I. INTRODUCTION

The last drainage monograph was published in 1974 (van Schilfgaarde, 1974a). Section VIII of that volume contains two chapters discussing drainage water quality concerns. One chapter concentrates on the salinity of drainage waters (Bower, 1974) while the other examines nutrient and other chemicals in agricultural drainage waters (Mackenzie & Viets, 1974). In contrast, almost every chapter in this monograph makes reference to water quality, reflecting the ever-increasing emphasis on protecting the quality of our water resources.

During the late 1960s and the early 1970s, pollutants entering the environment were linked to many possible sources from urban and industrial wastes to agriculture. Typically, urban and industrial sources are concentrated into point sources while agriculture is generally considered a nonpoint source. Since the 1972 Federal Water Pollution Control Act, many federal, state and local regulations have been directed at point source pollution. For nonpoint sources, education and improvements of system designs have been the main vehicles for improving water quality. Many states in the USA cost-share best management practices, which have beneficial effects on environmental quality. Often, the guidelines for applying the best management practices are site-specific and difficult to transfer to other soils, agricultural management systems and climatic regions.

Field experiments are expensive and only a limited number of comprehensive experiments can be conducted to examine contaminant losses. Any given experiment contains a very limited selection of variables so the results are only applicable to a few sites. The only way management recommendations and decisions can be made for a wide variety of conditions and locations is to have models which predict contaminant losses under various conditions reasonably accurately. The intent of this chapter is twofold: (i) to review existing “state of

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