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## SHORT COMMUNICATION

# Water Use Efficiency (WUE) an Index of Optimum water use in Agriculture (Case Study: Southwest of Iran, Dezful)

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### IMPORTANT OF WUE

Due to decrease in water supplies, climate change and diminishing resources devoted to agricultural water due to population growth, water use efficiency (WUE) based on the more produce per drop is important in many countries. To achieve this goal, a detailed understanding of the relationship between water use and crop yield is essential. Considering that the effects of water requirement decrease in the intensity, duration and timing of different actions, modeling of crop response to water decrease is a very difficult and complex. Initial efforts to understand this relationship leads to find correlations between the water consumptive use and the yield production function. Production function yield are widely used in the economic analysis of crop yield response to water use and efforts to optimize the allocation of water resources at the local level has taken place. Of the methods based on this approach, the yield response to water, FAO Irrigation and Drainage paper 33 is used usually.

### NECESSARY OF RESEARCH ON DRIP IRRIGATION METHODS ON ENHANCE OF WUE IN ARID AND SEMI-ARID REGIONS

Although more than 90 percent of recoverable water is used in agriculture section, however this vital is an important limiting factor in agriculture activities in Iran. One of the main reasons for this is the lack of modern irrigation methods. One of the modern methods are drip irrigation methods. Reducing evaporation from the soil and deep percolation losses increase the efficiency of water use in these methods. These methods are used mainly for row crops and orchards. Potato is one of the important crops that can be irrigated with these methods. The production volume of potato product in the world after wheat, rice and maize are in the fourth degree. According to recent statistics from the FAO in 2007, about 19.6 million hectares of cultivated crop harvest will be about 321 million tons. Potato is a plant that has well yield in cool and moist regions. Soil moisture conditions in the development of this product have an important role in the quality and quantity of production, so that most of the irrigation experiments have shown that the product of this plant is relatively sensitive to water stress. Management of water supply for irrigation to low frequency words and short intervals through the drip irrigation can lower the stress level of the soil matric potential and maintain a minimum.

The hot and dry climate in most parts of the Khuzestan province and commonly Iran lead to appropriate water management in potato fields due to the sensitivity of the product under stress is very important. Use drip irrigation methods to evaluate the performance of this product has been studied in humid and cool regions , and very little research on the hot and dry climate. In arid and semi- arid climates such as Khuzestan important problem in addition to the evaporation of soil salt accumulation in the upper soil layer. These methods can be used to reduce water consumption leads to environmental pollution due to leaching is limited. The goal of this evaluation scheme potato yields in both surface and subsurface drip

irrigation (Tape) in comparison with a conventional furrow irrigation in a hot and dry climate in southwest of Iran, Dezful.

### **SUBSURFACE DRIP IRRIGATION**

The goal of good irrigation management is to provide water to the plants when needed for better growth. Sub-surface drip irrigation (SDI) is the placement of permanent drip tape (trickle) below the soil surface, usually at a depth of between 20 and 40cm. Emitters along this drip tape emit water during irrigation [1]. A range of crops have been successfully grown with SDI – cotton, cucurbits, lucerne, maize, potato, navy beans, sorghum, onion, tomato and wheat.

There are a number of advantages and limitations of SDI systems that need to be considered by irrigators before investing in the system. Usually SDI water use savings range from 0 to 50% when compared with traditional irrigation systems [2]. In situations where water savings are not made there is often a significant yield increase resulting in improved production per unit of irrigation water – improved water use efficiency (WUE).

### **RESULTS OF STUDDING IN ARID AND SEMI-ARID REGION DEZFUL, IRAN**

In a study includes three main plots of irrigation methods: surface drip irrigation, subsurface drip irrigation (Tape with 10 cm in soil depth) and furrow irrigation has been used for potato, Sante variety. Irrigation strategies as secondary treatment levels of 120, 100 and 80% of the crop water requirement has been considered and tested in four replications.

Results of this research showed that both the drip irrigation methods used in this study was appropriate performance, so that the water uses efficiency of drip irrigation, subsurface drip irrigation and furrow irrigation, respectively 6.39, 5.36 and 3.57 kg per cubic meter of use water.

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