



Analysis of Work Process Study of Agricultural Crops Irrigation Methods and Technologies

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Abstract: In this article, the methods of irrigation of agricultural crops, their advantages, obtaining a fruitful harvest from crops in places with a shortage of water, types of irrigation are studied. In addition, irrigation organization techniques and technology, their advantages and disadvantages were studied. Ways to introduce irrigation methods and get a good harvest as a result have been studied.

Keywords: Irrigation, irrigation, crop, crop, harvest, sprinkle, drip, water, soil.

Irrigation method is a set of methods and measures used to distribute irrigation water to irrigated areas and transfer water from flow to soil and atmospheric moisture. To implement the irrigation method, the elements of the irrigation technique are selected. Irrigation technology is the technology and technical means of transferring water from the flow form to soil and atmospheric moisture. The main essence of irrigation methods is to create optimal soil moisture for the plant as a result of using an optimal irrigation method for the purpose of effective and rational use of water resources, as well as obtaining a high and stable yield. The method and type of irrigation affects the irrigation procedure, labor productivity in irrigation, leveling works for land reclamation, location and construction of water networks, construction and operation costs, product productivity, etc. The correct choice of its type determines the yield and productivity of agricultural crops.

Irrigation method - the method of applying the seasonal irrigation norm to the soil is called the irrigation method. In addition, it is necessary to ensure the following in the irrigation method and water supply methods that implement the artificial irrigation process: high productivity; to achieve high melioration indicators by consuming little water; should ensure that irrigation networks have high technical indicators.

In order for this artificial irrigation process to have a good result, this process requires forest-technical melioration (transplantation of trees around irrigation fields and irrigation networks) and agro technical measures (leveling of land, preparation for irrigation, optimal selection of watering method) should be carried out together.

Currently, there are the following irrigation methods:

1. irrigation over the land;
2. sprinkler irrigation;
3. watering from inside the soil;
4. drip irrigation;
5. Irrigation by raising the level of seepage waters (subirrigation);
6. Irrigation by creating mist (dispersed irrigation method).

In the first method, water is distributed through the soil and is absorbed into the soil.

In the second method, water was supplied to the irrigated area with the help of special mechanisms in the state of rain, and the above-ground part of the plants was irrigated along with the soil;

In the third method, water is supplied to the soil through pipes installed from within, not over it, and the active layer is mainly concentrated at the expense of the irrigation power of the soil;

In the fourth method, water is delivered to the soil in drops to the base of each plant using special pipes and drippers (kapelnitsa) installed on them;

In the fifth method, the level of seepage water rises artificially (by closing the collector and ditch networks), and the active layer is moistened due to the thrust of the soil.

In the sixth method, the water is dispersed in the form of mist to the irrigated area through pipes with the help of special pumps. It is mainly used to improve the microclimate conditions of irrigated areas and to irrigate them.

When choosing the elements of irrigation technology, the used irrigation method and the type of cultivated crop are taken into account. Currently, the following irrigation methods are used to irrigate agricultural crops grown in our Republic:

1. over the ground;
2. Raining;
3. From the soil;
4. Drop by drop;
5. Under the soil (subirrigation);
6. Aerosol (fog-forming, finely dispersed)

The method of watering over the ground. In this method, water is distributed over the soil to the irrigated area. In this case, water is absorbed into the soil vertically (vertically) and sideways during horizontal movement. Taking into account agricultural crops grown in surface irrigation, the following types are used:

- ✓ Irrigation;
- ✓ Irrigation by sidewalks;
- ✓ push (check) irrigation.

Regular watering.

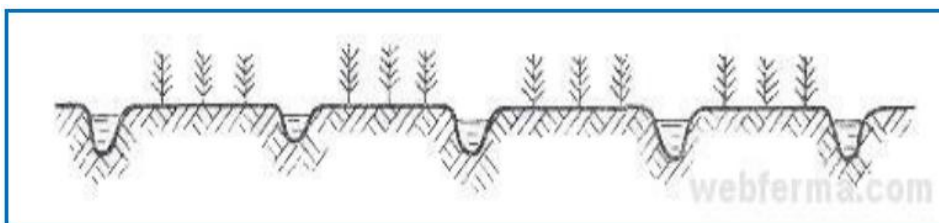


Figure 1. Regular watering

It is used in cotton fields. The distance between the legs is 60 cm. and 90 cm. will be done. Irrigation by pavement.

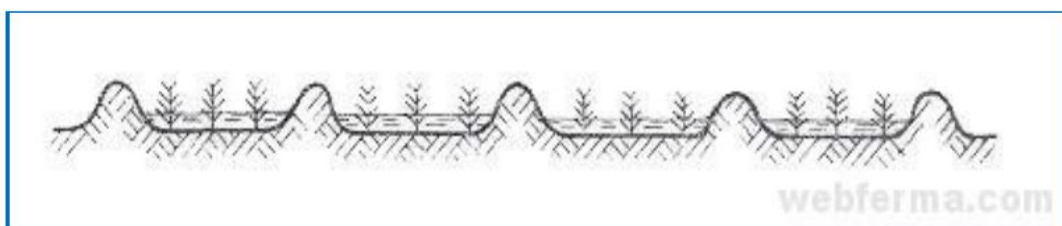


Figure 2. Irrigation by pavement

Submersible irrigation is mainly used in the cultivation of fodder and fodder crops. Irrigation by pressing (taking a check).

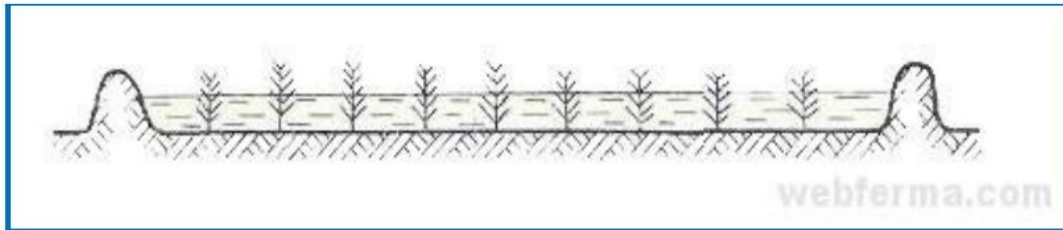


Figure 3. Irrigation by pressing (taking a check)

This method is used for salt washing in irrigated fields and rice cultivation. At a time when water is scarce, sprinkler and drip irrigation methods are of great importance, and they are of great importance in automating and saving irrigation water.

Sprinkler irrigation method

Sprinkler irrigation is the delivery of water to the soil surface (satkhi) and plants in the form of artificial rain with the help of special machines, devices and aggregates. In the active layer of the plant, as a result of providing water based on the demand of the agricultural crop through the use of sprinkler irrigation optimal humidity is created. As a result, the balance of water-air-food and salt balance necessary for the plant is maintained.



Figure 4. DDA-100 sprinkler irrigation machine



Figure 5. Small pressure irrigation device.

The sprinkler irrigation method has the following advantages:

Changing the depth of soil moisture by reducing or increasing the rate of irrigation (based on crop demand). Increasing the relative humidity of the air in the surface layer. Lowering air temperature by increasing relative humidity. Ensuring that crops are not affected by frost. Even distribution of water across the field (no demand for irrigated land relief).

There is no need to build irrigation ditches and ditches. It is possible to give mineral fertilizers with irrigation water. Economical use of water. High land use. Increasing efficiency of water use, etc. Water-saving irrigation technologies.



Figure 6. Use of cost-effective technologies

On the scale of our country, special attention is being paid to the widespread introduction of advanced water-saving technologies, including drip irrigation, laying a film on the edge, and

irrigation using flexible portable pipes instead of ditches. Only in recent years, a drip irrigation system has been built and successfully used on an area of more than 7.6 thousand hectares. The technology of irrigation with the help of a film and portable flexible pipes is used on an area of about 4,000 hectares, and the main part of it is used for irrigation of cotton fields. From water resources taking into account the importance of the use of advanced water-saving technologies in increasing the efficiency of water use, the development of this direction is being supported by our state. In particular, based on the decision of the first President of the Republic of Uzbekistan dated April 19, 2013 "On measures to further improve the reclamation condition of irrigated lands and rational use of water resources in the period of 2013-2017", a total of 25 drip irrigation system on an area of 1,000 hectares, film irrigation on 45,6 thousand hectares and irrigation instead of arrow ditches on 34,000 hectares it is decided to introduce irrigation methods using flexible pipes.

The procedure for introducing modern water-saving technologies (Decision No. PQ-4087 of the President of the Republic of Uzbekistan dated December 27, 2018 and Decision No. PQ-176 of the Cabinet of Ministers dated June 21, 2013) is being implemented step by step.

Drip irrigation method. In the conditions of shortage of irrigation water in our republic, the most important and urgent task is to use technologies that save water resources in the cultivation of high-quality crops. Drip irrigation is currently the most optimal method of water saving technologies remains one of the methods. Saving every drop of water in field conditions, applying solutions to prevent water loss in the field in the right amount and at the right time, that is, to reduce water loss, and to use water every day. is to create an opportunity to get more crops from a drop. Consistent introduction of soft pipes and drip irrigation system in our country, starting production of necessary equipment for this is one of the important tasks defined in relevant state programs for reforming the agricultural sector. The consistent implementation of the system of economical use of irrigation water in our country, the production of the necessary equipment for this is relevant for the reform of the agricultural sector. is one of the important tasks defined in state programs. The main goal of this is to radically increase soil fertility, to use every drop of water efficiently, and as a result of this, to get a high and quality harvest from agricultural crops, including horticultural crops.

Drip irrigation is the periodic application of water to the root layer of the plant in the required volume, taking into account the water demand of the plant. In drip irrigation, irrigation water passes through pipes and falls on the soil in the form of a very small stream or drop from special droplets transmitted to the root layer of the plant.



Figure 7. A view of the drip irrigation method

The drip irrigation method has the following advantages: due to the active (active) development of the plant root layer and good air exchange in the soil, the assimilation of nutrients by the plant is accelerated. Irrigation can be carried out at any time of the day, regardless of the cultivation of crops in the field.

The row spacing allows the soil not to be watered, to work the soil and the plant at any time, and to harvest the crop. Drip irrigation has the following advantages: Less water is used. Evaporation of water, useless waste from the active layer is not allowed. Wind power does not affect the irrigation process. It is possible to irrigate the area with difficult terrain. Moisture (irrigation water) is evenly distributed. Irrigation can be done at any time of the day. Weeds are less likely than the other method. This is due to the fact that the temperature in the soil is higher compared to the methods of raining and watering over the soil as a result, agricultural crops ripen early. Absorption of water into the soil is carried out mainly on the capillary principle. In the process of irrigation, there is a possibility of adding mineral fertilizers to the roots of plants together with irrigation water.

Short periods between irrigations (1-3 days). In this case, the sudden change of moisture in the root layer of the plant is reduced. Drip irrigation has the following disadvantages: Clogging of the drippers with salt deposits and cloudy particles in the water. Pipeline damage by rodents. Value. The conditions of use of the drip irrigation system are limited. Building a drip irrigation system costs a lot of money. Therefore, this method should be used in irrigation of high-yield agricultural crops, as well as other irrigation methods. It is recommended to be used on the slopes with a large slope (greater than 0.03), scarce water resources, difficult topography, light mechanical composition and water erosion-prone soils, as well as areas with a small flow of fresh water.



Figure 8. Crop germination in drip irrigation

According to the information of G. Bezborodov, B. Komilov, the irrigation method from under the soil is convenient, cheap and effective. During the growing season, when cotton is irrigated 5-6 times by regular irrigation method, 5673m³/ha of water is consumed, and 7 times by drip irrigation method, the seasonal irrigation rate is 3863m³/ha. is enough. As a result, 1810m³/ha (31.9%) water saving per hectare is achieved. Advantages of subsoil irrigation method According to the data obtained as a result of the experience of S.Y. Azgan, tests of subsoil and furrow irrigation methods (the test was used for watering tomatoes) Crop yield increased by 100%, It was saved by 40%, labor cost by 90%, water by 50%. Advantages of subsoil irrigation method: scientific research works on the use of subsoil irrigation method were carried out in the scientific production fields of Andijan branch of Tashkent State Agar University (for example). The purpose of the experiment: improved water-saving subsoil irrigation technology that provides an optimal planting scheme of cotton Andijan-35 and Andijan-36 varieties and irrigation procedures in the conditions of Andijan region improvement and its impact on the growth, development and productivity of cotton varieties, scientific and practical recommendations for farmers and water management organizations were developed. According to the obtained results, the following conclusion was reached:

1. Hoses laid underground to a depth of 50 cm do not rot for 20 years, and fuel and lubricants are saved due to less use of agricultural machinery in the field;

2. Improvement of the air and temperature regime of the soil is achieved in order to prevent the appearance of clumps between the bushes in the field;
3. Optimum conditions were created for the cotton root and the supply of the plant with moisture, nutrients and other factors was improved;
4. Nutrient solutions are delivered directly to the roots through the irrigation system from under the soil.
5. Fighting against diseases and pests in the soil, preparing the land for planting, enriching the land with organic fertilizers, tilling, opening irrigation ditches, sprinkling mineral fertilizers, fighting against weeds, etc. A number of agrotechnical measures are not required.
6. The effectiveness of mineral fertilizers will be high. Water saving in irrigation was 70-80 percent;
7. In this method, water erosion was stopped because the water was not thrown into the drain;
8. In this method, irrigation water is less per hectare compared to withdrawal irrigation 2400 m³ were saved.
9. Cotton productivity increased by 19.3 centners when the row spacing was 60 cm compared to irrigation. Photographs of the conducted experiments are given below.



Figure 8. Laying irrigation hoses to a depth of 0.50-0.70 cm



Figure 9. application of subsoil irrigation method to cotton crop

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