

# **INTRODUCTION**

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In arid and semi arid regions, water has special importance where low or poorly distributed rainfall and or other sources of irrigation water are limited. So water is considered the limiting factor for agricultural production in these regions

Under these conditions, finding the optimal irrigation decision is extremely important to produce the food and fiber as well as to reduce the risks of low crop yields.

Therefore, water source management and water conservation are very important for increasing the cultivated area.

The optimum management of water irrigation in this region may include converting from flood to modern irrigation systems, increasing the irrigation efficiency and uniformity and irrigation scheduling which means determining when to irrigate and how much water to apply.

Modern irrigation systems such as sprinkler and drip or trickle irrigation help in controlling water application, reducing water requirements, reducing water losses, reducing the risks of agriculture, increasing crop yield and increasing irrigation efficiency.

Drip irrigation system is defined as the irrigation method whereby small water and fertilizer are applied at short intervals directly to root zone of the plants. This highly controlled irrigation system is widely used in many areas of the world with different technical specifications and various engineering aspects. Design and selection of the system aims to distribute irrigation water uniformity on the field. The accuracy of this uniformity depends on the engineering aspects of the system and it may affects the system cost and the crop production economy specially for the sensitive crops.

For design of drip irrigation system, it is important to select and determine the level of irrigation efficiency or system irrigation uniformity.

The irrigation uniformity is a key component in overall irrigation efficiency and hence plays an important role in scheduling and economics of crop production.

The optimal level of design emission uniformity of drip irrigation system depends on the availability and quality of irrigation water capital cost of the system, cost of applying irrigation water and the farm gate price crop yield.

Therefore, this investigation was planned to study the effect of some levels of design emission uniformity percentage of drip irrigation system on:

1. The seasonal irrigation water applied for maize and soybean crops.
2. Yield and yield components of maize and soybean crops.
3. Water use efficiency.
4. Capital cost of the system.
5. The seasonal cost of the irrigation.
6. Finally, defining the optimum emission uniformity for drip irrigation system which minimizes the production costs and maximize the net benefit.