Regulation of nutrient status of soil - guarantee of obtaining stable crop yields

A.J. Atakanov, A.O. Naloychenko

Kyrgyz Scientific and Research Institute of Irrigation,
4 A Toktonaliev Str., 720055, Bishkek, aatakanov@mail.ru

The stable increase in yield and quality of crops is one of the fundamental factors of food security in rural areas and of social development of market economy. This can be achieved by conducting complex land reclamation, but the most convincing soil protective technology is perfect method of regulating the nutrient status of soil through fertilizer irrigation method, i.e. application of weak fertilizer solution concurrently with irrigation.

Spreading of nutrients through fertilizer irrigation method has some substantial advantages compared with introduction of solid fertilizers, as fertilizer in available form can be applied at those stages of plant development, when they mostly need nutrients and moisture. This ensures more even spread of nutrients over the area and significantly (up to 98% instead of 60) increases utilization coefficient by plants (discharge decreases, which significantly increases the ecological safety of environment); expands the possibility of improving product quality due to late fertilization of crops, regardless of row width and state. Combining of applications of water and fertilizer solution doest not require special machines for applying fertilizers, reduces requirements to their caking properties, granular size and other physical - chemical properties, expands opportunities for transportation of fertilizers without special equipment and application of their liquid forms, reduces nutrient losses during washing out, does not create elevated concentrations of soil solution, meets the demands of providing crops with food compounds when they are particularly sensitive to their shortage and in times of greatest need for nutrients, reduces environmental pollution.

Before applying compound fertilizers based on fertigation method, solid fertilizers (nitrogen N, phosphorus P, potassium K) should be liquefied, i.e. must be dissolved in water. The obtained liquid concentrated stock solution should be added to water; however, the ratio should not exceed 0.3%.

In general, factors of fertilizer irrigation are stimulants used to obtain additional yield. The yield increase, compared with application of solid fertilizers for cultivating maize for fodder amounted to 38.2%; yield of grain maize has risen from 66 to 73 centner/ha; increase in yield of spiked cereals amounted to 6.9 centner/ha and grain quality has improved, i.e. the protein content increased from 10.3 to 13.1% and the gluten content from 20.2 to 25.6%. Tomato yield increased by 9.9%, while increase in yield of sugar beet made up 72 centner/ha.

The fertilizer irrigation can be effectively used in any soil - climatic conditions for growing various crops.