LAND MANAGEMENT UNIT NO. 7

AGRONOMY BRANCH REPORT

SOIL CONSERVATION SERVICE

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LAND MANAGEMENT SURVEY
Unit No. 7
AGRONOMY DIVISION

Land Management Unit No. 7 occupies parts of Navajo and Apache Counties in Arizona. Most of the Unit, or 874,675 acres, is in Navajo County with only 49,407 acres of the northeast corner falling in Apache County.

The Unit lies between 35° 00' and 36° 00' parallels of latitude and 109° 45' and 110° 45' meridians of longitude. The Reservation boundary extends along the south end of the Unit.

The Unit is located in the south-central portion of the Navajo Reservation.

That part of the Unit north of the 35° 30' parallel of latitude is all Reservation land, while that south of this line is divided between Reservation, Railroad, and other potential lands.

TOPOGRAPHY

In the northeastern part of the Unit is Balah Kai Mesa, extending in a southwestern direction until the finger-like extension finally breaks off near White Cone and at Amatowi Ruin.

*Traveling further south, we enter the rough and irregular Hopi Buttes country, which extends to the southern boundary. This part of the Unit is noted for its innumerable

*See report on Geology of Unit No. 7

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lava-capped mesas which are scattered over an area about 40 miles long and 35 miles wide.

Most of the agricultural land is located on fans formed by the drainages from the igneous covered mesas.

All the drainages in the Unit flow in a southwestern direction with the exception of Coyote Wash in the southwest corner, and it flows slightly northwest until it reached the Jeddito, six and one-half miles west of the Unit boundary. The Jeddito heads in the northeastern part of the Unit and flows southwest until it fans only a short distance above the Unit boundary. The old valley, however, continues until it reaches the Polacca drainage in Unit No. 5. It is only the heavy floods that reach many miles beyond the Unit boundary.

Another small drainage that deserves mention, because of possible developments, is the Bidahochee. It heads north of Indian Wells, runs in a southern direction 18 miles, draining approximately 185,000 acres before emptying into the Cottonwood Wash.

The Cottonwood Wash cuts through the southeastern corner of the Unit.

GEOLOGY

The following paragraphs were taken from Tom Meek's report on the Geology of District 7.

"The geology of the Unit is represented by the formations from the Triassic to late Tertiary age. The varie-

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"gated Chin Lee formation is the most widespread of the Unit, extending from the vicinity of Indian Wells south to the southern border of the district. The Mesa Verde formation forms the Mesas in the northern part of the Unit, with the Mancos, Dakota, the Morrison forming a thin border along its outskirts. The Tertiary sediments are distributed throughout the Unit and occupy zones immediately overlying all of the other formations.

The Hopi Buttes volcanic field is an isolated field measuring from 35 to 40 miles on a side. The rolling plains and irregular badlands are diversified by groups of castle and chimney-like buttes, by wall-like dikes, and by lava-capped mesas that stand out conspicuously among the delicately tinted sediments by reason of their somber color."

CLIMATE

The climatological data for this Unit is based on records obtained over a 16-year period at Keams Canyon and records obtained over a 22-year period at Winslow. Keams Canyon is in Unit No. 6; however, it is located in a box canyon that extends several miles into Unit No. 7. Therefore, the precipitation records will be correct for the northwestern part of the Unit. The Winslow station is 30 miles south of the southwest corner of the Unit. The records obtained there will give some idea of the growing season, average temperature and precipitation expected in the southern part of Unit No. 7.

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Of course, in making our estimations we took into consideration elevation and vegetation along with actual records taken from nearby stations.

The only station in the Unit is located at the Jeddito Trading Post. Records have been taken there for about 7 years. The results are similar to those taken at Keams Canyon up to the time the station was moved to Jeddito.

The average precipitation for the Unit is 10 inches, probably varying from 9 inches in the southern part of the Unit to 16 or 17 inches on top of Balah Kai Mesa.

The temperature during the summer months is mild, averaging about 70°. Strong winds during late winter and early spring result in most of the damage by wind erosion. (See Table No. 1)

The spring winds have a very direct effect on the time of planting, and should have a very direct effect on farming methods.

The rainfall is of the thunder shower type, although occasional slow rains may be expected.

The average growing season is 140 days, starting about May 23 and ending about October 13.

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CLIMATOLOGICAL DATA*

Table No. I

Area or Station	Elevation	Ave. Annual Precipitation	Ave. Annual Temperature	Maximum Temperature	Minimum Temperature	Ave. Date First Killing Frost	Ave. Date Last Killing Frost	Ave. Length of Growing Season
Southern Extremity	5350-5400	9½"	54°	101°	-10°	Oct. 15	May 15	150
Northeast Extremity Balah Kai Mesa	7400-7500	16"-17"	45°	94°	-15°	Oct. 5	May 25	130
Western Extremity Jeddito Wash	5250-5300	9"	55°	101°	-10°	Oct. 15	May 20	145
Indian Wells	5770	10"-10½"	53°	100°	-11°	Oct. 13	May 23	140
White Cone Flats	6200-6300	12½"	51°	99°	-12°	Oct. 12	May 21	135
Top Mesa Opposite Keam's Canyon	6500	12½"-13"	50°	98°	-13°	Oct. 12	May 27	135

These figures are estimates based upon elevation, vegetation and previous reports submitted on Land Management Units No's 4, 5, and 6.

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EROSION

Wind erosion constitutes the most serious erosion problem in this Unit. The main farming operations are postponed in the spring until after the windy season is over. Sheet and gully erosion is damaging only a few farms; however, most of the farms on Balahkai Mesa are threatened by deep heads. In some instances, the heads have cut into the lower ends of the farms and will eventually cut through the entire length of the fields, rendering them worthless as agricultural land. It is a problem just how to handle these heads, as they are very deep, and a drop structure will cost considerably more than the value of the land it will benefit. In most cases there is only a small area upon which water can be spread. It seems that the only feasible operation is to hold as much water as possible on the farm and try to slow down the advancement of the heads as much as possible.

VEGETATION

The vegetation for this unit can be broadly grouped into four major types; namely, Grassland, Browse, Woodland and Waste.

Grassland

Blue Grama	Bouteloua gracilis
Galleta	Hilaria jamesii
Alkali-sacaton	Sporobolus airoides
Sand-dropseed	Sporobolus cryptandrus

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Grassland

Three-awn	Aristida spp.
Spiny Muhley	Muhlenburgia pungens

Woodland

Pinon-juniper

Shrubs

Chamise	Atriplex canescens
Greasewood	Sarcobatus vermiculatus
Salt bush	Atriplex cuneata
Shadscale	Atriplex confertifolia
Yellow brush	Chrysothamnus greenii
Snake weed	Gutierrezia spp.
Mormon tea	Ephedra spp.
Big sage	Artemisia tridentata
Sand sage	Artemisia filifolia
Rabbit brush	Crysothamnus biglovii

Weeds

Russian thistle	Salsola pestifer
Croton	Croton texensis
Colorado bee-weed	Cleome serrulata
Lambs quarter	Chenopodium spp.

The weed causing the most trouble on the farm land is Russian thistle (Salsola pestifer).

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POPULATION

There are approximately 1856 people grouped in 232 consumption groups resident in Unit No. 7.

Table No.

Distribution of Population, Farm Land, and Expansion by Sub-units

Sub-Unit	Population	Acres Farmed	Expansion
1	653	268	28
2	673	820	71
3	507	236	24
4	123	216	101
Totals	1856	1,540	224

The people are scattered over the entire Unit; however, the bulk of the population is found in the vicinity of Indian Wells, White Cone, Jeddito and Dilkon.

The people gain their livelihood from the raising of livestock, farming, wage work and weaving.

AGRICULTURAL PLANTS USED

Corn is the principal crop grown in this Unit, representing 91.2% of the land now under cultivation.

Crop	Acres	Per cent
Corn	1,405	91.2%
Melons	64	4.2%
Beans	24	1.6%
Oats	15	1.0%
Peaches	1	.0%
Idle	20	1.3%
Meadow	11	.7%
	1,540	100.00%

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(See Table II)

The earliest record of agriculture in this Unit dates back to the 16th century when the Spanish Conquistadors invaded this country. They report people dressed in cotton clothing woven from native cotton and used corn as a staple crop. Of course, there is nothing left of these people except the old ruins on top of the mesas along the Jeddito Valley and a few signs of old cultivated areas in the valley, which are detectable only on the contact prints.

There are several varieties of beans, corn, squash and melons grown.

In this extensive survey squash, pumpkins and melons were classed as melons, and were listed as such on the farm survey sheets.

There was a very small acreage planted to potatoes; however, from their appearance about the middle of the growing season, it looked as though they were going to make a fair yield for flood-irrigated potatoes.

HISTORY AND FARM PRACTICES

There are scattered farms over the entire Unit. A person travelling over the Unit from north to south, or east to west is not astou ded by the size or number of farms as is true of Unit No. 6.

There are a few small concentrations along the Jeddito and the Bidahochee drainages.

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The farms are rich in fertility and will produce abundant crops if sufficient moisture is available.

Agricultural development is recent over most of the Unit; however, along the Jeddito in the vicinity of Awatovi we can still see the signs of what was at one time a flourishing agricultural community that extended for many miles up and down the Jeddito Valley.

Due to the habitation of the Jeddito Valley by the Hopi Indians prior to 1600 and for many years after there is considerable interesting history that could be written about agriculture in this Unit.

In trying to present a picture of present agricultural conditions we cannot weave the past agricultural practices into the present, because the country is being farmed at the present time almost entirely by Navajo's, who do not depend upon agriculture for their entire living, and are not agriculturalists as were their predecessors.

Where the valley was farmed intensively at one time and supported hundreds of people, there are small scattered farms at present supporting a sparse population. (See Agronomy Map.)

It was not due to depletion of the soil, nor low water supply that the Hopi's moved; therefore, until the time the valley was drained by the Jeddito channel, about 30 years ago, the soil was capable of producing abundant crops.

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The fertility of the soil was not depleted during the centuries of continuous cropping, because the flood water spreading over the farm land was high in silt, carrying considerable organic matter and nitrogenous material.

During the last twenty years there has been a gradual movement of the Hopi's back into this valley. In some places there are Navajo's and Hopi's farming in the same field; however, in most cases they have their fields separate. The Hopi influence upon farming methods is quite evident especially where they are farming in the same vicinity.

The general farm practices in this Unit are much the same as is evident over the Navajo Reservation.

Corn is planted by hand directly behind the plow; when the plow is not used the seed is placed in the ground with a stick or hoe. The farms are located on alluvial fans, which are in most cases a sandy loam, loamy sand, or sand. Soils of this type are subject to severe wind erosion, and the Indians experience considerable trouble in the spring from the moving sand.

The hoe and horse-drawn blade are used for weeding cultivation.

A large per cent of the corn crop is consumed by the Indians while it is in the milk or dough stage. There have been instances noted where large families have consumed the entire corn crop while it was in the "roasting ear" stage.

CROP ACREAGES BY SUB-UNITS

Table No. II

Quad.	Corn	Melons	Beans	Oats	Peaches	Idle	Total
Sub-Unit No. I							
Quad. 13	80	12	2			1	86
" 56	37	2	1	15	Meadow-6		61
" 60	94	6	5		1	1	107
" 15	5						5
Total	216	20	8	15	1	2	268
Sub-Unit No. II							
Quad. 15	408	9	9			5	431
" 16	158	1					159
	217	5	3		Meadow-5		230
Total	783	15	12		Meadow-5	5	820
Sub-Unit III							
Quad. 22	143	12				5	160
Quad. 58	2	2				3	7
" 61	9	3					12
" 64	57						57
Total	211	17	4			8	216
Sub-Unit IV							
Quad. 61	194	12	4			5	215
" 62	1						1
Total	195	12	4			5	216
GRAND TOTAL	1,405	64	24	15	11-Medow	20	1,540

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All the crops grown such as corn, beans and melons are harvested by hand. Corn is dried out in the sun, shelled, sacked and stored in underground bins or sold to the trader. The acreage planted to beans is usually small so the harvesting of beans is no problem.

As soon as the crop is harvested the livestock are allowed to graze in the fields. The pulveration of the surface soil by the trampling of the livestock and the complete removal of all traces of vegetation are conducive to severe wind erosion. As soon as there is no roughage left in the field the Indian completely forgets about his farm until spring rolls around and it is time to plant again. Fall plowing is not practiced.

DISEASES AND PESTS

No diseases of agricultural crops were reported in this Unit.

Rats, prairie dogs and squirrels are present in this Unit. It was reported by several Indians in the central and southern part of the Unit that squirrels and Kangaroo rats did considerable damage during the planting season. Their main complaint was that they could not secure poison grain will go a long way. Poison grain should be available for the Indians in time for the planting season. Possibly, the traders would be glad to handle the grain for a small profit.

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AGRICULTURAL LAND CLASSIFICATION

There are at present 1,540 acres of farm land in this Unit, and by the diversion and economical use of flood water an additional 224 acres can be put under cultivation.

There is no irrigated land in this Unit at the present time; however, there is an area along the Jeddito, Farm No. 9, (See Agronomy Map) where the Indians divert a small flow on their farm during the winter and spring months. The water is not available after the first floods, and that is just the time it would do the most good. Therefore, according to the classification of irrigated land, this would be classes as flood-irrigated.

However, this area can be classes as irrigated after a partial diversion has been built in the Jeddito and it is possible to divert water on the farm land whenever it is needed.

1. Irrigated land is land that has permanent water available.
2. Flood irrigated land is that land that is being irrigated from intermittent streams.
3. Rainfall farms are those farms that depend upon direct rainfall for moisture.

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CLASSIFICATION OF AGRICULTURAL LAND

Table No. III.

		PRESENT FARM LAND					EXPANSION		
Sub-Unit	Class	A	B	C	G	Total	A	B	Total
1	Flood	181	80	1	6	268	23	5	28
2	Flood	780	35	-	5	820	71	-	71
3	Flood	202	34	-	-	236	24	-	24
4	Flood	215	1	-	-	216	101	-	101
Total		1,378	150	1	11	1,540	219	5	224

For explanation of the classes A, B, C, and G see pages 20 to 24 inclusive.

HOPI FARMS

The following farms are Hopi-owned:

Quad.	Farm No.	Acres	Owner
60	25	28	Se Qui
15	3a	6	Ma Soo Wa Tewa
15	45	80	12 owners See Field Study Sheet.
15	47	5	Charley Na Ba
		Total-173	

The following farms are Hopi and Navajo owned:

15	46	3	Tom BaHe
15	50	13	Unknown
		Total- 16	

In one instance the Hopi got along with the Navajo's he was farming with, but that is an exception. In most cases they seem to have a hatred toward each other. It seemed that livestock

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breaking into the farms was the cause for most of their trouble.

YIELDS

No actual measurements of crop yields were made in this Unit. All yields were ocular estimates from conditions as we saw them in the field and should not be used as definite material.

Due to low rainfall during the summer of 1937 over part of the Unit, the yields are probably below the average over a 10-year period.

Table No. IV.

PRESENT AND EXPECTED CROP YIELDS

Crop	Present Average Production	Expected Average Production
Corn	11 bu.	20 to 25 bu.
Beans	95 lbs.	200 to 250 lbs.
Melons	1,000 lbs.	1,500 to 2,000 lbs.
Oats	800 lbs.	1,500 lbs.
Bluestem	800 lbs.	1,500 lbs.

In estimating the yields several points were taken into consideration such as: uniformity and density of stand, size and vigor of the plants, moisture condition and freedom from weeds.

A number of the farms were visited before the corn was in the "tasseling" stage; therefore, our estimations can be off almost 100%. However, it is believed that 11 bu. as an average for corn in this Unit will be close to the actual yield.

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METHOD OF LOCATION

The farms in this Unit were given the same number on this survey they were given on the Agricultural Survey which was conducted during the summer of 1935. The Water Spreading projects were given the next consecutive numbers. The new farms located by this survey were numbered consecutively starting where the Water Spreading Survey numbers stopped.

All members of the survey party helped locate farms which were not previously located. This cooperation, we feel, has resulted in the location and identification of about 99% of the farms in this Unit.

The area enclosed by the fence is shown on the Agronomy Map and not the actual cultivated area. However, in some cases where the farms were large enough the fence and actual cultivated area is shown. The cultivated area is outlined with a broken line. Increased yields can be accomplished by:

1. Subjugation of present farm land where recommended.
2. Strip cropping where wind erosion is a problem.
3. Crop rotation.
4. The introducing and correct use of simple farm machinery.
5. *Field selection of seed.
6. The introduction of new crops. especially soil binders.
7.

*The bean seed used in this Unit seemed to be of very poor quality. Many of the plants made good growth, but were of poor yielding quality.

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7. Fall plowing

   a. To reduce damage being done by cutworms.
   b. Reduce wind erosion and conserve moisture.
   c. Increase percolation.

8. Improvement of seed-bed preparation and cultivation practices.

9. Abandonment of "C" class farms.

10. Planting of windbreaks where wind erosion is serious.

SUGGESTED CROPS

The agricultural crops that can be grown in the Unit are corn, beans, melons, squash, pumpkins, oats, sudan grass, grain sorghums, rye, barley, wheat, and various fruits and vegetables.

It may be possible to work one or more of these crops in the crop rotation system, so there will be some stubble left on the ground during the winter and spring months.

Potatoes can be grown in a few places on Balahkai Mesa. However, they can't be grown to any grate extent because the area adaptable to potato culture is limited, due to heavy soil and low water supply.

COST OF FARM DEVELOPMENT

The total cost of farm development involving bordering, clearing, leveling, scattered spreader dikes, or a combination of all these is $8,339.00. All work recommended was on present and potential flood-irrigated land. Refer to farm

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study sheets for cost of subjugation on individual farms. This figure does not include the cost of canals or cost of structures. For these estimated costs, see Engineering Report.

Table No. VI.

CALCULATING COST OF SUBJUGATION

Slope	Leveling Only	Leveling and Bordering
Less than 1%	0 to 6%	$ 8 to $12
2%	6 to 10%	$14 to $20
3%		$30 to $45
4%		$40 to $60
5%		$50 to $75

Table No. VI was used in estimating the cost of subjugation. For total cost of subjugation or treatment by Sub-Units, see Table No. V.

Table No. V.

COST OF AGRICULTURAL DEVELOPMENT

Sub-Unit	PRESENT FARM LAND				EXPANSION			
	Acres Subj.		Cost of Subj.		Acres Subj.		Cost of Subj.	
	A	B	A	B	A	B	A	B
1	18	-	$ 160	-	18	-	$220	-
2	322	-	$3,994	-	58	-	$690	-
3	92	-	$ 569	-	20	-	$230	-
4	170	-	$1,447	-	101	-	$1,029	-
Total	602	-	$6,170	-	179	-	$2,169	

EXPLANATION OF TERMS USED IN
LAND MANAGEMENT SURVEY
AGRONOMY DIVISION

FLOOD IRRIGATION

Grade of Agricultural Land

A - B - C and Grass land as classified by Agronomist on Agricultural Land Survey

A - Grade

1. Will be confined to the following soil textures: Fine sand, very fine sand, fine sandy loam and loam.
2. Will not contain more than .2% alkali.
3. Water must be available for satisfactory growing of tilled crops. (Note all areas where watershed area is large in proportion to cultivated area, for engineering survey).
4. Must not have over 3 per cent slope for above-mentioned soil textures.

B - Grade

1. Will be confined to soil textures included in grade A land, plus silt loam and clay loam textures.
2. Will not contain more than .4% alkali.
3. Adequate water available under normal conditions.
4. Slope not over 5 per cent.

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C - Grade

Not recommended for Agricultural Purposes.

1. Slope too steep or irregular considering type of soil and alkali conditions.
2. Presence of over .5% alkali.
3. Excessive erosion conditions.
4. Lack of available water.
5. Deficient drainage.

IRRIGATED LAND

Existing Projects

A-Grade

1. Will be confined to the following soil textures: Fine sand, very fine sand, fine sandy loam and loam.
2. Must have adequate water supply for growing any crop.

B-Grade

1. Will be confined to soils with silt loam and clay loam textures, in addition to soil textures included in Grade A Land.

C-Grade

Not recommended for agricultural purposes.

1. Slope too steep or irregular.
2. Presence of over .4% alkali.
3. Excessive erosion.
4. Lack of available water.

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5. Deficient drainage

Note: The amount of white alkali will not exceed .4% of any irrig. ble land. Over .05% black alkali automatically excludes any land from project. Coarse sand, stony land and shallow soil will be considered as non-irrigable land.

DRY FARMING

A - Grade

1. Will be confined to soils with fine sand, very fine sand and fine sandy loam textures, when the slope does not exceed 5% and up to soils with loam and silt loam textures, when the slope does not exceed 2%.

2. Adequate seasonal rainfall for the growth of beans and corn

B - Grade

1. Will include any dry farms which are not classed as A grade, and which would not be recommended to take out of production because of excessive erosion.

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POTENTIAL LAND

Grade A and B

Specifications for grades A and B under this heading are the same as for flood irrigated land.

Grade C

1. Will include only soils with loam, silt loam and clay loam textures.
2. Area must be large enough to use probable water supply or such as to economically justify control of excess water.
3. Slope must not exceed 3% and preferably not exceed 2%.

IRRIGATED LAND (Available water supply continuous or nearly so).

Proposed Areas (Under consideration at present)

A - Grade

1. Will be confined to soils with fine sand, very fine sand, fine sandy loam and loam textures when slope does not exceed 5%, and up to soils with silt loam and clay loam textures when slope is not more than 3%.
2. Must have adequate water supply.
3. Must be easily put under ditch.
4. No leveling allowed for this class.

B - Grade

1. Will be confined to silt loam and clay loam soils.
2. An uncertain water supply would justify placing soils of fine sand, very fine sand, fine sandy loam and loam textures in this grade.

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IRRIGATED LAND (Available water supply continuous or nearly so).

C-Grade

Not recommended for agricultural purposes.

1. Slope too steep or irregular
2. Presence of over .4% alkali.
3. Excessive erosion.
4. Lack of available water.
5. Deficient drainage.

DEFINITIONS OF TERMS USED IN
AGRONOMY SURVEY BLANKS

Tract No.

Each tract or farm is numbered beginning with one on each quadrangle. The number in the notes corresponds to a number on the map and a number placed on each tract. The study will use these numbers as permanent in reference to location of a farm under consideration.

Owner

The person or persons who are farming in the particular area.*

Topography

The surface condition of the tract, expressed in the following terms: rough, even, irregular, hummocky, and rolling; the general grade of the farm, expressed in %-slope; and the location in respect to geographical features, expressed in the following terms: valley floor, toe slope, mesa, etc.

*When the space is not sufficient for names of all owners, those names are listed on the back of the sheet.

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Soil

Soil texture as defined by soils department:

C = Clay. S = Sand. L = Loam. Li = Light. F = Fine.

The use of the symbols thus: $\frac{FSL}{C}$ indicates a fine sandy loam with clay sub-soil.

Alkali

Amounts and Kinds

Determined by laboratory tests when necessary. There was no alkali reported on the Study Sheets unless the alkali was in sufficient quantities to be toxic to agricultural plants, as indicated by salt-loving plants and surface deposits of salts.

Erosion

The extent of erosion: Gully or Sheet, caused by wind or water.

Classification: Slight, moderate, or severe.

Water

Water available for crop production.

Classification: Doubtful, sufficient, excess.

Expansion

The possibilities of expanding the present farm to take in additional adjacent land. Listed as acres of expansion.

Present Crops

The crop or crops grown on the tract and acreage of each at the time the farm was visited.

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Suggested Crops

Crops which the agronomist suggests growing on the tract.

Yield

Estimate of yield per acre for crops grown on tract.

Treatment

Recommended soil and water conservation practices, such as borders, dikes, terraces and furrows.

Recommended treatment other than that directly on the farm land will be in the Engineering Report.

Terrace:	A long mound of earth thrown up against the slope of the land using dirt below to construct border above.
Bench Terracing:	A series of steps constructed across the slope on steep land forming benches which are level both ways and can be watered by means of flooding from ditches.
Dike:	An enlarged border used for protection.
Basin:	An area of land surrounded by borders.
Contour Furrow:	A single furrow plowed on contour.
Border:	Two or more furrows thrown together to confine water to a restricted area.

Cost per Acre

Estimated cost per acre for recommended work on each tract.

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Class

The class of land as defined by the legend of land classification.

Remarks

Includes type of land: irrigated, flood irrigated or rainfall and features noticeable to the agronomist. Potential land will appear under expansion. When more space is needed remarks are continued on the back of the survey sheets.

PRIORITY PROJECTS

No. I - Farm No. 9, Quad. No. 15

There are two possible agricultural developments in this Unit that stand out above any of the rest. The best area from an agronomic standpoint is Farm No. 9, Quad. No. 15, located along the Jeddito just below the crossing on the Polacca-Winslow Road.

The Indians in this vicinity have been using the small perennial flow in the Jeddito on their farm land for the last nine years. They dam the Jeddito after the fall floods, and spread the clear water on their farm land during the winter, spring, and part of the summer months. When it is about time for the floods to start they cut their dam so the muddy flow will not cover their farm land, but will flow on down the Jeddito several miles before it finally spreads out over an intermittent flood plain.

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There was about 2 to 3 S.F. flowing in the Jeddito during the first two weeks of August.

It is believed that it will be possible to irrigate about 120 acres during the summer by using the furrow method of irrigation. If the above acreage can be farmed, it will, no doubt, justify the construction of a partial diversion.

It will be the best policy to let the flood water go by and use only the clear water. It may be that the tail-end of the floods can be used on the land if the water doesn't carry too much silt. In this case, the acreage can be increased. By using the clear water it will pay to subjugate the land so that the best use will be made of the water. This will not be true where the flood water is to be used because the borders and ditches will be filled with silt after every flood. Several of the traders who have lived in this country agree that the water has been r running in the Jeddito for the last seven to eight years.

As the slope is even and not over .5%, the cost of subjugation will not be over $12.00 per acre. The estimate of cost of diversion and canal is $ and $, making a total of $

No. 2
Bedahochee Project

This area is located four miles south of Indian Wells on Bedahochee drainage.

There are 112 acres farmed in this area at the present time and it can be increased to 137 acres.

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The soil where they are farming is a $\frac{SL}{CL}$; the expansion will probably run a light CL over a CL.

Wind erosion is moderate over the present farm area.

The flood water is low in silt because most of the drainage area is covered with igneous material.

The cost of subjugation will be low, probably not over $800 per acre.

The Indians in this part of the Unit are not in sympathy with the Land Management Program.

No. 3 Lower Jeddito

There is some work planned for the lower Jeddito. It does have an agronomic value although it was not included as potential acreage in the Agronomy Report.

This area extends a few miles above and below where the Jeddito naturally spreads during heavy floods. This area covers about 1,000 acres.

The Indians farm in this particular vicinity where the silty flood waters happen to spread. It happens that the present farms in this vicinity have been located within the last two years.

After the engineering structures have been built the farms may be more stable in the future than they have been in the past; however, it is felt that there will always be some movement of the areas farmed in order to take advantage of the most favorable conditions. There probably will not be any material increase in the area farmed as a result of this work; however, there will

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be considerable shifting after the structures have been built and the Jeddito has deposited a coat of silt over the new area.

By spreading the Jeddito we reduce the severity of the headcutting below the Coyote-Jeddito Junction, probably eliminating the construction of costly drop structures at this point.

No. 4 Farm No. 23, Quad. 61

There are 20 acres farmed in this area at the present time and it can be increased to about 70 acres.

The soil is a $\frac{\text{SL to LS}}{\text{Clay}}$.

The erosion is classed as:

Slight to moderate wind, and Moderate Gully.

There is an extremely active headcutting at the lower end of the farm, and if it is not checked, it will soon be eating into the heart of the agricultural land.

By spreading the water on additional farm land above the headcutting, it may be that a costly drop structure can be eliminated.

The cost of subjugation will not be over $10.00 per acre.

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Recommended Treatment on the Potential Farm Land, where it involves more work than can be expected of the Indian or Indians farming in that Particular Area

Quad. No.	Farm No.	Expansion	Suggested Crops	Yield per Acre	Class A or B	Cost	Priority	Recommended Treatment
				Sub-Unit No. 1				
13	73	3	Corn, sorghum, beans, melons	Corn 20-25 bu.	A	$10.00		Contour spreader dikes
13	3	5	" "	" 20-25 bu.	A	$ 8.00		Several spreader dikes
60	4	10	" "	" " " "	A	$15.00		Contour spreader dikes
				Sub-Unit No. 2				
15	51	5	Corn, sorghum, melons, corn	Corn 20-25 bu.	A			Contour terrace
15	9	20	Corn, sorghum, rye, wheat, melons, beans	" " " "	A		1	Leveling and bordering
60	12	10	Melons, sorghum, corn, beans	" " " "	A			Contour terrace
60	13	4	" "	" " " "	A			Several contour spreader dikes
60	14	15	" "	" " " "	A			List between contour terraces
60	30	4	Corn, sorghum	Corn 20-25 bu.	A			Contour borders

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Quad. No.	Perm No.	Expansion	Suggested Crops	Yield per Acre	Class A or B	Cost	ity	Recommended Treatment
				Sub-Unit No. 3				
22	4	15	Melons, beans, corn, sorghum	Corn 20-25 bu.	A			Contour spreader dikes.
22	17	5	Corn, sorghum	" " " "	A			List between contour spreaders
				Sub-Unit No. 4				
61	12	3	Beans, corn, sorghum	Corn 20-25 bu.	A	$ 8.00		Contour spreaders
61	5	5	" "	" " " "	A	$12.00		Spread water with contour spreader dikes
61	15	5	Corn, sorghum	Corn 20-25 bu.	A	$10.00		Contour spreader dikes
61	16	5	" "	" " " "	A	$15.00		" " "
61	18	8	" "	" " " "	A	$15.00		Spread gully Contour terrace
61	23	50	Corn, sorghum, melons, beans	Corn 20-25 bu.	A	$10.00		Spread water over as much of the valley floor as possible
61	6	25	Corn, sorghum, melons, beans	" " " "	A	$ 8.00	2	Leveling and bordering

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Recommended Treatment on the Present Farm Land, Where It Involves More Work Than Can Be Expected of the Indian or Indians Farming in That Particular Area.

Quad. No.	Farm No.	Acres	Present Crops	Suggested Crops	Present Yield per Acre	Expected Yield	Class A or B	Cost per Acre	Priority	Treatment
					Sub-Unit No. I					
13	73	1	Corn	Corn, beans	Corn-10 bu.	20 to 25 bu.	A	$10.00		Contour spreader dikes
13	3	15	Corn	Corn, sorghum	Corn-15 bu.	" " " "	A	$ 8.00		Several spreader dikes
60	4	2	Corn	Melons, corn Beans	10 bu.	" " " "	A	$15.00		Contour spreader dikes
					Sub-Unit No. 2					
15	51	7	Corn	Corn, beans, Melons, sorghum	12 bu.	20 to 25 bu.	A	$18.00		Contour terrace
15	9	160	Corn	Melons, sorghum, Beans, corn, Wheat, rye	12 bu.	" " " "	A	$12.00	1	Bordering & leveling. Strip crop & plant windbreaks
15	47	5	Corn	Corn and sorghum	10 bu.	" " " "	A	$15.00		Contour terrace
15	4	18	Corn	Corn, sorghum, Melons, Beans	10 bu.	" " " "	A	$ 8.00		Border with slope.
15	22	30	Corn	Beans, corn, Sorghum	10 bu.	" " " "	A	$15.00		Contour terracing, strip crop
15	46	35	Corn	Beans, corn Sorghum	12 bu.	" " " "	A	$18.00		Contour terracing, strip crop

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Recommended Treatment on the Present Farm Land, Where It Involves More Work Than Can Be Expected of the Indian or Indians Farming in That Particular Area.

Quad. No.	Farm No.	Acres	Present Crops	Suggested Crops	Present Yield per Acre	Expected Yield	Class A or B	Cost per Acre	Priority	Treatment
					Sub-Unit 2					
60	10	40	Corn	Corn, sorghum	15 bu.	20 to 25 bu.	A	$10.00		Strip crop. Contour spreaders
60	12	18	Corn, 18	Corn, sorghum, melons, beans	12 bu.	20 to 25 bu.	A	$ 8.00		List between contour terraces
60	13	6	Corn	Melons, corn, Beans, sorghum	10 bu.	" " " "	A	$10.00		Several contour spreader dikes
60	30	3	Corn	Sorghum, corn	8 bu.	" " " "	A	$15.00		Contour bordering and 2 small rock partial diversions. See Engineering Report.
					Sub-Unit No. 3					
22	4	12	Corn	Corn, sorghum, melons, beans	0	20 bu.	A	$12.00		Contour spreader dik
22	17	5	Corn	Corn, sorghum	5 bu.	20 bu.	A	$10.00		List between contour spreader dikes
22	21	75	Corn	Corn, sorghum, melons, beans	15 bu.	20-25 bu.	A	$ 5.00		Contour spreader dikes &

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Recommended Treatment on the Present Farm Land, Where it involves more Work than can be expected of the Indian or Indians Farming in that Particular Area.

Quad. No.	Farm No.	Acres	Present Crops	Suggested Crops	Yield per Acre	Expected Yield	Class A or B	Cost per Acre	Priority	Treatment
				Sub-Unit No. 4						
61	2	3	Corn	Corn, sorghum, melons	8 bu.	20-25 bu.	A	$10.00		Series of contour spreader dikes
61	12	5	Corn	Corn, sorghum, beans	8 bu.	20-25 bu.	A	$ 8.00		Contour spreaders Strip crop
61	5	8	Corn	" "	12 bu.	20-25 bu.	A	$12.00		Series of spreader dikes Strip crop
61	15	5	Corn	Corn, sorghum	10 bu.	" " "	A	$10.00		Series of spreader dikes Strip crop
61	18	5	Corn	" "	12 bu.	" " "	A	$15.00		Spread gully Contour terrace
61	19	12	Corn	Corn, sorghum, beans	12 bu.	" " "	A	$ 5.00		Several contour dike
61	23	20	Corn	Corn, sorghum, melons, beans	12 bu.	" " "	A	$10.00		Spread water over as much of valley floor as possible
61	6	112	Beans, corn, melons	Corn, sorghum, beans, melons	10 bu.	" " "		$ 8.00	2	Leveling and bordering

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