EFFICIENT WATER USE IN CROP PRODUCTION: RESEARCH OR RE-SEARCH?

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I. INTRODUCTION

For centuries man has been concerned to some degree with the efficient use of water in the production of his crops. Indeed, the ability to grow crops and manage their needs for water probably was a requisite for civilization. Yet only in the past century have scientific studies been undertaken on the role of water in crop growth. This book is intended to review, to give perspective, and to explore the future of research into the efficient use of water in crop production.

In this chapter, we hope to give general historical and current perspective to the detailed and specific discussions contained in the chapters to follow that are essential to understanding efficient water use.

We will begin with the title of this book. The phrases "efficient water use" or "water-use efficiency" are intrinsically ambiguous in relation to crop production. We may mean saving water from a given supply for crop use; we also may mean increasing production per hectare (yield) per unit of water evaporated from the soil and/or transpired from the plants in the field.

Saving water by decreasing the 59% loss from storage and conveyance of irrigation water (Ackermann et al., 1978), decreasing surface runoff so that more water is stored in the soil and water table for future use, decreasing evaporative losses by fallowing and mulching, or avoiding water losses from excessive irrigation, allows more hectares of crops to be grown. These savings of water can increase total production per unit of water available to agricultural use, and are "efficient uses of water." However, they do not...