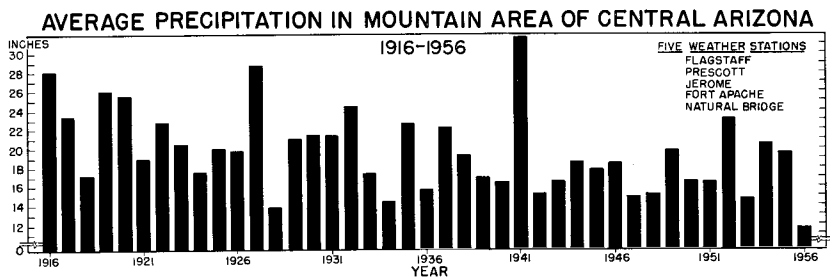


Figure 3 — As measured by five weather stations in Central Arizona, the year 1956 was the driest in the last 33 years. The drought was costly both to range livestock producers and to irrigation farmers.

TABLE 2. COST OF PRODUCING UPLAND COTTON PER ACRE, 1957^a

	Salt River Project ^b	Arizona Pump Areas	
		200' lift	350' lift
Preharvest costs			
Land preparation.....	\$12.00		
Seed	2.50		
Planting	1.50		
Cultivating	7.00		
Hoeing and thinning ^c	13.00		
Irrigation and ditch labor.....	8.00		
Fertilizer and application ^d	18.00		
Insecticide and application ^e	15.00		
Production credit.....	4.00		
Industrial Insurance and Soc. Sec. ^f	2.00	\$ 83	\$ 83
Harvest costs, net after seed credits^g			
Per bale			
Hand picking, \$3 per cwt.....	\$43.50		
Contracting, 30c to 35c per cwt. ^h	5.00		
Hauling	1.75		
All ginning services (including drying, lint cleaning, insurance and 20 days storage) 14.5 cwt. @ \$1 per cwt.....	14.50		
Seed credits deductible 800 lbs. @ \$60 per ton.....	-24.00		
	\$40.75		
For two-bale yield.....	82	82	82
Water, "out-of-pocket" cost only, 4 acre-feet.....	20	21 ⁱ	37 ⁱ
Total direct costs.....	185	186	202
Interest and depreciation on well and pump installation.....		11	19
Total cost except for land (rent or interest and taxes) and management.....	185	197	221
Return for land and management (difference between cost and expected return)	115	103	79
Total return for 2-bale yield at 30c per pound	\$300	\$300	\$300

^aCost of machine operation based on custom rates where operation is commonly hired, and on farm costs for operation where farmer normally uses his own equipment. Included is an allowance for depreciation and interest on tractor and machines. The latter is not ordinarily covered in crop financing.

^bSimilar for Yuma Valley except for water costs of \$13 for 5 acre-feet.

^cVaries depending on weed condition.

^dFor 100 lbs. N. and 25 lbs. P₂O₅.

^eFor 80 lbs. dust containing DDT Toxaphene and Sulphur @ 13c per lb. for dust (or equivalent in spray) and allowance for application.

^fIndustrial Insurance 2.73 per cent of payroll; employer contribution to Social Security, 2.25 per cent of payroll.

^gFigures for hand labor. See text.

^hIncluding Social Security on picking.

ⁱElectricity figured at 1c per kwh or 2c per acre-foot per foot of lift. See Arizona Agriculture 1954, pp. 3 and 4.

Note: **Cost of Producing Pima S-1 Cotton.** Same as above except for a net harvest cost which is estimated for a 1.2 bale lint yield at \$110 figured as follows: Hand picking including contracting \$5.50 per cwt. (1600 lbs. seed cotton per bale); hauling, \$2 per bale; all ginning services, \$25.60 per bale plus \$3.00 per bale contribution (voluntary) to the Supima Corporation; less seed credits, \$27 per bale.

of any other state. Exceptionally good weather prevailed throughout most of the picking season and lint from the 1956 crop averaged slightly higher in grade than that of the 1955 crop.

Nearly 30 per cent of the 1955 Arizona upland cotton crop remained in the government loan. Arizona ranked fifth among the 14 major cotton producing states in the proportion of the 1955 crop which moved into channels of trade outside of government loan. This is indicative of the acceptability by the cotton trade of Arizona produced cotton.

The 1957 upland cotton acreage allotment of 360,892 acres for Arizona is an increase of five per cent over 1956. This compares with a national increase of one per cent. As this is written, the support price for the 1957 cotton crop has not been announced. It is expected, however, that it will not be changed much from that established for 1956.

Only about 2,600 acres of Arizona cotton were put into the Soil Bank Program in 1956. Late announcement of the program undoubtedly held down participation. Reaction to the Soil Bank regulations, already mentioned in this publication, may not result in as large a percentage reduction on farms where an adequate water supply is available as might be expected in rainbelt states because of the comparatively low risk nature of cotton production in Arizona. The plan does provide an opportunity for pump irrigated areas to conserve ground water supplies.

It is estimated that the cost of growing and harvesting a two-bale crop on one acre of cotton in 1957 will be \$165, before water and land charges. (Table 2) The cost of water varies greatly from \$13 per acre in the Yuma Valley, to about \$20 in the Salt River Valley and to a much larger figure in most of the pumping areas. At a pumping lift of 350 feet, the total cost of water is estimated at \$14 per acre-foot, or \$56 for four acre-feet.

The per-acre "rental" value of the land for growing cotton is closely related in most instances to the total amount paid in rent for the entire farm divided by the number of acres of cotton. This, of course, is exactly the case where cotton is the only crop grown and the remainder of the farm, perhaps 60 per cent, lies idle. The cotton budget must also bear the cost of the entire farm rental where other crops are grown, in the hopes that a return will be made for management but without the expectation of a return for the use of the land, that is, for interest and taxes or rent. Some farms have been rented in the Salt River Valley at \$90 to \$110 per acre with the rent applicable only to "allotted acres."

The practice of planting-four-rows-and-skipping-four was followed in 1956 by 30 to 35 per cent of the farmers in Maricopa and Pinal Counties, according to a sample check made by the Agricultural Stabilization and Conservation staff. Where water is scarce, the practice will doubtless be continued. Under this plan of operation the cost of farming 80 acres must be charged to 40 acres. Some of the added costs that should be considered are use of at least one-fourth more water; land preparation,

nearly double; an increase in insecticide and application cost by two-thirds; and cultivating, possibly one-half more.

Machine picking accounted for about 36 per cent of the 1956 harvesting. This compares with a maximum of about 50 per cent in 1953. The reduced use of machines has been due in part to the study made in 1954 which pointed out large field-losses of cotton from machines and partly due to the availability of labor since that time.

Loss of cotton due to plant disease has been held to a rather constant figure of about 12 per cent for the last five years according to estimates of the plant disease experts. One factor in this loss has been on the increase, however. Loss from verticillium wilt was estimated at 1.7 per cent in 1950 and at 4.5 per cent in 1956. Infestation is becoming more widespread in Pinal and Maricopa Counties.

American-Egyptian

The current American-Egyptian cotton situation presents an optimistic outlook for Arizona producers. Increased domestic mill consumption and increased exports of American-Egyptian cotton, coupled with decreased imports of competitive foreign varieties, have greatly reduced the carry-over of extra-long-staple cotton in this country.

Of the 26,572 bales of 1955 crop American-Egyptian cotton which had been pledged to the Commodity Credit Corporation as collateral for loans, only 1,400 bales had not been redeemed when this was written. Producers have been able to sell their extra-long-staple cotton for a price above that of the government loan.

It appears that the following three factors have to some degree been responsible for the reduction in supply and increased demand for American-Egyptian cotton: (1) The voluntary support price at 75 per cent of parity has allowed the mill market to compete price-wise with the CCC, (2) the Supima Association of America has conducted a vigorous campaign to promote new and increased uses for American-Egyptian cotton, and (3) Egypt has been exporting a larger proportion of her crop to Iron Curtain countries. Current tensions in the Egyptian area may have caused domestic spinners to stockpile American-Egyptian cotton in anticipation of a shortage of Egyptian extra-long-staple varieties.

Because the supply of American-Egyptian cotton is declining, acreage allotments for the 1957 crop of American-Egyptian cotton have been approximately doubled. The allotment for Arizona was increased from 18,433 acres for 1956 to 36,657 acres for 1957.

LIVESTOCK AND LIVESTOCK PRODUCTS

Beef Cattle

The range livestock industry operated in 1956 under one of the most severe drouth conditions of recent times. In the 12-month period ended October 1956 a total of 540,000 head of cattle

was shipped from Arizona compared with 466,000 head during the previous 12 months. Most of these cattle (89 per cent) went to California. Numbers of cattle slaughtered in Arizona also increased to 165,000 head or 17 per cent more than in the previous year. Shipments into the state during the year ended June 1956 were 266,000 head compared with 351,000 head in the year ended June 1955. The drouth conditions reduced the weight of cattle and calves sold directly off the ranges, but the effect of the drouth in reducing numbers will not show up until the figures for 1957 are available.

Cattle feeding, which expanded into a major industry in Arizona only in 1953 and 1954, continued near the maximum output rate in 1956. About 400,000 head were fed during the year. Two hundred and twenty-two thousand head were reported on feed January 1, 1957, compared with 204,000 head January 1, 1956. Feedlot capacity increased in the state during 1956 from 300,000 to 320,000 head. The major part of the cattle fed in 1956 was fed on a custom basis.

The housewife's selection of meat at the counter when different qualities are sold at the same price indicates that she has a somewhat new set of criteria for meat quality.⁴ Practices and goals in beef feeding may need modification to assure a continuance of the predominant position of beef among meats on the dinner table. The beef industry by careful consideration of changes in consumer desires may be able to gain advantage rather than suffer disadvantage from such changes.

Cattle feeding costs are closely related to feed prices. A detailed study of 65 individual lots of cattle during the 1955-1956 feeding season showed the average cost per 100 pounds of gain was about \$25.30 for steers and heifers and \$15.80 per 100 pounds for Brahman short-fed calves.⁵ Feed alone accounted for about 85 per cent of the total cost of the gains. With higher prices for hay and barley in 1956-1957, somewhat higher costs per pound of gain are expected during the current feeding season. The principal constituents of an Arizona ration are barley or grain sorghum, or both, cottonseed meal, molasses, cottonseed hulls, alfalfa and grain hay, and in some cases silage. The bulk of the cattle fattened in Arizona are short-feds; i.e., they are on feed from 100 to 150 days.

Dairy

Arizona dairymen produced about 165,000 tons of commercial milk in 1956. Of this 153,000 tons was delivered under the federal milk marketing order. The milk marketing administrator

⁴Consumer Acceptance of Beef by George W. Campbell, Arizona Agricultural Experiment Station, Report No. 145, January 1957.

⁵Cattle Feeding Costs in Arizona, by Andrew Vanvig, Arizona Agricultural Experiment Station, Report No. 140, October 1956.

reported that 91 per cent of the milk received under the order was sold for Class 1 purposes: fluid milk, skimmed milk for fluid consumption, buttermilk, flavored milk and cream. Importations of graded milk from outside the state, that is from California, amounted to only 615 tons in the 11 months ended with November 1956.

The value of sales of dairy products at the farm amounted to 18 million dollars in 1956. The net price per 100 pounds for milk at the farm was about \$5.41.⁶

The trend toward larger and fewer units in the dairy business continues. In November 1956, a total of 469 dairymen delivered milk under the order, somewhat fewer than those who began deliveries when the order became effective December 1, 1955. But while the number of producers was less, the milk delivered increased from 23.5 million pounds in November 1955, when the marketing program was being established, to 27.6 million pounds delivered under the order in November 1956.

The number of dairy cows in Arizona was indicated to be around 40,000 head at the end of 1956. About half of these cows were in dairies serviced by the Dairy Herd Improvement Association. The average herd in the association in 1956 had 82 milk cows with a per-cow production of 9,937 pounds of milk and 373 pounds of fat. These predominantly are well equipped, Grade A dairies of which 92 per cent have farm tanks, 60 per cent have pipeline milkers and more than 50 per cent feed green chop at least part of the time.

There is an increasing use of corn for silage: 30 per cent of the dairies in 1956 compared with 16 per cent in 1955. Sorghum silage was used by 35 per cent and 18 per cent reported use of "grass silage" made up of Sudan grass, grains and low grade alfalfa. Artificial breeding was reported by 41 per cent of the dairies. Cost of producing milk increased somewhat during the year 1956 and is expected to average \$524 per cow in 1957. (Table 3) On the other hand, a greater flow of milk per cow has resulted in a lower cost of production per 100 pounds of milk. This is estimated at \$5.55. Principal item of the increase is related to an increase in the amount of concentrate fed, associated with greater production per cow. Membership in the American Dairy Association has been added as an item of cost since most dairymen belong. The increase in the sale price of milk and the decrease in production cost, resulting from increased efficiency of the dairymen has narrowed the spread between price received and the cost of production. However, the latter is still greater for the average dairy when a reasonable figure is included in the cost to cover management return.

⁶\$6 per cwt. for 3.8 per cent milk including the Class 1 premium in late months of 1956, less 30 cents adjusted rate to principal producing areas, less 19 cents hauling charge from farm to processing plant and less 10 cents to adjust from 3.8 per cent milk to more usual 3.7 per cent.

TABLE 3. COST OF PRODUCING MILK IN CENTRAL ARIZONA, 1957

	Per cow per year (dollars)	Per 100 lbs. of milk (dollars)
Feed		
Alfalfa hay ^a (30 lbs daily at \$32 per ton delivered).....	175	1.85
Concentrate ^b (8 lbs. daily throughout year).....	99	1.05
Labor		
Milking, feeding, and care of cows and cost of services furnished ^c	80	.85
Replacement of cows ^d	30	.32
land and buildings and corrals and equipment, and Interest at 6% on value of cows, on investment in land and buildings and corals and equipment, and on cost of 3 months' hay supply.....	35	.37
	30	.32
Miscellaneous costs ^e	50	.53
Management ^f	25	.26
Total cost at the farm.....	524	5.55

Note: This budget is based on a herd of 60 cows weighing 1,350 pounds each, with an average of 50 cows milking and with annual sales of 9,440 pounds of milk per cow. The latter was the 1956 average production as reported by the Dairy Herd Improvement Association, after deducting 5 per cent milk lost and used for other than human consumption.

^aAlfalfa hay or other roughage (silage, green chop, pasture) figured at the price of the feed value of an equivalent amount of hay; e.g., 80 pounds green chop, or 60 pounds of good grain sorghum silage could be substituted for 20 pounds hay.

^bFigured at \$67.80 per ton delivered for 16 per cent protein.

^cWages at \$300 per month plus \$75 per month for house, water, electricity and milk furnished.

^dThe budget assumes use of cows an average of five years, replacement of cows with heifers to freshen within six weeks, plus six weeks cost of feed and labor, a 2½ per cent death loss, a purchase price of \$260, and a sale price of old cows at 11c per pound for 1,300 pounds.

^eMiscellaneous costs per cow: Supplies and repairs, \$12; veterinary, \$8; artificial insemination, \$7.50; electricity, \$7; organizational fees including check testing, \$5; American Dairy Association, \$4; DHIA fees, \$3.50; taxes, \$4; fire insurance, \$3; industrial insurance at \$2.73 per \$100 payroll, \$1.65; Social Security, 2¼ per cent paid by employer, \$1.35; telephone, 65c; less \$3 credit for manure, and less \$10 credit for each heifer calf.

^fTotal labor and management allowance on a 60-cow dairy, would be \$6,300.

Sheep, Lambs and Wool

Numbers of stock sheep and lambs on Arizona farms and ranches in 1956 were down slightly as compared to the previous year, 410,000 in 1956 and 412,000 in 1955. The sheep industry in Arizona has declined in size in recent years, the 410,000 head in 1956 being about 150,000 below the 1941-1950 average.

The 1956 lamb crop in Arizona was estimated at 258,000 head, approximately the same as the previous year. About 75,000 spring lambs were fed in the main wintering areas of the state. Most were on irrigated pastures and made excellent gains. Prices of fed lambs averaged about \$18.50 per hundred pounds.

Wool production in Arizona during 1956 was estimated at 2,933,000 pounds, a decrease of two per cent from 1955. The incentive payment program guaranteed a support price of 62 cents per pound as a national average and will continue in 1957.

VEGETABLES

Arizona produced a 61 million dollar vegetable crop in 1956. This is a 17 per cent increase from the 52 million dollar 1955 crop. Lettuce accounted for almost all of the increase, and for about 60 per cent of the total increase from vegetables. Twenty-one thousand cars of lettuce were shipped from 45,000 acres. This acreage is 36 per cent higher than was harvested in 1955. The increase was distributed as follows: Salt River Valley fall acreage up 41 per cent; Salt River Valley spring up 50 per cent; and Yuma acreage up 17 per cent.

The lettuce industry is constantly making adjustment to change in consumer demand and to changes in the conditions of production. The conversion from Imperial to Great Lakes type reached a point in the spring and fall of 1956 in which Great Lakes constituted three-fourths or more of the total acreage in the state.

Shifts in the areas producing lettuce are occurring and new areas are being investigated. The latter include Aguila and the Harquahala plains in Maricopa County and Bowie in Cochise County. The reasons for changes included: (1) a jockeying for seasonal position in the market; (2) a desire for lower land and water costs; and (3) the urge to move from areas that have become infested with lettuce-attacking diseases and insects.

Acreage planted to cantaloups was 3,500 less than the 23,000 acres harvested in 1955. Shipments totaled 6,290 cars from 19,500 acres. Most of the decrease occurred in the Salt River Valley, where insects and disease have taken a heavy toll in recent years.

Twenty-eight hundred cars of potatoes were shipped from 4,000 acres. Carrot production was down about 50 per cent from 1955. Only 1,349 cars were shipped from 3,200 acres. Watermelons accounted for 4,800 acres and 2,900 cars.

It appears that chemical weed control is on the way, a result of recent research conducted by the Agricultural Experiment Station in cooperation with the United States Department of Agriculture. The industry expects a shift to this practice may begin by the fall of 1957.

HAY, GRAIN AND SILAGE

Alfalfa Hay

Arizona hay production in 1956 may have amounted to 657,000 tons, according to USDA estimates. A current study indicates that 530,000 tons of hay were fed to livestock in 1956, and 130,000 tons exported to California.⁷

Hay prices at the farm in the fall of 1956 ranged from \$25 to \$35 per ton. Rapid price advances occurred after mid-October, when the drouth relief program was announced for Arizona stockmen.

⁷Unpublished figures obtained in a research project of the Department of Agricultural Economics. The results of this research will be submitted for publication later this year.

Alfalfa hay growers have had to overcome difficult problems. The irregularity of yield is striking. Yield is closely related to the availability of water. Although water has been plentiful in the Yuma Valley and Gila Project and although large alfalfa growers in the Salt River Valley have their own pumps for supplemental water, yet in most of the remaining irrigated areas growers have had difficulty getting enough water on the alfalfa to make a satisfactory crop. If the irrigation water supply is limited on farms where both alfalfa and cotton are grown, the alfalfa fields get only water not needed for cotton. Control of insects is costly. Out of an estimated cost of \$102 to grow and harvest an acre of alfalfa hay in the Salt River Valley, \$15 is budgeted for insect control. (Table 4)

TABLE 4. COST OF PRODUCING ALFALFA HAY PER ACRE, CENTRAL ARIZONA, 1957^a

	Salt River Project	Pump Areas	
		200' lift	300' lift
Establishing stand			
Land preparation.....	\$13.00		
Seed (20 lbs. @ 30c).....	6.00		
Drilling	1.00		
Irrigating, twice.....	2.50		
Insecticide and application.....	2.50		
Fertilizer and application (75 lbs. P ₂ O ₅).....	9.00		
Water, 1 acre-foot.....	5.00		
Total cost establishing stand.....	\$39.00		
One-third charged each year	\$ 13	\$ 13	\$ 13
Growing and harvesting cost			
Irrigation labor.....	\$10.00		
Fertilizer and application (75 lbs. P ₂ O ₅).....	9.00		
Insecticide and application ^b	15.00		
Mowing and raking.....	8.00		
Baling, 5 tons.....	22.00		
Total growing and harvesting cost.....	64	64	64
Water, "out-of-pocket" cost only, 5 acre-feet.....	25	27	40
Total direct costs.....	\$102	\$104	\$117
Interest and depreciation on well and pump installation.....		13	20
Total cost except for land (rent or interest and taxes) and management.....	102	117	137
Return for land and management (difference between cost and expected return)	23	8	
Total return for 5-ton yield at \$25 per ton	\$125	\$125	\$125

^aThese calculations represent anticipated costs during 1957 on owner-operated farms assuming a yield of 5 tons per acre. No item was included for farm automobile expense, and no return credited for pasture, or for soil improvement.

^bFor six ground applications; 90 pounds of 5% Malathion @ 13c, plus cost of application. Number of applications will vary.

Grain and Silage

A total of 261,000 tons of grain (excluding wheat) were fed in Arizona in 1956. This is some 40,000 tons more than was fed in the preceding year. Primarily the increase was due to the larger number of cattle finished in feedlots in 1956. Barley comprised 65 per cent of the total grain fed to livestock. Sorghum grain contributed another 25 per cent. The remaining 10 per cent was made up of corn, oats and wheat.

Arizona storage stocks of most grains, including grain stored under CCC loan, were reduced during 1956. The total reduction in farm and commercial storage stocks of feed grains amounted to about 70,000 tons. It is interesting to note that the average farm price for grain at harvest was 30 to 40 cents per hundredweight higher than the effective support price.

Net exports of feed grains from Arizona in 1956 amounted to some 226,000 tons. Nearly all of this went to feed-deficit areas in California.

Barley is the leading feed grain of Arizona with a harvested acreage in 1956 of 173,000 acres from which were produced 249,000 tons of grain. Barley prices in 1956 were about 12 per

TABLE 5. COST OF PRODUCING BARLEY PER ACRE,
CENTRAL ARIZONA, 1957

	Salt River Project	Pump Areas	
		200' lift	300' lift
Preharvest costs			
Land preparation.....	\$ 8.50		
Seed (100 lbs. @ \$4).....	4.00		
Drilling	1.00		
Irrigation and ditch labor.....	5.50		
Fertilizer and application ^a	15.00		
Insecticide and application ^b			
Total preharvest costs.....	\$34	\$34	\$34
Harvest costs			
Combining	\$ 5.00		
Hauling	4.00		
Total harvest costs.....	9	9	9
Water, "out-of-pocket" cost only, 2½ acre-feet.....	6	12	18
Total direct costs.....	\$49	\$55	\$61
Interest and depreciation on well and pump installation.....		6	9
Total cost except for land (rent or in- terest and taxes) and management.....	49	61	70
Return for land and management (differ- ence between cost and expected return)	31	19	10
Total return for 1.6-ton yield at \$50 per ton.....	\$80	\$80	\$80

^aFor 75 pounds of N. and 25 pounds of P₂O₅.

^bInsecticide application not included but when needed for control of aphids and mites, 20 pounds of 3% Malathion at 9c, plus \$1 per acre for application, total cost \$2.80.

cent higher than in the preceding year and contracts offered growers in January for the 1957 crop indicated a still more favorable price in 1957, \$50 per ton and up in bulk deliveries to warehouses.

The cost of producing barley, as well as grain sorghum, will be higher in 1957 than in many past years because on most farms water will not be available in sufficient quantity to permit double-cropping. It is estimated that the cost of growing and harvesting barley on the single crop plan will be \$43 per acre in 1957, without the inclusion of water costs and land and management charges. (Table 5) The budget assumes a yield of 1.6 tons of grain and a gross return at \$50 per ton, of \$80 an acre. Many growers have been getting only one ton per acre. Such a yield results in a financial loss almost everywhere in the state. Usually barley will be the grain planted on farms where only one grain is grown. Winter water tends to be less expensive and in many places more plentiful than summer water, and less is required per ton of grain grown.

TABLE 6. COST OF PRODUCING GRAIN SORGHUMS PER ACRE, CENTRAL ARIZONA, 1957

	Salt River Project	Pump Areas	
		200' lift	300' lift
Preharvest costs			
Land preparation.....	\$ 8.50		
Seed	1.00		
Planting	1.00		
Cultivating	2.50		
Irrigation and ditch labor.....	6.50		
Fertilizer and application ^a	18.00		
Insecticide and application ^b	5.50		
Total preharvest costs.....	\$43	\$43	\$43
Harvest costs			
Combining	\$ 6.00		
Hauling	4.00		
Total harvest costs.....	10	10	10
Water, "out-of-pocket" cost only, 3 acre-feet.....	12	16	24
Total direct costs.....	\$65	\$69	\$77
Interest and depreciation on well and pump installation.....		8	12
Total cost except for land (rent or interest and taxes) and management.....	65	77	89
Return for land and management (difference between cost and expected return)	25	13	1
Total return for 1.8-ton yield at \$50 per ton.....	\$90	\$90	\$90

^aFor 100 pounds of N. and 25 pounds of P₂O₅.

^bWhen needed, 20 pounds of DDT and Sulphur at 13c, plus \$1 per acre for application to control stinkbugs. For the lesser corn stalk borer a ground application at the time of planting of 10 pounds 10% Chlordane or 2% Dieldrin costing \$1.20 plus 80c for application.

A 20,000-acre reduction of grain sorghum in Maricopa County in 1956 compared with 1955 reflected the effects of insect damages with resultant lower yields, the "skip-row" planting of cotton, and restricted water supplies. Some double cropping of hegari grain was attempted in 1956 but an early frost (November 2) damaged the second grain crop. The double cropping of hegari for silage purposes at lower elevations in southern Arizona is being recommended where water is available. For grain purposes the varieties most common are hegari and Double Dwarf 38 milo.

Increased cattle feeding has made a ready market for both grain sorghum and for silage. Some 485,000 tons of silage was fed in 1956. About 75 per cent of this was fed to cattle in feedlots. Silage prices in the Salt River Valley late in the harvest season of 1956 varied from \$6.50 per ton to as high as \$8 standing in the field, although earlier in the season some silage sold as low as \$4.50.

Cost of producing grain sorghum is a little higher than that of growing barley, partly because more water is used. In areas where the pumping lift is 300 feet, a somewhat greater than average yield, about 1.8 tons grain per acre, will be required to pay the costs of growing, harvesting, and water in 1957. (Table 6)

SEED CROPS

After a period of years of declining yields and declining importance, Arizona's crop of alfalfa seed was much better in 1956. In the period 1947 to 1950 Arizona produced about one-eighth of the United States crop of alfalfa seed. The Arizona crop in 1956 was reported to be 9,000,000 pounds from 36,000 acres, or a yield of 250 pounds per acre. There is new experimental evidence that proper area-wide management may resolve the pollination and insect control problems, which at times have been in conflict with each other.

The 1956 Arizona crop of sugar beet seed amounted to 5,700,000 pounds with an average yield of 2,870 pounds per acre at a contract price of 14 cents per pound. The acreage planted in 1956 for harvest in 1957 comprises 1,850 acres with a contract price of 14.5 cents. Almost all of Arizona sugar beet seed is produced in Maricopa County.

Yuma County continues to produce practically the entire U.S. crop of Bermuda seed. Other seed crops are important in Arizona. During the year 1956 the Crop Improvement Association certified for seed 3,200 acres of small grains and 8,000 acres of sorghums.

TABLE 7. CUSTOM OPERATION RATES, CENTRAL ARIZONA,
EFFECTIVE TO JANUARY, 1957^a

Operation	Most	Unit
	Common Rates (dollars)	
Land preparation, tillage and crop care		
Stalk cutting.....	1.50	Acre
Disk plowing, 12 in.....	4.50-5.50	"
Moldboard plowing, 16 in.....	8.50	"
Renovating, 8-10 in.....	2.50-3.50	"
Subsoiling, 20 in. depth with shanks 3' apart.....	5.00-6.00	"
Land planning (twice: first time \$3, second time \$2.50).....	5.50	"
Disking, offset.....	1.75-2.00	"
Dragging.....	1.50-1.75	"
Bordering, border disk.....	.75	"
Planting, row crops.....	1.50-1.75	"
Drilling grains.....	1.75-2.00	"
Broadcast seeding.....	.75-1.00	"
Cultivating.....	1.25-1.50	"
Ground dusting, cotton.....	.90	"
Ground spraying for weeds in		
Grains.....	1.50	"
Carrots (oil spray).....	2.00	"
Onions.....	3.00	"
Ground spraying (insecticides)		
Cotton.....	1.25	"
Alfalfa.....	1.25	"
Vegetables.....	2.00	"
Fumigation (ground injection to control nematodes).....	3.00	"
Operations by Airplanes ^b		
Seeding alfalfa or small grain.....	1.20	"
Dusting cotton, 20 pounds application ^c90-1.00	"
Dusting vegetables ^d	1.00	"
Insecticide spraying, 5 gal. application ^e	1.70	"
Defoliating cotton, 10 gal. application.....	2.65	"
Citrus dusting.....	2.00	"
Harvesting		
Combining barley, wheat ^f	5.00-6.00	"
Combining sorghum.....	6.00-7.00	"
Combining soybeans.....	7.00	"
Mowing hay.....	1.25-1.50	"
Raking hay.....	1.25-1.50	"
Baling hay.....	4.00-4.50	Ton
Hauling and stacking baled hay.....	1.50-1.75	"
Baling straw.....	6.00	"
Cutting and hauling sorghum for silage ^g	2.00	"
Machine picking and hauling of Upland cotton ^h	1.75-2.00	Cwt.
Machine picking and hauling of Pima S-1 cotton ^h	3.00-3.50	"
Hauling ⁱ	1.75	Ton

^aBased on interviews with custom operators.

^bWhere custom operator furnishes flagmen. If farmer furnishes flagmen, rates are about 10c per acre lower; \$25 minimum charge for airplane operations.

^c4½c per pound but 90c per acre minimum 300 acres or over, \$1 per acre minimum under 30 acres.

^d5c per pound with \$1 per acre minimum, 7½c per pound for organic phosphates.

^eRates vary from 4 gallons @ \$1.50 per acre to 15 gallons @ \$3.15 per acre.

^fVaries according to yield and amount of lodging.

^gIncludes hauling up to 5 miles.

^hIncludes trailers and hauling to gin.

ⁱFor first 5 miles; 5c per ton for each additional mile.

TABLE 8. PRINCIPAL ARIZONA CROPS IN 1956 — ACREAGE BY COUNTIES AND PRODUCTION FOR THE STATE

	State Totals ^a	Apache	Cochise	Cococino	Graham	Greenlee	Maricopa	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Acres Irrigated ^{bc}	1,150,000	12,000	80,000	4,000	35,000	6,000	465,000	10,000	55,000	275,000	8,000	15,000	175,000
Alfalfa: Acres ^d	212,000	4,000	8,200	1,000	6,000	1,600	100,000	2,200	5,100	36,000	1,600	5,500	37,500
Tons cut for hay ^d	657,000												
Cotton: Upland, Acres.....	340,000		12,500		9,570	1,690	125,470		22,270	138,000	1,680		28,600
Bales ^b	804,000												
American-Egyptian Acres harvested.....	18,000		70		4,530		7,510		1,350	4,380	20		140
Bales.....	26,000												
Barley Acres harvested.....	173,000	200	2,500	200	3,200	300	86,500	200	3,800	58,000	1,000	1,000	15,000
Tons of grain.....	249,000												
Corn Acres harvested.....	45,000	7,000	15,000 ^e	2,000	2,000	500	10,000	8,000	1,000	2,000	500	4,000	2,000
Tons of grain.....	32,060												
Grain sorghums for all purposes, acres.....	129,000	200	30,000 ^e	200	2,000	800	61,000	100	7,000	20,000	300	400	12,000
Tons of grain ^f	121,000												
Wheat: Acres.....	58,000	400	700	900	400	500	26,100	1,900	5,000	10,000		1,000	10,000
Tons of grain.....	52,000												
Dry edible beans: Acres harvested.....	6,000		725 ^e	3,500				500					
Tons.....	1,300												
Vegetables, Acres ^{bg}	90,000	200	4,000	100	100	250	50,000	300	700	1,000	50	200	32,000
Carlots shipped ^{bg}	40,000												
Grapefruit—Acres ^b	6,000						4,500		40	15			1,480
Tons sold ^{bg}	77,000												
Oranges and Tangerines Acres ^b	6,700						5,500		50	50			1,070
Tons sold ^{bg}	44,000												
Lemons—Acres ^b	4,900						1,000		5	15			3,870

Source: Federal Crop & Livestock Reporting Service, Phoenix, except as otherwise noted.

^aState totals include estimates for Mohave and Gila Counties.

^bEstimates of the Department of Agricultural Economics, University of Arizona.

^cFigures represent both irrigated crops and irrigated pasture. Acreage double cropped is counted but once. In addition, it is estimated that dry-land crops were harvested from approximately 50,000 acres. Hence, the figures on this line do not represent crop acreage totals.

^dAlfalfa acreage does not include land that was pastured only, and tons of alfalfa do not include hay crops pastured.

^eFigures obtained in survey by Agricultural Extension Service, January, 1957.

^fDoes not include grain on 33,000 acres harvested for silage and forage.

^gYear ended August 31, 1956.