WORK REPORT

DETAILED SOIL AND EROSION SURVEY

DINNEBITO IRRIGATION AREA

NAVAJO PROJECT

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1936

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The Dinnebito Irrigation Area

"Soil and Erosion"

The Dinnebito Irrigation Area is located on the Dinnebito Wash, about 15 miles northwest of Oraibi, Arizona. From the diversion site, the area surveyed extends southwest down the valley for a distance of about three miles. It includes all the arable land between the main wash, on the east, and the steep sandstone escarpment which forms the west boundary. The area embraces approximately 2.7 square miles or 1,730 acres.

The general topography is level to gently sloping. The surface is smooth, except for an occasional hummock or frequent shallow gullies which traverse the valley bottom.

Surface drainage is good, except for small depressions where water accumulates, and ponds during storm periods. Several intermittent streams enter the area from the west. Soil materials carried by these streams during flood are deposited upon the level, main valley floor in the form of alluvial fans. Dry farming by local Indians is confined to these fans.

The soils are of alluvial origin. Those which occur in the valley bottom are derived primarily from Mancos and Mesa Verde shale, located higher up on the watershed of Black Mesa. The alluvial fans located along the west side of the valley are derived from local sandstone.

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The soils have been separated, according to variation in surface texture and profile characteristics, into two types, indicated on the map by numbers 1 and 3.

Type 1:- The surface soil is a light brown to light yellowish brown sandy loam. The subsoil, though more compact, has about the range of color and texture as the surface soil. This soil is readily permeable to water, and it has a moderately high water holding capacity. The alkali content is low.

This soil, representing 929 acres, occurs on the alluvial fans along the west side of the valley. The topography is smooth and gently sloping, at a rate of not more than two per cent. The native vegetation consists of Chamisa brush and annual weeds.

From the standpoint of agricultural adaptation, this soil is rated as class "A" soil. It is therefore, recommended for agricultural development. It is adapted to a wide variety of crops, but especially to those which require a well drained sandy loam soil. Fair yields of Indian corn are obtained without irrigation.

Under cultivation this soil is susceptible to wind and water erosion. The following suggestions would seem advisable from that standpoint. (1) Cover crops and wind breaks, especially during the spring, to protect the soil from blowing. (2) Leveling of land and approved irrigation methods to prevent undue washing of the soil. The soil can probably be improved, from the standpoint of production, by adopting a crop rotation which included legumes.

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Type 3:- The surface eight inches is a grayish brown or light brown, clay loam, or light clay undifferentiated. The subsoil, from 8 to 24 inches, is a heavy, compact clay. The substratum consists of light friable, or moderately heavy clay. Water penetration is slow in this type, but the water holding capacity is high.

This soil, representing 800 acres, occurs on the valley bottom. The topography is level or slightly sloping, southwestward with the axis of the valley. The native vegetation consists almost entirely of greasewood.

Owing to the heavy clay subsoil, and the effect this will have upon water and root penetration, as well as interfering with subdrainage, this soil is not recommended for general cropping purposes. It is rated, from the standpoint of agricultural adaptation, as class "C" land, or soil of doubtful agricultural adaptation. This soil can probably be recommended for specific crops, such as alfalfa or pasture grasses where the friable, light clay surface soil is 12 inches or more in depth, or where the heavy clay subsoil layer is not more than 12 inches in thickness. It should be regarded as an area upon which to use surplus irrigation water, and a pasture improvement program could be considered a feasible method of making the best use of the soil.

Precautions: This soil will waterlog easily. Heavy applications of water for long periods should be avoided. Water should not be allowed to stand for long periods on the surface. This soil will not absorb water rapidly. A slow irrigation stream at frequent intervals is advised.

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Erosion: Frequent shallow gullies, and active gully head erosion occurs in several places. These are indicated upon the map by appropriate symbol. It is suggested that this erosional condition be treated properly as early as possible. The main Arroyo or Dinnebito Wash is also actively cutting away soil which might otherwise prove valuable for farming purposes. This might, however, be checked by the proposed diversion. Wind erosion is not important at the present time.

Soil samples taken from the Dennebito Irrigation Project have been analyzed to determine their texture, alkali content and dispersion. The results are expressed in the following table.

Analysis of soil samples taken from the Dinnebito Irrigation Project.

Lab. No.	Field No.	Depth	Total Na_2CO_3	Salts	Sand	Silt	Clay	Dispersion
3060	1	0-8"	0	.12	39.5	22.1	38.4	17.4
3061	2	"	0	.13	23.4	33.9	42.7	14.6
3062	1A	"	0	.67	46.8	24.7	28.5	55.6
3063	2A	"	0	.34	67.3	7.7	25.0	39.5
3064	3	0-12	0	.137	15.9	29.6	54.5	15.1
3065	3	12-24	0	.37	23.1	27.4	49.5	13.8
3066	3	24-36	0	.17	37.9	26.4	35.7	6.7
3067	3	36-45	0	.145	58.4	15.7	25.9	9.3

*Depth is expressed in inches. Total salts, soil texture and dispersion are expressed as percentages.

The results show that the soil texture varies between a clay loam and a light clay. Sample number 3, taken from the extreme southern portion of the area, is a heavy clay.

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The soils of this area are, for the most part free of alkali salts. Samples number 1-A and 2-A, taken from very localized black spots, have a high total salt content, and a high dispersion ratio. These spots, detected in the field by small spots having a barren, hard soil surface, should be excluded from the farming area.

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