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4.1.4. Садоводство, овощеводство, виноградарство и лекарственные культуры

ОСНОВНЫЕ СПОСОБЫ ОРОШЕНИЯ ПЛОДОВЫХ НАСАЖДЕНИЙ И ИХ ПРИМЕНЕНИЕ В АФГАНИСТАНЕ

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Основная цель выращивание плодовых растений получение высоких урожаев качественных плодов. Для достижения вышеуказанной задачи – орошение является одним из главных факторов. Для разработки системы орошения, необходимо знать в какое время выпадают осадки и площадь, которую надо обеспечить водой. Первый шаг в работе -определение способа полива. На втором этапе изучение типа почвы и соответствие выбранной оросительной системы. На третьем этапе мы должны рассчитать экономику. Таким образом, мы можем достичь поставленной цели. В Афганистане более чем на 50 % территории количество выпадающих за год осадков составляет менее 300 мм. Проведенный анализ имеющихся материалов показал, что в Афганистане для полива можно использовать воду морей, родников, воду из кяризов. Были рассмотрены все способы орошения в плодовых насаждениях и возможность их использования в Афганистане

Ключевые слова: АФГАНИСТАН, ПЛОДОВЫЕ РАСТЕНИЯ, ВОДА, СПОСОБЫ ПОЛИВА, СИСТЕМА ОРОШЕНИЯ

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4.1.4. Horticulture, vegetable growing, viticulture and medicinal crops

BASIC METHODS OF IRRIGATION OF FRUIT CROPS PLANTINGS AND THEIR USE IN AFGHANISTAN

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The main goal of growing fruit plants is to obtain high yields of quality fruits. To achieve the above task, irrigation is one of the main factors. To develop an irrigation system, it is necessary to know the time of precipitation and the area that needs to be supplied with water. The first step in the work is to determine the irrigation method. The second stage is to study the type of soil and the suitability of the selected irrigation system. In the third stage, we must calculate the economy. In this way, we can achieve the goal. In Afghanistan, the annual precipitation amount is less than 300 mm on more than 50% of the territory. The analysis of the available materials showed that in Afghanistan, water from seas, springs, and karez water can be used for irrigation. All methods of irrigation in fruit plantations and the possibility of their use in Afghanistan were considered

Keywords: AFGHANISTAN, FRUIT PLANTS, WATER, IRRIGATION METHODS, IRRIGATION SYSTEM

Afghanistan is a country that has been suffering from a civil war for more than 24 years. And it is still going on. The country is badly damaged. It is moving towards poverty and economic incapacity. According to the UN list, Afghanistan currently ranks 171st in the world out of 174 countries [1,2,3]. And it is one of the oldest countries. The irrigation systems of Afghanistan have always faced problems. Which eventually led to the destruction of these

systems. The Motherland cannot cope with the current situation. With its weak economy, it must revive and rebuild all the economic foundations of its ministries. In this regard, our country is in dire need of help. The goal of the reconstruction work is not only to reform and repair the traditional irrigation system of Afghanistan. Rather, it is a training and information program for Afghan engineers working on the reconstruction of the irrigation systems of Afghanistan.

The main objective of the work carried out is to accurately describe the existing irrigation methods and their implementation in the conditions of Afghanistan.

In the field of irrigation methods and evaluation of irrigation systems, simple and economical methods are noted.

Results and discussion.

Irrigation is one of the most important ways to increase the yield and quality of agricultural crops. This is not only the case in arid and semi-arid areas, where most of the water for plant growth comes from irrigation. It is also important in humid conditions. After people emerged from primitive life, they already knew that plants grow better in the presence of water. It was noted that most plants grow near running water. Plants located far from water or in the desert need to be supplied with water. Providing the world's ever-increasing population with sufficient food is possible by irrigating large arid and low-water areas and planting crops on them. This will save the world from hunger [12].

Water for irrigation can come from the sea, lakes, wells, springs and rainwater storage. There are certain rules and regulations associated with the use of water for irrigation purposes [15]. Before farmers spend money on irrigation equipment. They should know and understand these rules. Water can be pumped from rivers, freshwater lakes and reservoirs to the farm. Water comes out of some wells automatically. While others need a pump to lift the water. Farmers can use one or more sources or systems for irrigation water. The cost of

diverting water from a river is often borne by a group of people. When powerful pumps are needed to lift the water. This is due to the large initial costs. The cost of drilling a well, installing a pump and its motor, and building a temporary storage tank can be a significant investment.

The basic and practical aspect of watering is determining the amount of water and the time during which water should be supplied to a particular plant. The amount of water used is determined by the amount of evaporation and transpiration. Therefore, it is necessary to evaluate this factor. Evaporation occurs from the soil surface, and transpiration from plant tissues.

It is known that evaporation is the change of liquid into gas. While transpiration is related to the flow of vapor from the plant to the atmosphere. Based on this, it was proposed to use the term evaporation (TE) (Total Evaporation). However, the more common expression is transpiration, (TET) is used to express the loss of water from both sources, because the change of form from liquid to gas is not related to the loss of water to the atmosphere [12,9,7].

In irrigation work, studying the properties of the soil is very important, and among them, the water-holding capacity of the soil is one of the most significant. This property is determined by the mechanical composition and structure of the soil. The water-holding capacity of the soil can be expressed as a percentage of the volume and weight of dry soil. In addition, we can take into account the amount of water available at a certain depth of the soil. For example, 30 cm of soil depth may contain 3 cm of water. Of course, this method is convenient for daily irrigation work.

The ability to retain water in heavy soils is much higher than in sandy soils. This means that the water-holding capacity of the first type of soil can be twice as high as that of the second type of soil.

Soil permeability is another important factor. This means that the amount of water that can enter the soil per unit of time is as important as the soil's ability

to retain water [11,]. The application of this issue is the rate at which the land can be irrigated.

Water quality is very important for irrigation, and if it is not suitable, it will destroy agricultural land. Soil damage during irrigation is due to the presence of sodium salts in irrigation water. If the amount of sodium is too much, it reduces the permeability of the soil for water. The ratio of sodium ions to the sum of magnesium, sodium and calcium ions should not exceed 50%. When using salt water for irrigation. Agricultural work should be carried out in such a way as to prevent the accumulation of dissolved substances on the soil surface. Especially at the stage when the seedlings are small. Crop rotation and selection of suitable plants should be done in such a way as to exclude the adverse effects of irrigation on arid and semi-arid lands. Otherwise, salts will accumulate on the soil surface. There is enough water for irrigation. However, the percentage of its salts is not always normal.

The most important irrigation methods are:

1. Surface irrigation.
2. Underground irrigation.
3. Striped irrigation.
4. Routine watering.
5. Sprinkling.
6. Irrigation of the pond.
7. Flood irrigation.
8. Drip irrigation.

Surface irrigation. In this method, water moves under the force of gravity, so in this method, the soil must have a sufficient slope. Water movement or through the atmosphere and the stacks are prepared by flooding. This method requires a predetermined irrigation schedule for the application of control. Irrigation of most crops is planned based on the calculation of 50% of the useful water discharge into the field development zone. It is better if there is

a possibility to postpone irrigation. This is due to the fact that planning based on 50% discharge can in some cases lead to useless water consumption. In this case, the system only works to replenish the soil profile. Because in the surface irrigation method, it controls the rate of penetration into the irrigation depth. Of course, the application of this method when watering less than 25 millimeters is difficult. Therefore, it is not recommended to use smaller quantities at longer intervals. With this irrigation method, water flows directly to the ground and reaches the plant and around the roots. This method of irrigation is carried out in three ways: flooding, atmospheric or ridge irrigation and irrigation (Figure 1).

Figure 1 - Surface irrigation of agricultural plants

Underground irrigation. In subsurface irrigation, water is added to the soil in the order in which it settles into the soil from below. Groundwater irrigation with abundant water, sandy loam surface soil (where water can easily move under gravity). Impermeable soil layers that retain water are needed.

Furrow irrigation. Furrow irrigation is an irrigation method that uses water in furrows. The slope, which is often constructed on the ground and on a slope, moves downward. The amount of water infiltration and its lateral distribution at any point in the row depends on the permeability characteristics of the soil and the duration of surface water stagnation at that point.

Strip irrigation (Figure 2). Irrigation of a strip of water from water on a sloping surface of the soil enclosed between boundaries. A stream comes. The distance between boundaries depends on such factors as the terrain, the volume of water entering the irrigation method, the need for agricultural machinery, the uniformity of irrigation. Typically, it is from 20 to 100 feet. As a rule, the slope across the width of the strips should be very small or approximately smooth, while the permissible longitudinal slope should not be more than 1%. The depth of penetration at any point in the strip depends on the permeability characteristics of the soil and the duration of water residence on the soil surface at that point [4,5,6,7].

Figure - 2 Strip irrigation of agricultural plants

Sprinkling. Sprinkler systems can range from a simple sprinkler to a very complex network. These systems can also be portable or permanently installed in a specific location (Figures 3,4)

Figure 3 - Features of using sprinkling

Figure 4 - Sprinkler Application

Pond type irrigation (Figure 5) -Irrigation refers to a type of irrigation system that specializes in the area around the irrigated area with short dumps. A pond can be about a few feet around a tree and tens of acres. But the important issue in a large pond is the flatness and homogeneity of its soil material. It should be relatively full of water to cover the basin in the shortest time. The task and size of the pond should be somehow selected. Be compatible with the type of soil, land area and water flow. The embankments around the pond can be built in such a way as not to hinder the movement of agricultural machinery during planting and harvesting. In addition, it can create them on the border of homogeneous soils (which mostly do not have a special non-geometric shape). Pond irrigation is the simplest way to irrigate plants that can be immersed in water for a while.

Figure 5 - Pond type irrigation

Flood irrigation. With this method, water is created on the soil surface. So the entire surface of the earth is covered with a layer of water. Water flows down to the soil surface, penetrates into it and moistens the soil to the required depth. With flood irrigation, water penetrates into the root zone of the plant and the problem of hardening the surface of heavy soils and reducing soil aeration arises [8,9,10].

In the years preceding the start of the Civil War, 85% of the irrigated area was irrigated by changing the course of reservoirs or using reservoirs. Only 7% of the area was irrigated by kyariz. This is evidenced by statistics for 1967-1968 [16,13].

At that time, the government of Afghanistan irrigated more than 167 thousand hectares of land with karez. The total number of karezes reached 674, each of which irrigated 15 hectares or 125 acres of land. Thus, karezes played a very important role in irrigating agricultural and horticultural lands. It should be noted that its importance has not diminished to this day [15,17,18,19,20].

General Irrigation System in Afghanistan

Afghanistan's agricultural sector relies heavily on irrigation. Around 85% of the country's agricultural output comes from irrigated land. Irrigated lands are divided into four main groups based on the water source used, namely:

• Lands receiving water from the seas 84.6%

• Lands that receive water from springs. 7.9%

• Lands receiving water from karez. 0.7%

Irrigation systems in Afghanistan are generally divided into two main groups.

1. Traditional irrigation systems that are managed by the community.

2. Modern irrigation systems

Traditional community-managed irrigation systems. These are traditional systems, many of which have existed for many years. The maintenance and rehabilitation of irrigation systems is usually based on traditional informal or social rural order.

Large surface systems: usually located in plains and valleys. Its maximum area is 200 thousand hectares. These systems are the main source of water supply in the regions of Afghanistan. Usually, each region has a canal originating from the sea of the Coast. These canals then divide into intermediate canals and, finally, into sub-canals that exit into fields.

Groundwater irrigation system:This system is technically modern. It is unconventional. But it is mainly operated by people. This system extracts water from underground through tube wells. These wells can be deep or shallow depending on the characteristics of the reservoir. Shallow tube wells are usually less than 20 meters deep. Their flow rate ranges from 4 to 20 liters per second, while deeper tube wells are more productive and are usually more than 60 meters deep. Irrigation using groundwater, especially at the individual level or in small communities, has increased in recent years [9]. Our country has suffered enormous human, financial and economic losses during civil wars.

During the years of the civil war in Afghanistan there was a huge burdennot only on the irrigation system, but on the entire economy of the country. Statistics show that agricultural production has declined by more than 53% compared to pre-war years [18,19]. 40% of irrigation systems have been destroyed, large agricultural farms and state livestock have been partially or completely destroyed in some provinces of the country.

Currently, Afghanistan has a huge amount of work to do to restore the destroyed irrigation system. To select optimal methods for using the available water resources in the country. All this will increase plant productivity and provide food for the country's population [20,21].

Conclusion

Thus, different methods and water sources can be used to irrigate agricultural lands in Afghanistan. Accordingly, our task is to select an economical irrigation method for each zone, taking into account the relief, soil type, and the amount of available water. If used correctly, taking into account the need for irrigation water, we can not only protect but also conserve water resources. Thus, it is necessary to develop and use agricultural methods and achieve high results in the conditions of Afghanistan.

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