

**MODIFICATION AND EVALUATION OF SENSOR-BASED FURROW
IRRIGATION SYSTEM FOR SUNFLOWER (*Helianthus annuus* L.)
PRODUCTION**

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ABSTRACT

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The need to constantly monitor over-irrigation was one of the many challenges farmers confronted in their daily farming activities. Frequently, the farmer must travel a considerable distance to access their fields and irrigation pumps. This study further developed the feedback mechanism and program of the CLSU-AFIS. The performance of the sensor-based furrow irrigation system was determined in this study. The specific objectives were to design, fabricate, and evaluate the system through the growth and yield of the sunflower, determine the water productivity, and perform a cost analysis of the system.

The study considered four treatments which were sensor-based furrow irrigation system with mulch (T1), sensor-based furrow irrigation system (T2), conventional furrow irrigation system with mulch (T3), and conventional furrow irrigation system (T4). The variety of sunflowers used was CLSF-1.

Results showed a significant difference between sensor-based and conventional furrow irrigation. Growth and yield parameters of the sunflower in a sensor-based furrow irrigation system with mulch obtained the highest value with average plant height of 74.14 cm, leaf number of 22.82, sunflower head weight of 184.87 g, sunflower head diameter of

17.23 cm, and yield of 80.14 kg. Mulch also reduced the irrigation frequency. Thus, it used less water but obtained the highest yield, increasing water productivity. The water productivity of using SBFIS without mulch in comparison with Conventional was found 54% higher while in SBFIS with mulch in comparison to Conventional with mulch was 72% higher. The water productivity of using SBFIS with mulch compared to SBFIS without mulch was found 39% higher while the Conventional with mulch compared to Conventional without mulch was also found 39% higher.

The system was viable for farmers with 5.2 years of payback period and a return on investment of 19.3%.

Keywords: sensor-based furrow irrigation; sunflower; microcontroller

SUMMARY, CONCLUSION AND RECOMMENDATION

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