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USING RESOURCE-EFFICIENT IRRIGATION METHODS IN THE FERGANA VALLEY

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Annotation: Abstract: In the current era of water scarcity and global climate change, more efficient use of water resources, hydro-modular zoning of irrigated land, irrigation regime for agricultural crops, efficient use of water and development of new innovative irrigation technologies, prevention of water waste in irrigation, meeting the water demand of agricultural crops at the required level, saving water through planned use of water in irrigation of agricultural crops, and increasing irrigation productivity are considered to be one of the main tasks today.

Keywords: Hydromodule region, irrigation, sprinkler irrigation, aerosol, surface irrigation, strip irrigation, subirrigation, specific water consumption.

Irrigation is the satisfaction of the water needs of agricultural crops at the required level. Various irrigation methods are used. In particular, today, irrigation methods such as surface (over the soil) sprinkling, through the soil, drip and aerosol are widely used. Irrigation methods are a set of measures used to distribute water to irrigated crops and convert the flow form of water into soil and atmospheric moisture. The development of modern irrigation methods is considered the most complex agro-ameliorative measure today. Increasing the efficiency of irrigated land depends to a certain extent on the method and technique of irrigation. When choosing a technique for irrigation of agricultural crops, it is necessary to take into account the climatic, hydrogeological, biological, economic, economic and other characteristics of the area. In addition, the level of moisture supply of the area, wind speed, water transpiration rate, and wind direction are also important factors to consider. For example, while the relief of the area is also important in irrigation, the location of groundwater, its

mineralization, and whether or not the area is drained determine the use of one or another method of irrigation of agricultural crops. If the use of sprinkler irrigation is considered effective in conditions where the mineralization level of groundwater is 1.5-3.0 g/l and the critical depth is 1.5-2.2 m, then surface irrigation is considered convenient in areas with a mineralization level of 5.0-7.0 g/l and a critical depth of 3.0-3.5 m, and one or another irrigation method can be used in conditions where the mineralization level is 3.0-5.0 g/l and a critical depth of 2.2-3.0 m.[1]

Surface irrigation of agricultural crops. This method has been used for a long time to irrigate agricultural crops. It has the following forms: furrow irrigation, strip irrigation, and edge irrigation. In surface irrigation (over the soil), water moves horizontally along the fields and is absorbed vertically and to the sides. The most advanced method of irrigation is furrow irrigation, in which rows with a slope of 0.001 to 0.05 are cut. This method is currently used in most of the irrigated lands of our republic. In modern agriculture, irrigation is carried out with closed (non-drainage) and open (drainage) bottoms with a slotted bottom, and the fields where crops are sown are furrowed2. Deep furrows with closed ends are used to irrigate crops with row spacings with a slope of less than 0.002. In addition, when irrigating lands with a slope of 0.002-0.004 without draining (using deep furrows), it is advisable to stop watering the furrow when 2/3 of the furrow is filled with water shortly before the water reaches the end of the furrow. Furrow irrigation, which does not cause strong compaction of the soil and allows wetting the deep layers of the soil, which maintain the soil structure well, has a good effect on microbiological processes in the soil. The disadvantage of this irrigation technique is that it is impossible to moisten the soil at the beginning and end of the furrow to the same depth. The impossibility of supplying large amounts of water is another disadvantage of this irrigation technique.

In areas with a lateral slope of less than 0.002 and a longitudinal slope of less than 0.015, the strip irrigation method is used. In this case, water is introduced

into the field through strips in a continuous manner. Today, this irrigation method is used to irrigate leguminous and fodder crops and cereal crops planted in a continuous manner in order to accumulate moisture in the soil.

Strip irrigation is carried out in two different schemes:

1) On well-leveled and non-vertical lands, water is transferred from a temporary network directly to the head of the strip;

2) In areas with poorly leveled and complex microrelief, water distribution is more complicated in this method. Therefore, in such conditions, water is supplied to the strip from its side.

3) In rice cultivation and salt washing activities, the strip irrigation method is carried out by taking a check. In this case, it is surrounded by ridges. Such irrigation is used on lands with a slope of <0.002 and without a fixed slope, with weak water permeability, high natural drainage or provided with collector-drainage networks. The disadvantage of this type of irrigation is that the curbs hinder the movement of agricultural machinery and damage the soil structure.

The sprinkler irrigation method of irrigation is aimed at accumulating water reserves at a depth of up to 0.6 m and improving the microclimate, and is divided into: regular and pulse sprinkler irrigation according to the method of impact on the plant and soil layer. Typically, in cases where the air temperature is high and the air humidity is low, irrigation is carried out every day at the highest air temperature (from 12 to 15 hours) to improve it. In addition, it is necessary to take into account the qualitative characteristics of sprinkler irrigation.

In the climatic conditions of Central Asia, for irrigation of berries, vegetables and other fodder crops, as well as in areas with a complex relief structure and a slope of 0.05-0.3, the pulsed sprinkler irrigation method is used as a new promising type of sprinkler irrigation.

The main disadvantages of sprinkler irrigation are low productivity at high rates of irrigation, limited use of this type of irrigation in saline soils, and

when the intensity of irrigation is high, the soil layer becomes compacted and becomes crusted, and strong winds limit this type of irrigation to a certain extent.

We can take inter-soil irrigation as an example, which is typical for desert, semi-desert, desert and semi-desert regions, but not typical for saline, very steeply sloping soils with very good permeability to the subsoil. The advantages of this type of irrigation are: there is no need to build irrigation networks, reduced water consumption, the possibility of preventing the spread of weed seeds through water, it is possible to increase fertility by applying mineral fertilizers dissolved in water to the layer where the plant roots are located, it has much higher advantages, such as reduced inter-row cultivation, and increased productivity of irrigators. The disadvantages of this irrigation method are high costs, inability to control the microclimate, inability to moisten the 10 cm layer of the soil surface, and water pipes buried under the soil becoming muddy and impermeable. This type of irrigation can be divided into pressure, non-pressure and vacuum types according to the passage of water into the soil. In this case: water is supplied to pressure pipes from networks located 0.6-2 m above them, while in non-pressure pipes this indicator is required to be 0.1-0.5 m.

In the vacuum type, unlike pressure and non-pressure pipes, it is carried out by the suction power of the soil. The suction power of the soil depends on the capillary pores of the soil. It should be noted here that the less moisture in the soil, the higher the suction power of the soil.

In areas where the mineralization level of groundwater does not exceed 4-5 g/l, the subirrigation method of irrigation can be used. With this irrigation method, agricultural crops can be irrigated by artificially raising the groundwater level and moistening the soil. The groundwater level is maintained at 0.7-1.5 m and is used for irrigation. In terms of regions, subirrigation can be used during the initial development phases of agricultural crops for the Khorezm region (mid-May), and when water shortages begin in the Fergana region, i.e. by

the end of August. This irrigation method has long been used in the regions of Central Asia. In this case, a two-way irrigation drainage structure is built and the groundwater level is maintained by installing barriers. After irrigation, in the dry season, the barriers are removed and drainage works are carried out.

In conclusion, it can be said that in the current water shortage, there is a need to carry out agricultural crops cultivation using new water-saving methods of irrigation. By combating erosion in areas where water erosion occurs during irrigation, it is possible to prevent the washing away of the fertile soil layer. Instead of the old traditional method of irrigation, it is necessary to use a new method of irrigation taking into account the soil and climatic conditions of farms..

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