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## Innovative design for drip irrigation system to improve fertigation and crop water productivity

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Maximizing irrigation water use efficiency is a common concept used in Egypt due to limited water resources. The experiments were carried out during the two growing seasons 2014 and 2015, at the Research and Production Station, National Research Centre, El-Nubaria Province, El-Behira Governorate, Egypt to evaluate the performance of new design for drip irrigation system compared with two traditional designs to maximize water and fertilizers use efficiency under desert environment conditions. Designs of drip irrigation systems were (1) Design1: drip irrigation system (control), (2) Design2: drip irrigation system with PRD technique (partial root drying; one emitter will irrigate one part of the root system and emitters of other lateral will irrigate other half of root system) with the same direction for main lines and laterals and (3) New design: drip irrigation system with PRD technique with opposite direction for main lines and laterals. The following parameters were studied to evaluate the effect of different irrigation methods on (1) water emission uniformity, (2) soil moisture distribution (4) application efficiency (5) yield of potato (6) Water productivity of potato "WP potato" (7) economical evaluation. Statistical analysis indicated that the maximum values of growth, yield, WP potato and total income were detected under new design of drip irrigation system with PRD technique with opposite direction for manifolds lines and laterals.

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## The effect of elevation, varieties and liquid organic fertilizer on nutrient uptake and growth of rice crops

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Research of the effect of elevation, varieties and liquid organic fertilizer (LOF) on nutrient uptake and growth of rice crops have been conducted for 4 months. The experiment began in February 2016 to May 2016. Goal of the experiment was to determine the effect of elevation, varieties, LOF on nutrient uptake and growth of rice crops. The experiment was arranged in the split plots design at 2 elevations, namely in Padang Panjang for high land (780m above sea level (asl) and, as lowland area in Padang City laid at 22m above sea level. The experiments were performed in parallel at each location. The main plot of rice varieties consists of two kinds, namely: Cisokan and Pandan Wangi. The subplot consisted of three kinds of LOF namely, F1 Crocober; F2 Unitas Super and F3 Commercial (K-Getz). The experiments at each location were repeated three times, in order to obtain a total of 36 experimental plots. Data were analyzed using the F test significance level of 5%, if the treatment significantly analyzed using the BNT  $\alpha$  5%. The parameters were nutrient uptake and growth of crop. The results proved that the fertilizer F1 (Crocober) is a type of LOF and is more suitable for using in highland, while LOF Unitas Super (F2) is more properly used in the lowlands. Cisokan rice crop variety is more suited plant in the highland, while the more appropriate Pandan Wangi variety planted in the lowland, for more N, P, K, Ca, uptake than Cisokan.

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