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# DRAINAGE PLANNING BY WATER BUDGET ANALYSIS

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## INTRODUCTION

When a drainage system for an irrigation project does not control the water table adequately, an alternative solution may be more practical than further expansion and revision of the existing system. For example, if water application to a given area raises the water table excessively, reduced deliveries may bring about more efficient irrigation practices and thereby lower the water table. If canal seepage losses are high, lining or sealing parts of the delivery system may be necessary to control the water table. The facts needed to determine whether additional drainage is the most logical solution are often hard to obtain and require much background information about water table records, water applications, crop water use, underground strata, soils, and farming practices. A review of past records of other investigators and the application of new techniques to analyze the entire soil water system can result in an optimum soil and water management program that may alleviate the drainage problem.

A problem area in south-central Idaho is being analyzed in a search for an optimum solution. This paper is based on an evaluation of one year's data

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and demonstrates a water budget analysis approach to the problem. The study is continuing with further refinements.

Background:

During the Minidoka Irrigation District's 60-year history, three water table studies have been made, and much basic data have been gathered. The area was first irrigated under the Minidoka Project of the Bureau of Reclamation in 1907. Early records show that a high water table existed in 1909 and an extensive study was made between 1909 and 1911 (4). After this study, a system of open drains was installed. The drains were designed to be about 6 feet deep, but this depth was not always reached because of unstable soils and quicksand. These drains also sloughed in and were difficult to maintain because of a very flat gradient and unstable soil. A study by the Bureau of Reclamation during 1929 to 1931 showed that the drains had only a limited effect upon the water table and acted only as surface drains in many areas. Because of the persistence of the problem, the Soil Conservation Service was requested by the Walcott Soil Conservation District to study the problem (3) to determine how much the agriculture of the area was adversely affected by the high water table and by the accumulation of salts. This evaluation was made between 1961 and 1965.

Between 25 and 45 percent of the irrigated area of 65,500 acres is affected by the high water table. The saline areas shown in Fig. 1 comprise about 5 percent of the district, or about 9 percent of the district's high water table area. Another 4 percent of the high water table area along the river is not farmed and is not irrigated. The topography of the area is a slightly rolling flood plain with ridges and swales running from east to west, somewhat parallel to the channel of the Snake River. The overall