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Perfection of Systems of Mountain Irrigated Agriculture in Azerbaijan with the Use of Technology of Micro-Sprinkling

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Abstract

The experimental work carried out by us in the objects of study in Shamakhi, the Tartar, Zagatala, Guba and Ganja on irrigation of soybean, sugar beet, maize and tobacco, orchards and a vineyard can give an estimated average the intensity of the rain (mm/min) under irrigation norms 300-500 m^3/HA, depending on the soil types: Sandy-0.3-0.4, light loamy-0.2-0.3, middle and heavy loam-0.1-0.2. Studies have shown that the wide production verification of this irrigation technology, taking into account the recommended intensity of rain, will clarify the technical-economic indicators and conditions for the use of irrigation. As a result of adjusting the irrigation regime, it was established that according to irrigation norms 300-420 m3 / ha of soil is soaked with insignificant depth (20-30, sometimes 40 cm). Low-speed absorption of the upper soil layer and large slopes provided a significant surface relief (30%), increasing from irrigation to glaze. Soil Humidity Increased only by 100-300 m3 / ha.

Keywords: Absorption rate; Irrigated; Irrigation norm; Water-holding capacity; Furrowing system

Introduction

The main requirement for artificial irrigation is the creation of rain with an intensity not exceeding the rate of water absorption. Various factors significantly affect both the choice of method of irrigation, and irrigation equipment. One and the same factor may be significant in one way and not have the special meaning otherwise.

Despite this, all of these factors and conditions are closely interact with each other. At the site in the village of Malham Shamakha district of the Azerbaijani Republic conducted a study micro-rainfall irrigation micro-rainfall irrigation system on medium and large slopes in deep groundwater level. There were studied the effects of watering fruit trees sprinkle apparatus type IDAD on territory of skilled plot MEI Sri "erosion and irrigation MINISTRY OF AGRICULTURE of the Azerbaijan Republic with an area of 4.82 ha, as well as on the territory of Ganja RACS in PIC. Bagmanly with an area of 1.45 hectares during the period 2004-2007 BC. In irrigated light-chestnut soils with extreme moisture capacity 3000-3100 m^3/ha and grey soils with deep groundwater occurrence on the Alazani Valley in Zakatala district between 2004-2006 BC. Conducted 99 irrigations (500-650 m^3/ha) with irrigation norm 1890 m^3/ha. Only the top layer of soil is humid (28-30) [1-4]. In the middle of July, the humidity level of 30 cm of soil was reduced to 40% (PPV), and in early September to 40-60% (in the meter layer), which led to drying and reduction of silage of maize and winter wheat.

At the control plot (five irrigation for a furrow with a watering rate of about 16,000 m^3 / ha), the moisture

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content was 80-100% of the PPV. As a result of the study, it is recommended to optimize the irrigation norm, the amount of irrigation and the reduction of the inter-field periods; pointed out the desirability of sprinkling with the use of design of various modifications of micro-absorption in areas where this irrigation furrow was difficult, and sometimes impossible [2,4,5]. Pilot-Experimental Base of the Scientific Research Institute Erosion and Irrigation" experiments with the IRD irrigation apparatus continued with the participation of the author, etc. Modifications of micro-irrigated equipment of different types of crops on newly regenerated rainfed lands, ie, by the example of research objects that were devoted to studying the experience of development of irrigated agriculture in mountainous areas, Guba-Khachmaz, Ganja-Gazakh, Garabagh, Upper Shirvan, Sheki-Zagatala and other regions of the republic. It should be noted that in the areas of the experiment, soil-deformed, leber, loam (gray), etc. With different characteristics of the soil. In all these areas, the experiment investigated the depth of groundwater. It should be noted that in the areas of the experiment, soil-deformed, Luborsky, loamy (gray), etc. With different characteristics of the soil. In all these areas, the experiment investigated the depth of groundwater. In this case, it is planned to increase the density of plants and not to conduct between the rows of processing. On site research, selected "posting area with more close-knit plantlets, the total area of 4.82 ha, located in the District of RANN Guba MEI Lips (Table 1).

Options	Width Row spacing, cm	Density of standing Plants, Thous. PCs/ha
(I)	4.5 -5.0	198
(II)	2.8 -3.0	280
(III)	2.2 -2.5	383

Table 1: Onsite Research of knit plantlets.

For vegetation period, irrigation 94 was held with the estimated irrigation norm 4590 m^3/ha, that did not provide normal soaking the soil. Height of plants of fruit trees (about 5.0 cm) and area on a path of wetting (8-11 m^2) that was lower than the irrigation by furrows [2,6]. The root system has spread in a layer to a depth of 2.0 - 3.0, and when the channels selected watering-in a layer deeper than 3.0 m. Hydration of this small area was uneven, and the Apple tree yields more wet areas in Guba region amounted to 210.9 (sentner/ha) and 189 kg/ha at Ganja RCAN and the withered accordingly 147.3 and 113.9 kg/ha [2]. The absence of crop treatments with narrowed spacing resulted in severe soil compaction and water permeability reduction, increased surface runoff when watering. The increase in density of standing has not had a significant impact on the oppression of the weeds.

The development and growth of fruit (apples, pears, peaches, persimmons, etc.) trees were soil relative humidity 20-40%, wetting does not exceed 25 cm. Later in the Republic micro irrigation IDAD type system and others, proposed to the serial production, nowhere else for sprinkling is not tested. Originally in 2003 г. We chose an experienced pilot plot on the territory of Guba district in MEI RCAN Lips, on the foothills of Sahdag, with a total area of 2.8 hectares, and MEI Ganja RCAN PIC. Bagmanly with an area of 1.45 hectares [2,6,7]. The soil of these middle massive arrays (30-40 cm), biases more -0.02 - 0.025. Carrying out irrigations on furrows is difficult, due to the difficult terrain of the territory. So here was planned sprinkler irrigation with small norms using various modifications and micro-sprinklers IDAD.

Water supply for irrigation of these sites was carried out from the hydrants, established through 85,120,200. As a result of the adjustment of irrigation regime, it was found that under irrigation norms 300-420 m^3/ha of soil promachivaetsja on insignificant depth (20-30, sometimes 40 cm). Low speed absorption of topsoil and large biases have provided significant surface relief (30%), increasing from irrigation to glaze. soil moisture Increase was only 100-300 m^3/ha. Small irrigation standards require private irrigation (via 5-6). Submission of large irrigation norms (600-700 m^3/ha or more) is difficult because of the intensity of rain (2-3 mm/min) and speed of absorption of water into the soil [2,8,9].

Large drops of rain destroy soil structure, and the upper 2-3 cm burrow; the speed of absorption is reduced, causing a superficial reset. Then, in the 1.5-hectare micro-splash area, an experimental site was established in the Terter region of AIA Sri with an area of 1.5 hectares to irrigate soy, sugar beet, silage corn, as well as a garden of fruit trees. Soil plot (with a total area of more than 30 hectares) consisting of loam, error 0.005 (Figure 1). And so, in 2004, have been implemented with glazes irrigation norm 3700-4200 m^3/ha (irrigation norms from 350 to 550 m^3/ha). Humidity in the 60 cm did not fall below 60% of the SWP, The upper boundary of the articulation was (after irrigation water was) 80-90%, PPV. Soaking of the soil was no more than 30-50 cm deep (most water - 20 cm). The yield was 14-17 kg / ha. In 2005, on top of the 0.6 hectare plot was conducted spring irrigation (groundwater level here was deep, and the rest of the plot ranged from 2 to 6.5 m) [6]. Soil moisture reserves were insufficient to get germination, so Peres was held in mid-May after spending Preplan watering norm 250-300 m^3/ha. Study on with Sprinkler at the site showed that the intensity of the rain at IDAD (3 mm/min) more speed the absorption of water into the soil study. Therefore, when submitting a 500 m^3/ha formed puddles and surface onto the object. Reset amounted 20-30%, resulting in uneven wetting. In the beginning of vegetation due to timely treatments surface declined reset (until 8-10). When processing of crops ceased, reset again reached 16-17%. Soaking soil when watering does not exceed 30-60 cm. More impregnation and better moisture uniformity in these conditions is achieved under irrigation norms more than 300-400 m^3/ha.

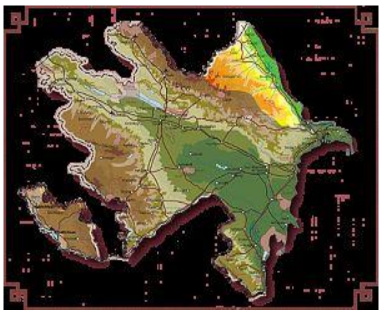

Figure 1: The Terter region of AIA Sri Farming.

When such rules about 60-70% of water remains in the top bar (20 cm) layer, and the plants are not totally moisture [1,10,11]. Observed disadvantages sprinkling apparatus IDAD, when availability of irrigation network, impassable for the mechanisms in soil treatment. In doing so, found that sprinklers and roads along them occupy 6% of the area; water loss in sprinklers in Guba RCAN amounted 25-30% at 1 km and in Terter AIA -15% [2,3]. The distribution of water in the micro-irrigation is shown in Table 2 while the greatest losses occurred in the discharge and evaporation. Balance of water when sprinkling the plots presented in Table 3. Irrigation norms for different soils and slopes where runoff begins are shown in the Table 4. According to Surface discharge to the zone of the Guba RACS, when the irrigation sabers of apple experimental sites are up to August 7-8% and 20% in August, which is confirmed by the results of studies submitted in 2005-2009 years. It should be noted that the results of the study in the Tarter region on small slopes and fertile soils, where the annual leveling of the margin, after feeding 350-400 m3 / ha on the surface of the fields, puddles appear [1,10,2,4].

Indicators	"Guba RACS"	"Terter RACS"	“Gyandja”RACS
Type of soil	Loesslikeloam	Galechnikovo-shhebenchatye (low-power)	Loesslikeloam
Maximum field moisture capacity, m^3/ha (SWP)	2970	1100	2500
Water permeability in the 1-hour, m/h	0,03-0,05	0.06	0.04
Biases(Distortions)	0,001-0,0001	0,02-0,03	0,004-0,007
Ground water depth, m	1-4	More than 10	2.5 -7 -10
Mineralized. g/l	3-10		13-14
Superficial reset with Irrigated plot, %.	No	up to 30	Maximum 10-20
Moist-armed irrigation and leaching m^3/ha	Are held in winter 2500-3000	Conduct is inappropriate	Conducted in the late-spring period 1500
Productivity, sentner/ha	30-40	5-10	15-20

Table 2: The conditions for the use of IDAD irrigation systems on the territory of the Guba RASN, in the "production areas" of the OEB for irrigation of gardens: in the Tatar region, in the village of Saryjali, sugar beet and soybeans, and in Ganja RACN in the village. Bag manly for horticultural crops and vineyards.

Balance sheet items	Gandja RACS		Terter RACS	
	m^3/ha	%	m^3/ha	%
Parish	644	100	693.7	100
Total	644	100	693.7	100
Including:				
Filtering in to the soil	16.2	2.6	55.7	8.0
Residual volume	7.1	1.1	10.0	1.4
Evaporation of falling drops rain on the land	81.2	12.6	88	12.7
Reset from the field	86.5	13.4	162	23.4
Left on the field	453	70.3	378	54.5

Table 3: Balance of water when sprinkling on plots of Terter and Ganja RACS.

Soil	Biases			
	0,0002-0,0005		0,002-0,007	
	First watering	The last watering	First watering	The last watering
Supeschanaja	450	230	400	170
Light loamy	340	150	290	100
Medium loamy	290	90	170	80

Table 4: Irrigation norm (m^3/ha) before the advent of the runoff on the results of the studies in the regions of Guba-Khachmaz andGanja-Gazakh zone.

When tested with IDAD reflex nozzles, working position, as in Guba-Khachmaz RACS and Terter AIA, established education puddles and runoff in medium and heavy soils under irrigation norms 250-300m^3/ha [10,2].

Small irrigation norms (prior to the formation of runoff) required a large number of irrigations. So, in Shamakhi district in experiments conducted by Shamakhi OES Institute, erosion and irrigation (4.8 hectares) on heavy soils in deep groundwater occurrence at the same norm (7000-7500 m^3/ha), the number of irrigations micro-sprinkler (42-53) has been significantly more than crop furrow (6-8). To combat the crust and seal required to dramatically increase the number of between rows treatments (up to 10), which prevented the complete destruction of the Peel around the stem. Shallow and uneven soil wetting and untimely processing of crops led when sprinkling a marked reduction of the harves [2,12]. Shamakhi OEB Institute Erosion and irrigation (4.8 ha) on heavy soils with deep groundwater with the same norm (7000-7500 m3 / ha), the number of irrigation micro-mufflers (42-53) was significantly higher than the furrows of agricultural crops (6- 8).

Production micro-sprinkler experiments were carried out on the territory of Zakatali district. Re-equip IDAD type tests, and the MDP, we found that groundwater level in deep and complex relief application on tobacco irrigation IDAD, corn, Apple tree, etc. more promising than others, the dominant traditional methods of irrigation [2,7]. The test results confirmed that, to reduce the intensity of rain on a rain showerhead apparatus desirable installation of special nozzles for sprinkling vibratory to 40-50 m range and additional supplements for regulation device layer rain, contributing to the SAP pressure port of the pump. All this made it possible to reduce the intensity of the rain and give irrigation norms 600-700 m^3/ha (where the daily mode) without significant surface relief and soil erosion. These activities can reduce runoff, but it reduces crop productivity. However, difficult and device sprinklers with greater intensity of water within 800-1000 m^3/ha, which require considerable planning work.

Proposed by nozzles installed at the sprinkler unit IDAD, have a relatively low intensity rain, because of the desire to create a microclimate on plants with low water consumption and limited irrigation geometry plot [2]. Experience shows that with increasing working width could reduce the intensity of rain, while maintaining productivity. The experimental work carried out by us in the objects of study in Shamakhi, the Tartar, Zagatala, Guba and Ganja on irrigation of soybean, sugar beet, maize and tobacco, allow you to give an estimated average intensity of rain (mm/min) under irrigation standards of 300-500 m^3/ha depending on soil: Sandy-0.3-0.4, light loamy-0.2-0.3, middle and heavy loam-0.1-0.2. Studies have shown that extensive production verification of this irrigation technology, taking into account the recommended intensity of rain, will clarify the technical-economical indicators and conditions for the use of micro-irrigation [10,4].

The study found that the discrepancy in the intensity of rain water into the soil absorption speed, education and surface soil erosion, uneven and shallow soaking , imperfection of open irrigation network in surface irrigation, the need for different ways of watering during the vegetative and outside the vegetative periods, low coefficient of land use, the high cost of irrigation and other features are, to a certain extent, in contradiction with the requirements for agricultural irrigation technique for arable crops in the zone of deep groundwater [2,5,6]. The analysis showed that irrigation with micro-irrigation could also find distribution in the context of a close non-saline groundwater depth.

In deep groundwater, level can achieve high yields of crops, however, techno-economic indicators at this level of development and re-equip the existing socio-economic living conditions of farmers, etc. farms are less favorable compared with surface irrigation by furrows [10,2]. Further improvement of sprinkling with higher technical and economic indicators might expand irrigated area micro-irrigation to irrigated agriculture mining conditions in the Republic.

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