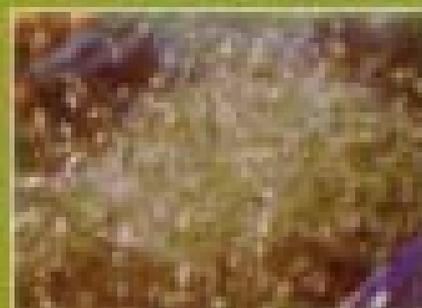


Utilization of Wastewater in Agriculture and Aquaculture



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PREFACE

Water in the most talked about issue these days all over the world. The demand of water for various purposes like domestic, commercial, industrial and for agriculture is increasing significantly all over the world. Growing urbanization has only aggravated the situation.

Pollution of water resources and consequently a large part of available water becoming unfit for various human uses has further worsened the situation. A number of legislations are in vogue making it mandatory for industries and organization to treat their wastewaters to sufficient level before discharging them in water resources. However, the currently used technologies are not only expensive in erection but need considerable power and other materials to run them. With worsening power situation and growing recessionary pressure on economy, it is going to become increasingly difficult to continue with power insentive wastewater treatment methods.

Thus declining availability and increasing pollution of water has forced communities all over the world to resort to water reclamation and reuse which has become an attractive option for conserving and extending available water supplies to meet current and future demands. While the need for additional water supply provides an impetus for water reclamation and reuse programmes at present, development and implementation of assimilative capacity based standards for the discharge of wastewater into water bodies, particularly for removal of phosphorus and nitrogen, would entail reclamation and reuse of wastewater as a cost effective alternative in future.

Traditional public water supplies are designed to provide water of potable quality to serve the water demands for various purposes when water demand exceeds the yield of good quality water sources. A lower quality water can be substituted to serve the nonpotable purposes. In some coastal cities, such as Hong-Kong, sea water has been substituted for high quality freshwater for toilet flushing. In the British Midlands highly polluted Trent river water has been used for industrial purposes. Many water demands such as industrial and agricultural can be satisfied with water of less than potable water quality. The use of reclaimed water for nonpotable purposes offers the potential for exploiting a new resource that can be substituted for existing sources. By replacing the potable water used for nonpotable

purposes an increased population can be served from the existing source.

Waste water reuse for agriculture presents not only a low cost appropriate disposal medium but also an opportunity to manage wastes with minimum adverse environmental effects as the treatment requirements prior to land application are less rigid than those for disposal into water bodies. Application of sewage sludge and municipal wastewater on land has been practiced since time immemorial. The challenge is to utilize the chemical, physical and biological properties of soil as an acceptor with minimum adverse effects on crops to be grown, soil characteristics and ground and surface water quality.

This book is written with an objective to cover most important issues in utilizing wastewater for agriculture and aquaculture. The book has in total sixteen chapters and two case studies. The book begins with policy, planning and management issues in wastewater and resource conservation through wastewater reuse is extensively covered. Physico-chemical and biological parameters of significance for soil as well as for human health are covered in detail. Water quality criteria for agriculture and forestry is discussed with practices followed in different countries.

Wastewater irrigation being an important aspect of reuse soil quality evaluation is taken up in detail. A large chapter is devoted to designing wastewater irrigation systems. Growth in aquaculture industry has been phenomenal in the past few decades. However, scientific information on various quality related issues is not available and extensive aquaculture has often invited criticism from environmental circles. The book perhaps, for the first time in country provides this information with extensive literature coverage from many parts of the world. Use of human and other wastes in aquaculture is practiced in several Asian countries for a long time.

Case studies and scientific literature from these areas is extensively covered in the book. Other important topics covered within wastewater reuse in aquaculture are : coastal seawater and freshwater aquaculture, mariculture systems, practices in a number of countries most notably from US and need for aquaculture farming in developing countries.

Since aquatic ecosystems are likely to get affected by aquaculture and use of wastewater in aquaculture, a chapter is devoted to ecological concerns in wastewater reuse in aquaculture where in aquatic (freshwater, marine and estuarine) is discussed in detail.

Other important topics in the book are : Water quality criteria for waste in aquaculture; technology options for wastewater

aquaculture; design considerations in reuse of wastewater in aquaculture farming; design of aquaculture system; environmental problems associated with aquaculture farming and control; economic considerations in aquacultural farming; health aspects of wastewater reuse in aquaculture; sociocultural aspects of wastewater reuse and economic, institutional and legal issues in wastewater reuse.

We are sure this book shall be highly welcome by a large number of organizations looking for this vital information.

November 14, 2001

V. S. Kulkarni
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