EFFECT OF POLYMERS ON SOIL PROPERTIES
WATER CONSERVATION, AND YIELD

By
FATEN ALKOFAYEH

A THESIS

Submitted In Partial Fulfillment Of The
Requirements For The Degree Of
MASTER OF SCIENCE
In Soils And Irrigation

UNIVERSITY OF JORDAN
FACULTY OF AGRICULTURE
DEPARTMENT OF SOILS AND IRRIGATION

February, 1986
EFFECT OF POLYMERS ON SOIL PROPERTIES
WATER CONSERVATION, AND YIELD.

BY
FATEN AL-KOFAHE

The examining committee considers this thesis satisfactory
and acceptable for the award of the Degree of Master of
Science in Soils and Irrigation.

Ibrahim O. Ghawi
Ibrahim Ghawi: Assistant Professor in Soils.
Advisor.

Marwan Kamal: Professor in Chemistry.
Member of Committee

Awni Y. Taimeh: Assistant Professor in Soils.
Member of Committee

Muhammad Shatanawi: Assistant Professor in Hydraulic and
Irrigation Engineering.
Member of Committee.

Date of thesis defense: September 2, 1985
INTRODUCTION

Since agriculture is very important in meeting the food needs of an increasing global population, production must be expanded, worldwide. More food must be produced by adopting and adapting new technology in the field of agriculture so as to optimize agricultural production return. Since water is usually the major limiting factor in agricultural development in arid and semi-arid regions, the major domain in such problem is the efficient use of water.

The shortage of water for agriculture in arid and semi-arid regions such as Jordan necessitates a good soil moisture management which is probably the most critical problem facing soil and water conservation researchers all over the world.

The economical use of water is required especially for crops grown during the Summer season, where the rate of evapotranspiration is relatively high. Consequently, the management strategy for such a problem recommends the use of polymers (synthetic soil conditioners), which have become very important during the last ten years due to better economical justification of their uses. Improved scientific understanding of their behaviour increased after the symposium on the fundamentals of soil conditioning
held in Ghent " Belgium " in 1972 .

Soil conditioning is not only concerned with the improve in the physical and chemical properties of the soils, but also to give soils the needed physical properties that allow plant growth, reduce evaporation, enhance soil stability, save water and increase water use efficiency.

Addition of polymers can change the physical properties of the soil dramatically. To understand this effect, the complex phenomenon has to be broken into simpler physico-chemical phenomena such as aggregation stability, water behavior, fertilizer behavior, evaporation and yield.

Four soils with different textures representing the major portion of the cultivated areas in Jordan were chosen in the present investigation and green-house experiments were set-up with the aim of studying the influence of application of two new polymers, namely Aquastock and Agrisc on:

a. Some physical properties and water conservation of the four soils.

b. The yield of wheat (*Triticum aestivum*) and tomato (*Lycopersicon esculentum*) in the four soils, respectively.
c. The availability of some micronutrients in the four soils for wheat and tomatoes.