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Issues of Developing Water Conservation Technology and Equipment

Atajanov Adilbek Husenovich, Khudayev Ibrohim Jumakulovich

Associate professorTashkent Institute of Irrigation and Agricultural Mechanization Engineers, the Republic of Uzbekistan

Candidate of technical sciences, dotsent,Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, the Republic of Uzbekistan

ABSTRACT: The economical use of water resources, the improvement and development of new technology and technical means for its implementation, ensuring the saving of irrigation water is one of the most important issues of today. This article is devoted to the issues of improving the technology of irrigation of furrows and the creation of technical means.

KEY WORDS: furrow, slope, technology, technical means, density, furrow opener, irrigation, irrigated water, moisture, area, leveling, root spreading layer.

I. INTRODUCTION

Gradual transition to market relations, achievement of sustainable development of agriculture and water resources of the Republic of Uzbekistan in the period of development through interconnection with the world community on the basis of common economic policy, improvement of rational use of water resources, working out of modern technological processes as well as automated working equipment and at the expense of introduction into production by using water and land which is directly related to perspective ways of transition to new forms for agricultural production.

Today, the issue of rational use of water resources is one of the most important issues for specialists in agriculture and water resources. The demand for agricultural crops of irrigation water in vegetation period is not always provided. In addition, the achievement of high-quality and high-yield irrigation technology depends on the reclamation of cultivated lands. To do this, agro technical treatment of irrigated land will need to be implemented by using modern technologies.

All kinds of measures are taken to prevent inefficient water supply to agricultural crops. Enterprises specializing in amelioration and water management work to expand and improve the capacity of water supply facilities. Legal norms and privileges established by the Government play an important role in this work. Decree of the President of the Republic of Uzbekistan Sh.Mirziyoev, dated November 27, 2017, PQ-3405 "On the State Program for the Development of Irrigation and Improvement of Irrigated Lands for 2018-2019", which will be an important factor in improving the efficiency of such works.

As a result of implementation of these decrees, ground water levels on more than 260,000 hectares of irrigated land have been reduced, average and severe salinization has been reduced on almost 32,000 hectares, and land-reclamation status of 182,000 hectares has been improved [1].

In order to save water resources efficiently and effectively, it is advisable to introduce new modern techniques and technologies. One way to achieve this is by preparing the surface area of the irrigated area.

Preparation of irrigated areas is the straightening of the irrigated area surface in the flat plain, or by giving it the required slope, and the removal of small hills to the lowlands. Preparation of irrigated land provides the following opportunities: Significantly improves the quality of irrigation and the washing of saline soils; increase irrigation productivity; normalizes the use of irrigated areas, irrigated water and natural precipitation; improve the quality of agricultural agro-technical work and the efficient use of agricultural machinery; improves the efficiency of fertilizers provided; Reduces the cost of building irrigation networks. All of this will increase the crop yield by 1.5 ... 2.2 times, and will reduce the cost of production.

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Efficient and efficient use of water resources depends, first of all, on the preparedness of the surface area, which is particularly apparent in arable irrigated areas [6].

Our study calls for focusing on the plane of the bottom of the furrow, rather than the flattening of the arable surface area. The aim of the research work is to correct the moisture quality in the field by its length and depth, rather than the large and costly land works on flattening the area. In the case of smoothing works, the focus should be on the straightness of the furrow length and the depth of the field due to the varying density of the longitudinal profile of the furrow bottom, without focusing on the performance. This will be achieved through automation of the workings of reclamation and agricultural machinery involved in agro-ameliorative activities, in particular, the opening of the furrow and the changing process of fitting the bottom of the fence [2].

Using this technology, the equipment will be used on the irrigated fields, which will be designed using automated control system techniques, and will ensure the efficient irrigation of agricultural crops during the development of the crop and the sustainable development of crops.

The proposed technical equipment will be applied to agricultural machinery, particularly tools for the cultivation of irrigated agricultural crops. According to the source irrigation method, the purpose of the invention is to create uneven groundwater density by changing the length of the furrow at the bottom of the furrow to the maximum at the beginning of the furrow and at the end to the minimum.

The prototype for this unit is a cotton plant cultivator used for furrow cutting, which consists of a fuselage mounted furrow with grid. The cultivator cuts the furrow against the prepared surface of the field so that the longitudinal profile of the furrow and its slope are usually formed as required by the unimpeded and rhythmic flow of irrigation water, but the irrigated soil does not provide a uniform soil moisture along the length of the furrow. At the beginning of the furrow, the water will have the maximum moisture content at the bottom of the furrow and the minimum at the end of the furrow. It is possible to adjust the soil moisture at its maximum value, but this is achieved by significant moisture losses due to the wasteful costs of irrigation water and irrigation time.

The purpose of the technical research tool is to develop a device for uneven ground sealing along the entire length of the furrow, with a flexible change of ground depth at the beginning of the furrow from maximal value to its minimum.

This task can be achieved as follows: this is organized from series of furrows (beam), the fuselage unit with a fuselage mount is equipped with a Sh - simulator ring hinge attached to the base tractor's hydraulic system by means of hydraulic cylinder, while the bottom of the frame is tightly tightened.

The essence of the proposed work is that in a single device a multiple coupling hinge with a hinge is attached to the fuselage of the cultivator, which is simultaneously controlled by a single hydraulic cylinder, allowing uneven sealing of the bottom of the furrow (Figure 2).

The proposed device consists of 2 mounted fitted shotguns. In the furrow stair, 1(beam) frame is mounted with 3 tightening wheels. There is a bracket 5 mounted on the top 3 of the frame, which is joined by 6 hydraulic cylinders, with a hinge on the fuselage. The hydraulic cylinder 6 is connected to the transmission pipes 7 with the hydraulic system of the base tractor.

The unit works as follows: the aggregator is set at the start position of the furrow, and the hydraulic cylinder 6 drops the compression cathode to the surface of the furrow, with the hydraulic cylinder being pressed to a maximum pressure of 4 on the tightening rolls.

The tractor’s hydraulic separator moves a tracer, by transferring fluid A to the stock cavity of the hydraulic cylinder. When the cultivator moves, the working fluid in the hydraulic cylinder slowly raises the frame 3, while a 4-pressure reduction of the ground-rolling rollers occurs, resulting in a gradual change in pressure from the maximum value of the ground surface to the minimum at the end of the furrow.

At the end of the aggregate, the hydraulic separator is placed in a neutral position and the vehicle is moved to the vehicle using the suspension mounting system, and then the unit is turned to the rear. The cultivator is set to the reversible position. The base tractor is moved to the opposite side of the hydraulic separator pipe (head) of the hydraulic cylinder to transfer fluid to the 6 B cavity. At the beginning of the reverse movement of the aggregate, fluid B enters into the cavity B and drops the compression cages to the bottom of the furrow until it is free of charge, then the unit is removed. The working fluid entering cavity B gradually presses the compression cathodes, creating a density from the minimum of 4 to the maximum value per furrow. In this way, a minimum density is created at the beginning and a maximum at the end. With the frame raised, the unit rotates and the process is repeated.

Adjusting the reduction or increase of the tensile strength of the catalyst with the displacement rate and the length of the fittings is made by selecting the hydraulic cylinder piston and rod diameters.

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According to the hydraulic rule [3], if the surface of the piston is twice as long as the stock surface, that is, Fp = 2fsh, respectively: [5]:

$$d_{sh} = D_{por} / \sqrt{2}, \quad (1)$$

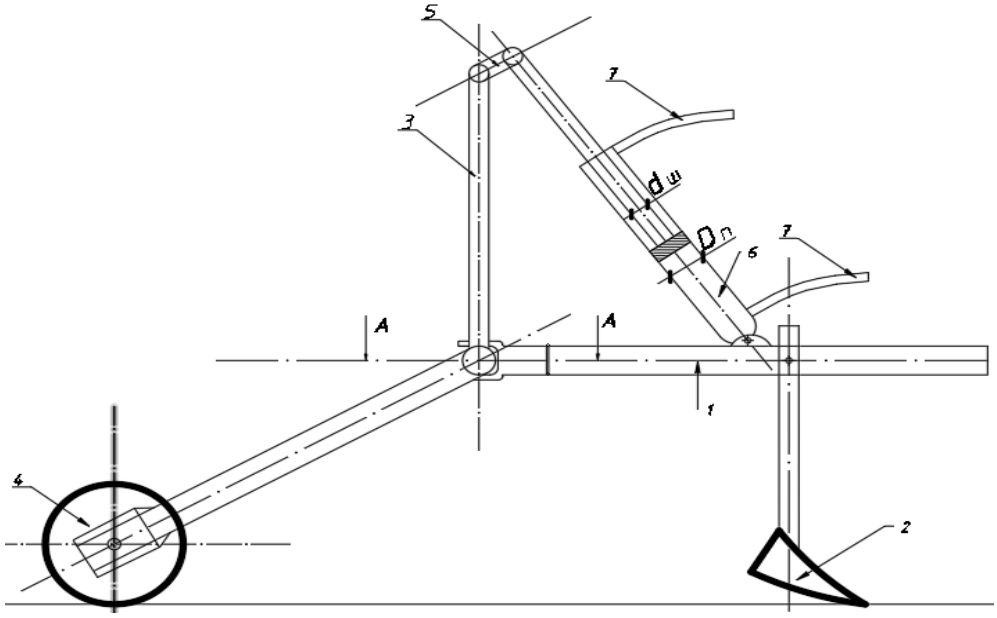
then the rate of lifting and lowering of the compression rollers is:

$$V_{pod} = V_{opis} = 4Q / p\, d_{sh}, \quad (2)$$

Here Q means the amount of fluid supplied to the hydrotylinder,

d_{sh} - rod diameter.

The use of the proposed device allows for the straightening of the entire section of the bottom of the furrow, starting at the maximum value of the furrow and ending with the zero at the end of the furrow.



Picture 2. Installation of irrigation water bottom

Technology that allows the surface area to vary in height even with rough surface (Figure 1) and automated work equipment (Figure 2), which allows for accurate image formation of longitudinal shear images. Uneven spraying of soil beneath the bottom of the furrow, which is achieved by maximal and minimum minimization at the beginning of the furrow, eliminates uneven moistening of the root-stratified soil layer. Fields prepared by this technology can be used in the early years of development [7].

The proposed technology will help to reduce the amount of water provided during the growing season, and to achieve higher yields on the furrowed irrigated fields with the use of automated control systems.

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