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Subsurface irrigation of potato crop (Solanum tuberosum ssp. Andigena) in Suka Kollus with different drainage systems

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Among the most important hydraulic structures of pre-Hispanic ancestral technology developed in the Andean region, we find the suka kollus, aymara word, called also waru waru, en quechua or raised fields, in English. They are raised platforms surrounded by water canals that irrigate subsurface, but also have the function of draining, to deal with floods because they are surrounding Lake Titicaca. They also have the property of generating a thermoregulatory effect to crops, depending on the configuration of the channels and platforms. Such agro-ecosystems are being abandoned, however, if properly addressed crop management and some drainage canals are replaced by underground drains for increased crop area could be very useful in enabling marginal soils affected by salts and / or excess water.

For these reasons, the objective of this study was to evaluate the subsurface irrigation in the potato crop in suka kollus under a system of surface drainage, and mixed drainage (surface and subsurface).

The study was conducted in marginal soils of Kallutaca area, located 30 km from the city of La Paz, Bolivia, at a height of 3892 m.a.s.l. The cultivation of the potato (Solanum tuberosum ssp. Andigena) was used. Four treatments were tested with different widths of the platforms: T1 (Control) with drainage through channels; T2 (replacing a channel by a drain); T3 (replacing two channels by two drains); T4 (replacing three channels by three drains).

The flow of water into the soil from the water table was predominantly upward, except during periods of high rainfall. In terms of treatments, the flow in T1 was higher, mainly at weeks 8 to 11 after seedling emergence, coinciding with the phenological phases of flowering and at the beginning of the tuber ripening. It was followed by T3, T2 and T4 treatments, respectively.

Tuber yield, if one considers that the channels detract arable land, was higher in the T3 treatment,16.4 Mg / ha, followed by T2 treatment, 15.2 Mg / ha, T1 treatment (Control) 7.3 Mg / ha and T4 treatment with 7.1 Mg / ha. Therefore, in the mixed system with two drains the best results were obtained.