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Review Article

Scientific Rationale for the Development of Low-Intensity Irrigation Systems in Azerbaijan

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ABSTRACT

The results of the study revealed that the mismatch intensity rain rate of water absorption into the soil formation of a surface relief and soil erosion, uneven and shallow soaking imperfection open irrigation system at a superficial irrigation, the need for different irrigation methods in the growing and not growing periods, low coefficient land utilization, high cost of irrigation and other features are, to a certain extent in conflict with the requirements of watering cultivated with techniques for/of crops in an area at the deep groundwater.

Keywords: Irrigation interval; Irrigation; Water capacity; Ground water; Loam

INTRODUCTION

The increase in the production of agricultural crops is one of the priorities of agrarian production in Azerbaijan, both for meeting domestic needs and for exporting them. In solving this problem, a significant role belongs to the regions, the natural and climatic and economic and economic conditions of which are favorable for the successful development of irrigated agriculture.

And taking into account the long traditions and high level of professional training of agricultural specialists, the experience of the population and the transfer of this direction to the private sector, we can safely assert not only the development of mountain-irrigated agriculture in Azerbaijan in the coming years, but its revival based on the introduction of high-performance modern technologies Irrigation, as pulsed sprinkling, micro-irrigation, pulsed sprinkling of self-oscillating action, combined irrigation, impulse rain Self-oscillating action with automated control and a number of others.

Taking into account that the territory of Azerbaijan, which is the most favorable for cultivation of various types of crops by natural conditions, is located in zones of unstable and insufficient moisture, the intensification of fruit growing is possible only with the use of low intensity irrigation systems. The necessity of using this kind of irrigation is also due to the increased demand of agricultural crops for moisture supply.

Course of research and discussion of results: At the research facilities on the territory of the Republic, irrigation with micro-irrigation was carried out on medium and large slopes with a deep level of groundwater in the period 2005-2011.

At the same time, the cultivation of fruit trees with an irrigation device of the IDAD type and a micro-diver of various modifications was studied in the experimental site of the OEB of the Institute of Erosion and Irrigation of ANAS in the village of Malakham of the Shemakha district with an area of 4.82 hectares, in the period 2006-2010, in the Guba RWC in the Shahdag foothills on an area of 2.8 hectares, in the period 2004-2006, the work was also carried out in the Ganja district of the PAC in the village of Ganja, Bagmanly with an area of 4.45 hectares, in the period 2007-2011.

On irrigated light chestnut soils with a maximum moisture capacity of 3000-3100 m^3/ha and on deep-seated serozems Groundwater in the Alazansky valley of the Zakatala district in the period 2004-2006. 49 irrigations (500-650 m^3/ha) with an irrigation rate of 1890 m^3/ha were carried out.

Only the upper layer of the soil (28-30 cm) was moistened. In the middle of July, the moisture content of the soil in the 30 cm layer decreased to 40% (from PPW), and in early September to 40-60% (in the meter layer), which led to drying and a decrease in maize yield for silage and winter wheat. At the control plot (five irrigation on furrows with an irrigation rate of about 16,000 m^3/ha), the humidity was 80-100% of PPV.

As a result of the research it was recommended to optimize the irrigation norm, the number of irrigation and the reduction of

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inter-irrigation periods; It was pointed out that it was expedient to use sprinkling with the use of the design developed by the author for the various modifications of microaraners tested at the experimental site, where watering along the furrows proved to be difficult, and in general impossible at all.

At the Institute of Erosion and Irrigation of ANAS with the participation of the author, experiments on irrigation with the IDAD apparatus and other modifications of the micro irrigation technique of various types of agricultural crops on newly developed rain fed lands have been continued. On the example of the objects of research on which the experiments on the problems of the development of mountain-irrigated agriculture in the zones of Guba-Khachmas, Ganja-Gazakh, Garabagh, Upper Shirvan, Sheki-Zagatala and other regions of the republic were laid. It should be noted that in the zones of the experiment the soils are overlying, felling, loam (sierozem), and so on. Land with different soil characteristics, and in all these zones of the experiment the groundwater table is deep.

With all this, it was planned to increase the density of plants and not to conduct inter-row treatments.

From the experimental sites on the territory of the research objects, from which a "registration site" with more amicable shoots was isolated, divided into plots located at the site of the Shemakha OEB Institute of Erosion and Irrigation of ANAS in the village of Malham and Guba RAN in the foothills of Shahdag in the Guba area with a total area of 4, 82 hectares.

Variants Width Between rows, m Density of standing Plants, thousand pieces/ha I II III 4,5-5,0 2,8-3,0 2,2- 2,5 198 280 383 During the vegetation period, 94 irrigation operations were carried out with an estimated irrigation rate of 4590 m^3/ha, which did not ensure normal soaking of the soil. The height of the fruit tree plants (about 5.0 m) and the area along the humidification contour (8-10 m^2), which was less than in furrow irrigation. The root system spread in the depth of the layer 2.0-2.5m, and with furrow irrigation in the depth of the layer more than 3.0 m.

Moistening of such a small area was uneven, and yields in more moistened areas in apple orchards in the Guba region amounted to 210.9 centers per hectare and 189 centers per hectare at the Ganja RCAN, and on drained respectively 147.3 and 113.9 center/ha. The absence of cultivation of crops under the narrowed between rows led to a strong compaction of the soil and a decrease in water permeability, which increased the surface runoff during irrigation. The increase in the density of standing did not have a noticeable effect on the suppression of weeds. The development and growth of fruit (apple, pear, peach, persimmon, etc.) passed at relative soil moisture of 20-40%, soaking did not exceed 35 cm.

Originally in 2007-2008. In order to select the object of the study, we chose an experimental site in the OEB of the Erosion and Irrigation Institute of ANAS in the village of. Malham of the Shemakha district, on the OEP of the Guba RUCN in the Guba district.

On the Shahdag foothills with a common with an area of 2.8 hectares and on the EIA of Gyandja RUCN in the village. Bagmanli with an area of 4.45 hectares.

It has been proven by the results of numerous experiments and researches, when choosing the right crop irrigation technology, it is imperative that we study the agro-soil, natural-economic, geographical relief of the territory and the degree of natural moisture and other characteristics based on the monitoring of multiyear data on the object of research, which we should study. Specified in the example of the Shamakhi region, where it was decided to set up experiments in the period 2007-2009. For which it is shown in the table! Water-physical and agro-chemical properties of the soil of the object of research, experiments that were carried out on the territory of the village Malham of the Shamakhi region. The results of our analysis showed that on the territory of the Shamakhi region widespread mainly degraded mountain brownish-brown soils are mainly widespread. Land plot plan [1] of the areo the village Malham of the Shamakhi the climatic and climatic conditions of the Aral rocks are favorable for the cultivation of algae.

Lacquer and high-quality products are also available due to climate change and agricultural technology, taking into account the climatic conditions and biological characteristics of the plant. During their studies, they studied and studied the peculiarities of the local agrarian nature, the land plot, the armagic boy and the development of dynamics, macro-and microelement droppers applied using micro-irrigation technologies, drip irrigation, predominantly traditional irrigation dominant technology that allows the issuance of mineral fertilizers along with irrigation water for local nutrition of plants. As a result of the research, the most effective yields and indicators of m acre and microclimate used in sewage treatment plants. Macro and Macro elements together with irrigation water [2].

Water supply for irrigation in these areas (with a total area of more than 8 hectares) was carried out from hydrants installed through 85, 120, 200 m on the corresponding transport pipelines, into open sprinklers (at a rate of 60, 80, 100 120 l/sec), cut Perpendicular to it. It was found that at irrigation rates of 300-420 m^3/ha the soil is soaked to insignificant depth (20-30, sometimes up to 40 cm). The low absorption rate of the upper soil layer and large slopes provided a significant surface discharge (30%), increasing from irrigation to irrigation.

He addition of moisture in the soil was only 100-300 m^3/ha. Small irrigation rates require private watering (after 5-6 days). The supply of large irrigation norms (600-700 m^3/ha and more) is difficult due to a mismatch in the intensity of the rain (2-3 mm/min) and the rate of water absorption into the soil. Large drops of rain destroy the structure of the soil, and the upper 2-3 cm is swollen; the absorption rate decreases, resulting in a surface discharge. Then, an experimental site for micro-irrigation for watering vineyards, soybeans, sugar beet, corn for silage, fruit trees was organized, in the territory of Ganja RACC of the village [3]. B/Bagmanli with an area of 4.1 hectares and AIA of the Agricultural Research Institute of the Terter region with an area of 1.5 hectares. The soils of the site (with a total

area of more than 30 hectares) are average loans, gradients of 0.005.

Reserves of moisture in the soil were insufficient to produce shoots, so in mid-May, the reseeding was carried out after the presiding irrigation with the norm of 250-300 m^3/ha. Where, irrigation was conducted in this period with an irrigation rate of 3800-4200 m^3/ha.

Further all this work was expanded in the Samukhian area of corn on the trees and mulberry trees, in the Shamakhi district in vineyards, in the Guba district of fruit gardens, Khachmas district of vegetable crops (cabbage, eggplant).

Therefore, when feeding 500 m^3/ha, puddles and surface discharges were formed at the site. Scheme of the irrigation sprinkling station on the experimental part of the Terter RACS in the Garabagh land in the period 2006-2010 with the use of the Idad and MDR sprinklers [4].

At the beginning of vegetation due to timely treatments, the surface discharge decreased (up to 8-10%). When the treatment of crops ceased, the discharge again reached 16-17%.

A big drawback with the irrigation of the Idad apparatus in the presence of an irrigation network, impassable for machining mechanisms. It was found out that sprinklers and roads along them occupy 6-8% of the area; For example, in this case, water losses in irrigation systems built in the Guba RRCN [5] were 30-35% per 1 km, and in Terter AOS 20-25%

DISCUSSION

Thus, in the Shemakha region, in the experiments carried out by the Shamakhi EIA of the Institute of Erosion and Irrigation of ANAS (4.8 ha) on heavy soils with a deep bedding of groundwater at the same irrigation rate (7000-7500 m^3/ha), the number of irrigations with micro-irrigation was significantly larger than in the case of furrows along furrows [6-8].

The results of the test revealed that to reduce the intensity of rain on the sprinkling heads of the apparatus, special nozzles-vichrators were mounted for sprinkling up to 40 m in radius and more than the action and added additional devices for regulating the rain layer, which helped to suppress pressure in the pump discharge port All this allowed to reduce the intensity of rain and give irrigation rates of 600-700 m^3/ha (with a daily mode of operation) without significant surface discharge and soil erosion.

Such measures can reduce run-off, but this reduces labor productivity in watering. However, it is also difficult to equip sprinklers with higher water delivery rate in the range of 800-1000 m^3/ha, where significant planning work is required. The proposed nozzles installed on the ISAD sprinkler have a relatively low rain intensity, which is explained by the desire to create a microclimate over plants with low water consumption, with limited geometry of the irrigated area.

CONCLUSION

Apparently, a wide production check of this irrigation technology, taking into account the recommended rain intensity, will allow us to clarify the technical and economic indicators and the conditions for the application of micro-irrigation. The analysis has shown that irrigation with micro-irrigation can also find its spread in conditions of close lying of non-saline groundwater. At a high level of groundwater, high yields of agricultural crops can be achieved; however, technical and economic indicators at the given level of development of sprinkling equipment in the presence of socio-economic conditions of life of farming and other farms of the republic are less favorable than surface furrow irrigation. Further improvement of sprinkler systems with higher technical and economic indicators, possibly, will allow expanding irrigation area of micro-irrigation in conditions of mountain irrigated agriculture in Azerbaijan. For this purpose, in the future, micro irrigation systems of the type IDAD and others proposed for serial production were not tested in the republic for any more (except for research objects) for sprinkling.

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