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Scientific Substantiation Of The Application Of The Aerospace Research In Improving Irrigation In The Conditions Of Mineral Farming In Azerbaijan

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Introduction

At present, in the field of agricultural reclamation irrigation questions inadequately represented in Azerbaijan. Underdeveloped questions rational application of different methods of irrigation and improve the design of irrigation networks.

Objectives of research

Today's challenge lies in land development with high and steep slopes. In these circumstances, you must, first and foremost, to replace open irrigation network in earthen channel with the use of devices for water allocation between slots by more sophisticated devices that will fundamentally solve the issue mechanization and automation of distribution of water in irrigated fields.

Strokes: Study

Given the importance of these issues, we have developed concepts for various slope area. This enabled one site cover a wide range of conditions, where various methods were tested and irrigation technique. The outcome of many research proved that the large slopes (more than 8^0) to avoid a direct hit on the ground rain Jet an unbroken structure, you must navigate to the sectorial sprinkler irrigation. The angle of the sector here is calculated depending on the angle of the irrigation area. When sprinkling the terraced slopes, rainfall value is assigned from slope and soil conditions on the slopes of terraces.

When slopes 6-8 ^{0} you can apply irrigation machines type DTTS applying irrigation water by flexible hoses, winding and unwinding sprinkling machines, SIDAD and other types of micro-irrigation systems. Downhill 4-5 degrees use semi-permanent sprinkling systems based on flexible high-pressure polymer hoses. In this direction were carried out research scholars of Georgia, Tadzhikstana, Kazakhstan, Russian Federation, etc. Special interest research work entitled "developing irrigation technology to Fergana Valley slopes. According to the description of the author notes that in the irrigated areas of Central Asia with each passing year, there is a growing shortage of land and water resources. At the same time-in the regions with high density of population and fertility, the problem arises of employment of the working population.

Given the above, it is considered that the steep slopes can successfully irrigated subsoil or drop way on high permeable soils can use sprinkler irrigation. Most common in the arid zone surface gravity irrigation. However, in its current form to recommend them for irrigation of steep slopes with low permeable soils is impossible. According to the results of multi-year experiments proved that irrigation erosion on gray Earth becomes palpable when slopes 0.008. 0.03. When further increase slope and application of irrigation technique it increases dramatically. Therefore, the higher the slope, the more careful you should be suitable to the development of slopes by applying glaze furrow here only in an improved form.

Our studies (1998-2015 years) watering instructions tilled crops (cotton) and perennial plantations (vineyards and orchards) on large slopes, slope up to 17^0 (slope 0.3) in the foothills of Shamakha and Guba districts the results show that the surface gravity irrigation by furrows in improved form is perfectly acceptable for irrigation of lands with steep slopes up to 0.3 (17 angle^0) irrigations on furrows and agricultural processing possible without the device. On slopes more than 17^0 need to terracing.

The ways and techniques to improve irrigation on furrows on the big slopes and steep slopes are:

- Layout of surface slopes;
- Selection of the optimal direction of irrigation furrows;
- Watering across the aisle on condensed tractor wheels furrows;
- Selection of the optimal furrow length and costs of irrigation Jet;

Device perfect on farm irrigation network and technical means water in furrows to ensure accurate dosing and adjustment of irrigation Jet in time;

- Optimization of irrigation regime of irrigation systems;

As noted above, the layout event is mandatory while mastering the slopes, but the possible volumes of it depend on the power of melkozemistogo soil layer. The powerful soil podzolic soil and loess-layout fix terrain dramatically, giving it a smooth character. Volumes greater than here planirovochnyh works srezok reach in some places a few meters (2. 3 and more). On soils with low-layer melkozemistogo podstilaemogo shingle or rock strata, planning perform small amounts in order to preserve the top layer melkozemistogo.

Therefore, after the relief of the irrigated plots planirovochnyh works can have a calm nature, or remain challenging as the arid lands, specific lands Top Guba-shirvan and Hachmazskih regions. One of the most important measures to improve methods of irrigation on large hillsides and steep slopes is correctly selected direction of irrigation furrows. Direction of irrigation furrows to the underlying terrain slope on steep slopes, in view of the chosen quality irrigation and mechanized crop treatments possible. For example, modern three-wheeled tractors can work across a slope on slopes not exceeding 0.1 and middle massive crawler tractors-on slopes of not more than 0.2.

When the big slopes, there is a risk of sliding tractor down the slope. Therefore, on the fields at hillsides 0.1 agricultural equipment should operate only in the direction of greatest slope. When slopes 0.2 they can spend 0.3 tillage only going down the slope, and they climb up the idling speed across the field, or on the road. On slopes of more than 0.3 mechanized inter-row cotton processing almost impossible, and it is recommended that you move to the terracing on the terraces of vineyards and orchards. On the basis of the above considerations, the following classification of irrigated lands in the foothill zone in **(Table 1).**

Characteristics of slopes or slopes	**Distinctive signs**	
	Recommended type of irrigation furrows	**Features of the operation of mechanisms in inter-row processing**
Large biases of 0.008. 0.03	Along the slope	Inter-row allowable processing along and across a slope
Very large biases of 0.008. 0.03	Across a slope	

The gentle slopes of 0.05 0.1 ...	Along the slope in difficult terrain	When processing across a slope having a slight difficulty in managing the tractor, tractor has shifted a few inches down the Hill
Slopes average steepness of 0.1 ... 0.2	Along the slope	Inter-row processing is allowed only along the slope forward and backward
The steep slopes of 0.2. 0.3	Along the slope	Processing inter-row is allowed only along the slope downhill
Very steep slopes more than 0.3	Across a slope on the terraces	Inter-row processing across the slope on the terraces

Table 1: Classification of irrigated lands in the foothill zone largest slope surface.

Here are some ranges of authors Aliyev b.g, G.m., G.k. Aslanova, Bashirova, N.t. Laktaev, v.f. Nosenko, V.g. Kerkelashvili similar, but watering instructions differ significantly. In particular, Aliyev b., believes that on slopes 0.1-0.25 and more, with difficult terrain need terracing. The author recommends terracing on slopes or more 0.3 and 0.1 on slopes and 0.35 irrigation along the slope by short furrows small squirt. The author's recommendations confirmed by experiences put us under production conditions on OJeB erosion and Irrigation research institute of ANAS Shamakhi district **[1][2][3][4][5][6].**

Studies have shown that the large slopes (0.008-0.03) furrow irrigation be directed along the slope. Change the direction of the grooves on these slopes can cause increased amounts of planning works. In addition, when deficient planning biases along the furrows in some areas may be less than optimal, and are equal to 0.02-0.03.

As a result, poor-quality irrigation in Ganja-Kazakh izrezhennost zone of vineyards increased with each passing year, the harvest fell and after 8 years after planting had to undertake the reconstruction of vineyards. On new vineyards in these areas give the direction of furrows on the slope. On slopes 0.03-0.1 when flat relief irrigation furrows it is advisable to cut into sloping 0.01-0.03 across a slope.

This gradient ensures water movement in furrows with a small filling them. When the furrows not overflowing with water and does not cause soil erosion on slopes. When difficult terrain irrigation furrow directed by the greatest slope of the terrain. It is not recommended to send furrows across a slope also strongly stony soil, because here it is possible to strong water filtration through stony fraction of upstream furrows in below. This phenomenon has been observed on a slope of terrain and content of 0.05 stony fractions in the number 55-85%. On slopes 0.1-0.3 irrigation furrows should be directed by the greatest bias, because on these slopes when working till the tractor across a slope, it is slipping and tipping.

As you can see from the above, watering through the aisle to condensed furrow is an important point for spending watering steep slopes. On large slope terrain inter-row spacing, obviously, should be 60 cm, increase the width of spacing up to 90 cm here does not allow to increase irrigation Jet (due to soil erosion), nor the length of the furrow.

Experiments have shown that the large slopes at 60 cm spacing and watering in each furrow irrigation norms constitute the actual 24th. m^3/HA or more against the estimated 1.2-1.5 thousand. m^3/HA. At the same time, Central Asia outline width gray earth soil moisture reaches the 1.1-1.2 m more width of a path under the sealed slots. Compacted layer plays the role of a screen, which contributes to a better diffusion of moisture. In compacted advance until the end of time grooves less the result is a more uniform wetting the soil along the length of the furrow and a little soil erosion. Analysis of the results of the studies showed that on the big slopes and steep slopes of inter-row spacing must be 60 cm, and watering should be conducted through the aisle (via 120 cm) soft wheels tractor furrows.

A characteristic feature of irrigation technology on steep slopes is to regulate irrigation jets in time: at the beginning of watering give small Jet, then through 5-7 hours increase in 2 times, after the Jets advance to the end of

the furrow, and stabilization of waste Jet flow reduced to its original size. Increased irrigation Jet in the middle of watering you can lengthen the furrow irrigation and improve the evenness of its moisture. The specified lengths and irrigation furrows jets slight flush the soil at the beginning of the furrow and accumulation of soil smytoj in the end of the furrow. Takeaway soil outside irrigation plot is negligible and is for irrigation season not more than 0.8-1 mm soil layer or 8- 10 cm/ha. Some violations of micro relief dicofol and accumulation of soil recovered operating design. For carrying out irrigations on steep slopes should be improved on-farm irrigation network. On-farm irrigation network should provide clear irrigation water flow management.

Biases furrows	Irrigation Jet l/s.		Furrow length, m
	At the beginning and end of the watering	In the middle of watering	
0.01	0.12-0.1	0.25-0.2	200-150
0.03	0.05-0.045	0.1-0.09	100-85
0.06	0.04-0.035	0.07-0.08	85-80
0.1	0.02-0.025	0.05-0.04	65-55
0.2	0.015	0.03	55-50
0.3	0.013	0.025	55-45

Table 2: The optimum length of furrow irrigation and Jet

Most meets these conditions tubular irrigation network, consisting of closed distribution pipelines and irrigation pipelines with holes. For example, the author described the results of the Experimental research natural area and Embedded Development Institute Erosion and irrigation NANA fully closed irrigation network to irrigate orchards and vineyard on the square 8.3 HA and polustacionarnaja irrigation network has become acceptable to solve problems. Because samonapornaja polustacionarnaja irrigation network is recommended for irrigation of crops on large slopes (0.008-0.3) for the distribution of water in furrows here apply polyethylene piping (hoses) diameter 100-160 mm.

Polustacionarnaja irrigation network versus temporary irrigation network in earthen channel allows to 20-25% to save irrigation water in 2-3 times increase labor productivity in the fields, on 10-15% improve land use, support optimal irrigation regime and due to this the 25-30% boost cotton yield. Even more technically perfect and cost effective closed irrigation network for irrigation of vines and orchards. Technical entity is closed irrigation network in earthen channel system consisting of a stationary distribution and irrigation pipelines with control valves and progressive irrigation technique developed in Institute of Erosion and irrigation NANA. Closed network allows operatively and given technology to supply water to any part of the irrigated array. New irrigation technology of closed irrigation network allows successfully combine the necessary variability irrigation jets with a constant flow of water supplied in the Brigade. This technique is achieved with simultaneous work of two or three or more irrigation pipes, one of which works with a maximum flow rate, and the rest with a minimum consumption. Estimated diameter of irrigation holes allow to strictly dose costs irrigation jets in the furrows.

Conclusions

From the above it follows that the benefit of micro-irrigation furrow is to reduce soil erosion, uniform spacing by the width of the hydration and along the length of the field, reducing surface discharge and increase productivity.

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