Geophysical Research Abstracts
Vol. 15, EGU2013-6492, 2013
EGU General Assembly 2013

Groundwater level deterioration issues and suggested solution for the water curtain cultivation area in South Korea

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Protected water curtain cultivation system is an energy saving technique for winter season by splashing groundwater on the inner roof of the green house. But the issue is that the method results in groundwater level deterioration because it disposes the used groundwater to nearby stream. Reuse of the groundwater for water curtain cultivation is important

Groundwater level, steam level, and groundwater usage rate are investigated at the five green house concentrated areas such as Cheongwon, Namyangju, Choongju, Namwon, Jinju. Groundwater usage rate is estimated using a ultrasonic flowmeter for a specific well and using the combination of pressure sensor and propeller type velocity counting equipment at a water disposal channel from November to April which is water curtain cultivating season. Groundwater usage rate ranges from 46.9m3/d to 108.0m3/d for a 10a greenhouse. Groundwater level change is strongly influenced by seasonal variation of rainfall and concentrated pumping activities in winter but the level is lower than stream level all year long resulting in all year around losing stream at Cheongwon, Namyangju, Jinju. At Nanwon, the stream is converted from losing one in winter to gaining one in summer.

Groundwater level deterioration at concentrated water curtain cultivation area is found to be severe for some area where circulating water curtain cultivation system is need to be applied for groundwater restoration and sustainable cultivation in winter. Circulating water curtain cultivation system can restore the groundwater level by recharging the used groundwater through injection well and then pumping out from pumping well.