

SATURDAY *SJ*

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*Calif. Works*  
**24**

MAR. 1962

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83

SAT., MARCH 24, 1962

282

will be included in the conservation program: Construction of water-spreading structures on a watered basis; construction of flood-and-silt control dams and gully-control structures; stream-bank protection; reseeding and reforestation of denuded areas; construction of fences and stock-water facilities to provide better range utilization; and any other measures which are found to be effective in retarding erosion on these lands. Trees for wood lots, windbreaks, and erosion control will be grown and supplied to Indians and groups of Indians who will plant and care for the trees.

The conservation program is based on the concept that conservation of resources can be achieved only through the mutual efforts of the Navajos and the Federal Government. Since the Navajo himself is to use and benefit from the area, he must assume major responsibility for the care of the land and of the structures built to protect the land. For example, in the last analysis, only the Navajo can prevent his flock of sheep from overgrazing every steep, eroded hillside in the neighborhood.

The success of any program for the conservation of soil and moisture on the Navajo Reservation will depend upon the alleviation of the basic human causes of soil erosion, namely, over-population, improper land-use practices, and lack of education in conservation.

The estimated capital cost of the soil and moisture conservation work which can be effectively carried out during the next 10 years is \$10,000,000. In addition, the Navajos will be expected to contribute \$1,657,000, largely in the form of hand labor on projects which will benefit an entire Indian community, or the farms of individual Indians. The program should not, of course, cease at the end of 10 years, since the protection of land against erosion must continue indefinitely.

#### EXTENSION OF EXISTING IRRIGATION PROJECTS

Irrigation farming is now second to sheep raising as a source of food and income on the Navajo Reservation. The most recent studies indicate that 40 acres of class I, or 60 acres of class II irrigated land, with a dependable water supply, are sufficient to support a family at a reasonable level under present conditions.

The present irrigation development on the reservation consists of 78 small tracts, varying in area from 20 to 4,800 acres each. These projects and statistics concerning them are listed in table 2. Table 3 shows the potential increase in irrigated acreage of projects having an assured water supply which are now incomplete. The present aggregate area in these units now provided with irrigation facilities is 23,000 acres, of which about one-half is class I, and one-half class II land, of five classes of land surveyed. Based upon the estimated productive capacity, the present irrigated area is sufficient for the sole support of 400 families. (Some 2,468 families used this land in 1946 with an average income of \$300 per family.)

Table 2.—Active existing irrigation projects—Navajo Reservation

Project	Number	Acres under ditch	Ultimate acres	Maximum irrigated period 1941-46	Estimated additional cost to complete <sup>1</sup>
Aneth	58-1	150	150	150	\$15,000
Beautiful Valley	58-2	250	300	199	47,000
Begashibito	58-4	68	200	68	52,000
✓Beclabito	58-5	72	150	56	68,000
Big Sage Mesa	58-6	0	600	0	26,500
Black Falls	58-9	0	1,600	0	75,000
Cambridge	58-11	300	300	122	15,000
✓Captain Tom	58-12	1,930	3,700	<sup>2</sup> 1,057	245,000
Charles Burke School	58-13	141	150	121	17,100
Chinle	58-15	1,470	1,720	1,101	200,000
✓Choiska	58-16	1,000	1,000	597	120,000
Cove	58-18	325	350	128	33,000
✓Crown Point School	58-20	22	60	16	
✓Crystal	58-21	408	600	275	116,000
✓Cudai	58-22	600	800	267	150,000
Denchoiso	58-24	637	800	455	47,000
Fort Defiance	58-25	160	510	159	26,000
✓Fruitland	58-26	3,275	3,675	2,107	300,000
✓Ganado-Cornfields	58-28	2,150	2,825	1,249	500,000
✓Grey Mesa	58-29	1,000	1,000	708	50,000
✓Hogback	58-30	4,832	11,500	3,112	1,100,000
Houck	58-31	350	750	155	50,000
Navajo-Jones Canyon	58-33	126	126	121	50,000
Kinlichee	58-35	201	250	150	50,000
Klagetoh	58-36	350	400	300	26,000
Likascod	58-38	110	200	69	
Lower Denebito	58-43	233	300	208	
Lower Moencopi	58-44	65	160	55	50,000
Lower Rock Point	58-45	833	2,000	813	100,000
Lukachukai	58-47	969	1,000	955	75,000
Many Farms	58-48	1,616	4,300	1,075	450,000
Marsh Pass	58-50	363	400	351	75,000
Moenave-Van Zee	58-52	115	115	115	23,000
Moencopi-Tuba	58-53	640	640	626	200,000
Montezuma Creek	58-54	300	300	28	26,000
✓Mulholland Well	58-57	60	60	30	
✓Naschiti:					
✓ Drolet	58-58	200	200	217	
✓ Northern	58-59	190	600	152	50,000
✓ Southern	58-60	50	250	32	
Natoni	58-61	100	175	70	
Natural Bridge	58-62	28	1,000	16	300,000
Nazlini	58-63	30	100	30	10,000
Oak Springs	58-64	42	50	42	5,000
Paiute Canyon	58-67	177	177	177	10,000
Red House	58-69	312	350	256	12,000
Red Lake	58-70	700	1,000	314	180,000
Red Rock	58-71	300	300	175	32,000
Red Rock Valley	58-72	200	200	69	10,000
Reservoir Canyon	58-73	301	301	301	( <sup>1</sup> )
Round Rock	58-75	400	600	288	50,000
✓Sanatee and Beautiful Mountain	58-77	800	1,000	581	40,000
Segihotsoci	58-78	83	100	73	15,000
Shili	58-79	400	500	282	30,000
✓Sheep Springs	58-80	339	500	218	60,000
✓Standing Rock	58-83	34	34	15	
✓Stinking Water	58-84	50	50	32	20,000
Teec Nos Pas	58-86	450	600	418	30,000
Tochinlini	58-87	190	250	181	25,000
Todestani	58-88	100	200	26	10,000
✓Toadlena	58-89	275	300	227	20,000
✓Tocito	58-90	250	250	148	20,000

See footnotes at end of table.

Table 2—Active existing irrigation project—Continued

Project	Number	Acres under ditch	Ultimate acres	Maximum irrigated period 1941-46	Estimated additional cost to complete <sup>1</sup>
Todelto Park	58-91	100	500	39	\$17,000
✓Tohalsissy	58-92	275	300	197	20,000
Tolani Lakes	58-95	220	220	107	12,000
Tolthlakan	58-97	160	340	112	20,000
Tuba City School	58-99	25	40	21	2,000
✓Well 14A-79	58-100	30	40	22	2,000
✓Well 14M-1	58-101	100	100	59	12,000
Wheatfields	58-103	1,000	1,050	711	175,000
Whiskey Creek	58-104	100	100	32	2,000
✓Zilbetod	58-105	250	300	147	20,000
Jeddito-Navajo	58-106	67	67	67	6,000
Aqua Sol		122	122	122	15,000
Shonto		102	102	102	15,000
Canyon De Chelley		250	600	( <sup>b</sup> )	20,000
Sonala Butte Reservoir					360,000
Miscellaneous:					
Project domestic water supply					267,400
Project building and plant.					150,000
Surveys and investigations					200,000
Miscellaneous subsistence and dry farm tracts			<sup>3</sup> 2,900	( <sup>b</sup> )	1,400,000
Total		33,923	58,859	23,076	<sup>1</sup> 8,022,000

<sup>1</sup> Since these estimates were compiled, prices have risen, making the total estimated cost \$9,000,000.

<sup>2</sup> May become a part of Shiprock project.

<sup>3</sup> 29,150 acres have been reported as "dry farm." It is estimated that 10 percent or 2,900 acres may be converted to irrigated units.

<sup>4</sup> See No. 58-53.

<sup>5</sup> No data.

TABLE 3.—Projects having assured water and incomplete

Project	Now irrigated	Acreage	
		Ultimate	Increase
Black Falls	0	1,600	1,600
Cudai	267	800	533
Fort Defiance	160	510	350
Fruitland	2,107	3,675	1,568
Ganado	1,249	2,825	1,576
Hogback	3,112	11,500	8,388
Many Farms	1,075	4,300	3,225
Natural Bridge	16	1,000	984
Red Lake	314	1,000	686
Total	8,300	27,210	18,910
Present maximum irrigated acreage			23,076
Increase on assured water supply units			18,910
Total acreage with assured water supply			41,986
Acreage with intermittent water supply			16,873
Total ultimate irrigable acreage			58,859

The potential irrigation development consists of (1) expanding to their ultimate areas the small miscellaneous units;

(2) the construction of the Shiprock project; (3) the inclusion in the proposed Bureau of Reclamation Animas-La Plata project of all irrigable Indian land in the Monument Rocks area; and (4) the inclusion in the proposed Bureau of Reclamation South San Juan project of all irrigable Indian land which can be served. The last three are discussed separately in a subsequent section of this report.

The 78 existing small irrigated tracts are scattered over the entire reservation, and because of such dispersal, fit in well with the livestock economy of the Indians. The expansion of these units to their ultimate irrigable area, estimated at 58,500 acres, should be given a high priority. The work involved consists principally of extending and improving the canal and lateral systems, the development of additional storage, and the preparation of the land for Indian use. Surveys and the preparation of detail plans are sufficiently advanced so that this work can be started immediately.

The reimbursable expenditures on these units to date amount to \$3,062,621 for the 23,000 acres presently supplied with irrigation facilities. The estimated cost of completing the 78 units to their ultimate irrigable area of 58,500 acres is \$9,000,000, at current prices of materials, equipment, and labor (which are about 180 percent of the 1940 costs), and assuming that funds are made available as needed, to permit economical construction.

On the basis of estimated productive capacity, the completion of these tracts will provide an additional 800 families with opportunities for attaining self-support by farming. In addition to the farm families, it is estimated that 300 nonfarm families would derive their support as a direct result of this development, making 1,100 families which, together with the present irrigated area, will provide opportunities for a total of 1,500 families on these miscellaneous irrigated tracts.

### TIMBER

The forest resources of the reservation constitute a valuable tribal asset, which is now being successfully utilized on a relatively conservative scale, and which may be susceptible of further development to provide support for a substantial number of Navajo families on a permanent basis.

The present Navajo Tribal sawmill operation is obtaining saw logs from the Defiance and Tsailee timber units. These include an area of 160,000 acres supporting a stand of ponderosa pine estimated at about 600 million feet board measure, based upon a very extensive and inadequate cruise made about 10 years ago. The total allowable cut during the first 25-year cutting cycle is estimated to be 329 million feet, or about 13 million feet per year, which is about the rate of cutting being currently maintained by the sawmill.

In addition to the 160,000 acres in the present working circle there are probably 100,000 acres of commercial timberland in the Chuska Mountains. If any considerable portion