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Castle, Emery.
Water - climate, Fort Rock,
Christmas Valley

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WATER - CLIMATE
FORT ROCK - CHRISTMAS VALLEY



TAKEN FROM:
IRRIGATION POSSIBILITIES IN THE FORT ROCK AREA, EMERY CASTLE AND CARROLL DWYER
7/56

SUMMARY

Ground water exists at depths of 25 to 100 feet in the Fort Rock-Christmas Lake Valleys. Most irrigation wells in the area are drilled 250-700 feet. There are over 40,000 acres under irrigation at present, although over 100,000 acres have soils suitable for irrigation.

The growing season is short, averaging about 76 days. Killing frosts may occur any month. The opportunities for many different types of farming are limited. Livestock, alfalfa, irrigated pasture, and mint appear to offer the greatest promise. Seed potatoes may be produced under favorable conditions.

Costs of land, land development, irrigation facilities, machinery and livestock are substantial in relation to income potential. These costs may vary from about \$800 to over \$1100 per acre, depending on the size and type of farm organization.

An operator considering purchase and development of an irrigated farm should have enough money so he can withstand crop failures, particularly during development years.

An opportunity exists for livestock producers with access to public rangeland to use irrigation to improve and stabilize their feed supply.



Agriculture, Home Economics, 4-H Youth, Forestry, Community Development, and Marine Advisory Programs
Oregon State University, United States Department of Agriculture, and Lake County cooperating

Economic development of the area will be associated with some risk and uncertainty. Not only are crop yields uncertain (due to frost hazards), but some characteristics of the water supply are not known. The exact location of water, and the type of water-bearing strata, may vary.

PHYSICAL CHARACTERISTICS

The Fort Rock-Christmas Lake Valleys are high desert intermountain valleys with an average elevation of about 4,315 feet. They are located in the northern part of Lake County, Oregon. The closest major towns are Bend, about 85 miles to the north, and Lakeview, about 90 miles to the south. The two valleys cover approximately 282,000 acres.

The first settlement occurred about 1875. Little development took place until after the turn of the century. Between 1900 and 1930 a large part of the area was cleared of sagebrush and planted to dryland crops, but is now largely abandoned. The discovery of a supply of underground water and the availability of electricity offer another type of agriculture for the area. Circle irrigation systems have been utilized to irrigate additional newly cultivated acres and have increased the transition from sagebrush to cropland.

GROUND WATER

The U.S. Geological Survey completed an investigation of the ground water basin underlying the Fort Rock-Christmas Lake-Silver Lake Valleys in 1952.¹ The state water resources department completed a similar study in 1982. Basic data indicate the following:

An underground lake lies under the Fort Rock-Christmas Lake-Silver Lake Valleys. The water has an outlet near the vicinity of Hole-in-the-Ground, northwest of Fort Rock. The water table lies in a saucer shape, from 25 to 100 feet below the valley floor.

The average yearly recharge is roughly estimated at 95,000 acre-feet. That presently being used approximates this figure.

The total amount of ground water available for irrigation would be equivalent to that now pumped, plus that saved from the present plant use, plus that lost through the underground outlet. Thus, the total amount of water that could be used yearly for irrigation is apparently near the 95,000 acre feet now being used.

Considering the probable amount that could be saved from present plant use, the estimated safe annual yield would approximate 95,000 acre-feet. Assuming the average annual irrigation requirement as 2.5 acre-feet per irrigated acre, about 40,000 acres would be the acreage that could be irrigated.

The geological survey suggests that irrigation development should not be concentrated in any particular area, but scattered over the entire valley plain to equalize water use and avoid water shortage that might follow concentrated pumping.

SOILS

Kenneth Irons and Rudolph W. Mayko of the Soil Conservation Service, U.S. Department of Agriculture, completed a general soils investigation of the Fort Rock-Christmas Lake Valleys in 1955.

¹ R.C. Newcomb. "Basic Ground Water Data in Lake County, Oregon." U.S. Department of the Interior. Geological Survey. Mimeographed.

SOILS (cont.)

The soils were divided into three classifications:

I - Soils generally suited to irrigation. (116,000 acres) Dominant soils are deep or moderately deep, with sandy loam, or silt loam texture, and good drainage potentials for removing or preventing an accumulation of toxic salts. These areas also include some soils which are not suitable for irrigation.

II - Soils generally not well suited to irrigation. (91,230 ac.) Dominant soils are either silty with moderate amounts of toxic salts and with poor drainage potential, or sandy with low water-holding capacity, excessive drainage, and liability to wind erosion. Some soils within this area may be suitable for irrigation.

III - Soils not suited for irrigation. (74,580 acres) There are three dominant soils: (1) shallow, sandy or loamy soils with irregular topography, (2) soils with low water-intake rates, poor drainage potentials, and strongly alkaline conditions and (3) active sand dunes. Within this area there may be some small bodies of soils suitable for irrigation.

Data contained in the report Basic Ground Water Data in Lake County, Oregon indicate about 32,000 acres can be safely irrigated. More acres appear suited for irrigation development than there is water to irrigate them.

WEATHER CHARACTERISTICS

Precipitation

Precipitation in the Fort Rock area averages about 9 inches per year. Without irrigation, rainfall is not adequate to successfully raise most cultivated crops. Some individuals who have been in the area for a long period have summer fallowed to conserve moisture. Even with this practice, their choice of crops is limited without irrigation.

Wind is an important climatic factor in the area. The soils are lacustrine (waterformed) in origin and when exposed will blow very easily. It is very important to be able to stabilize the soil with water or a cover crop when breaking out new ground or rotating crops.

Because of the lack of snow cover most winters, the winter winds have a severe drying effect upon soils and vegetation.

Growing Season

The growing season is the major agricultural limitation of the region. Early weather records indicate a growing season of approximately 76 days, if 28° is selected as the critical temperature. Damage will occur to most actively growing crops below this temperature. Current weather records show a shorter average growing season in recent years.

Climatic extremes are common in this high desert area. This has a severe effect upon crop yields and crop selection. Grain crops are often frosted at flowering or in the dough stage which prevents filling or results in shriveled "light" grain. This makes reliable grain yields unpredictable. Grain hay is used as a cover crop.

Growing Season (cont.)

Hay yields will average 3-4 ton per acre although higher yields do occur. High quality hay is produced with proper management. Irrigated pasture is productive as cool season grasses are not as severely effected by freezing temperatures as legumes.

On the basis of available data on soils, ground water and other physical characteristics, the short and variable growing season is the most serious limiting factor to a successful agricultural economy in the area.

Before considering development or buying land in this area, there are several places to check the potential productivity of a particular piece of land.

- 1) State Watermasters' office for water rights and availability.
- 2) Soil Conservation Service for soil type and its productive limitations and potential.
- 3) Oregon State University Extension Service for general productive potential of various crops of the area.

