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Transfer of Vegetable Water flows for Full Support of Drained Water from Wells of Vertical Drainage

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ABSTRACT: One of the important processes in the problems of land reclamation of Uzbekistan, is to increase the water supply of irrigated land. Considering the fact that groundwater with mineralization of 1-3 g/l is formed in the Fergana region, they can be considered as additional sources of irrigation.
The article talks about the transfer of vegetative irrigation to the full provision of pumped water from wells of vertical drainage in Fergana region.

KEYWORDS: water, research work, groundwater, drainage, water balance, Pumped water, irrigation**.**

I.INTRODUCTION

In the World, water resources play a crucial role in the development of the national economy of arid regions; they are the main limiting factor in achieving stable levels of social development. It should be noted that in countries with an arid and semi-arid climate, groundwater is widely used for irrigation. At the expense of groundwater, approximately 1/3 of all land is irrigated. Of the total irrigated land in the United States, 45% of the land is irrigated from groundwater, 58% in Iran, and irrigated agriculture in Libya is entirely based on groundwater. In Russia, only about 0.4 km3 / year is spent on land irrigation and irrigation of pastures, which is about 2% of the total groundwater withdrawal.

Worldwide, great importance is attached to research work on the protection of water resources. The forums dedicated to the water problem, talk about improving the water supply of irrigated land, the implementation of a set of measures for the protection of water bodies, as well as the rational use of land and water resources. At present, the number of dry years has sharply increased in Uzbekistan, which leads to the exacerbation of the problem of the distribution of limited water resources and their use, the problem of salinization, soil degradation and a decrease in agricultural productivity.

These circumstances dictate the need to develop a science-based complex of water-saving, ameliorative, environmental and other measures that ensure consistently high yields of agricultural crops at the lowest cost of water and material and technical resources, which determines the urgency of the problem.

The study of the processes of water-salt regime of irrigated areas, hydro geochemical flows in the soils and rocks of the aeration zone, groundwater and groundwater under the influence of irrigation is reviewed in the works of scientists of the former Union and the current Commonwealth of Independent States - A.N. Kostyakov, S.I. Kharchenko, S.F.Averyanov, V.A. Kovdy, N.M. Reshetkina, I.P. Aydarov, foreign scientists - I.S.Kanwar, W.P. Kelley, I.D.Oster, I.Szabolcs, L.V. Wilcox and others.

Under the conditions of Central Asia and in the works of A.A. Rachinsky and others, N.M.Reshetkina and Kh.I.Yakubov, N.N.Hojibaev, etc., Yu.M. Denisov, etc., A.Ramazanoa, R. K.Ikramova, A.T.Salohiddinov, A.U.Usmanov and T.U.Bekmuratova, L.Z.Sherfedinov, M.A.Yakubov, F.Kh.Hikmatov, S.V. Yakubov, L.Z. Sherfedinov and the establishment of common groundwater reserves and the possibility of using them for water supply and irrigation of crops, as well as the assessment of rechargeable operational reserves are dedicated to the assessment of rechargeable operational reserves devoted to ayutsya work Reshetkina NM, chr.inv. Yakubov [S.Sh Mirzaev, A.U. Usmanov, T.U. Bekmuratova, M.K. Dzhuraeva, Sh.Sh. Mukhamedzhanova, A.Kh. Karimov, R.K. Ikramova and others.

A review of the literature suggests that these researchers provide general and important insights into the environmental impacts of water management and irrigation development in the region. At the same time, these works did not consider the possibility of reducing the withdrawal of highly mineralized collective drainage water into rivers

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by converting vegetative irrigation to full provision of pumped groundwater from vertical drainage wells, developing principles for the redistribution of limited water resources due to the internal use of collector drainage water.

Method. When conducting research, the methods of water-salt balances, hydrogeological, laboratory, mathematical and others have been used. The object of the study is pumped water vertical drainage Fergana region.

Results: The development of the use of water resources for irrigation and industrial needs leads to a shortage of fresh water, which has been noted in Uzbekistan's conditions particularly acutely in recent years. At the same time, there is a fairly large amount of collector-drainage water .

The majority of collector-drainage waters are wastewater from irrigation fields and groundwater from wells of vertical drainage, which have a salinity of 1.0–1.5 g/l.

However, the pumped water is discharged into the collector and, in the event of possible use, is withdrawn by the pumps in the form of collector-drainage water of reduced quality. Considering the fact that pumped water is an internal reserve of each farm, these waters could serve as an additional source of fresh water for irrigation during the growing season. The use of pumped water can be carried out by transfer of vegetative irrigation of individual areas of the farm to the full provision of pumped water. To do this, the following issues must be addressed:

- assessment of ameliorative state of irrigated land;
- evaluation of the technical condition of vertical drainage wells;
- identify areas with subsurface groundwater at existing vertical drainage wells

To substantiate the transfer of vegetative irrigation by pumped water from wells of vertical drainage, to determine the current state of irrigated land, a water-salt balance was compiled in the Kuva district. The overall water balance of the irrigated area according to S.F. Averyanov is described by the following equation:

$$\Delta W=B+F_k+P-(I+T_r)-O;\ (m3 / ha) \quad (1.1)$$

$$\Delta Wp=A+B+(1-\alpha)F_k-(I+T_r)-C\pm q \quad (m3 / ha) \quad (1.2)$$

$$\Delta Wgr=\alpha F_k\pm q-Dr\pm(P-O) \quad (m3 / ha) \quad (1.3)$$

Where: ΔW, ΔWp, ΔWgr-total change in moisture reserves, change in moisture reserves in the aeration zone and change in moisture reserves of the surface layer of groundwater; F_k filtration losses from the channels; Groundwater inflow; A-precipitation; Dr- total discharge outside the territory of the collector-drainage system; I+ Tr-total evaporation; O - outflow underground.

Balance of the aeration zone. The determining quantities of the water balance of the aeration zone are water supply and total evaporation. The total water supply (net) for the studied area for the low-water year is 6825 m3 / ha, the total evaporation is 8.5 thousand m^3 / ha. The total water supply in the territory under consideration during the growing season was 69-81% of the annual value. In contrast to the water supply, the inflow of groundwater during the growing season was from 53% to 58% of the annual value. In the context of the year, there is an increase in moisture reserves, depending on the level of groundwater. Precipitation accounts for 17-20% of the total water supply of river and collector-drainage water. The main role in the incoming part of the salt balance is played by irrigation and groundwater. The arrival of salts with groundwater is less than that coming from the irrigation network. (The arrival of salts with irrigation water is 6.77 t / ha, with underground water — 5.4 t / ha.) The expenditure part prevails over the input. The main amount of salt falls on the growing season.

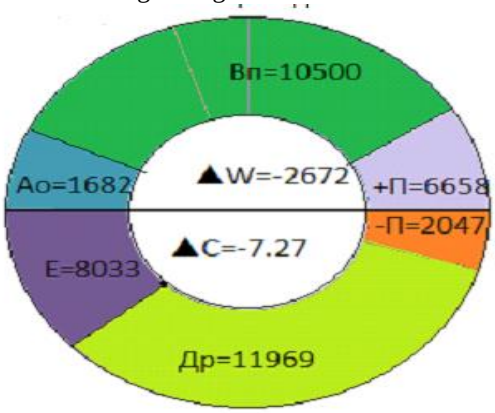

Figure 1. Diagram of the total water-salt balance in the Kuva district of the fergana region. Ao-atmospheric precipitation, Вп-water supply, E-total

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evaporation, Dp-drainage flow, + П-podsim inflow, -П-underground outflow, ▲ W and ▲ C-total changes in moisture and salt reserves in the balance area.

For a complete transfer of vegetative irrigation water from wells of vertical drainage, without dumping them into a CDW, it was necessary to study on the example of a specific farm. For example, the farm “G. Rayimjon Fayz "in Kuva district of Fergana region. The peculiarity of the soil conditions in this farm is in the small thickness of the surface fine-grained deposits, underlain by strongly permeable pebbles, strong and increased water permeability, with deep occurrence of the groundwater level. (GW> 5m). There are large losses of water during irrigation.

The task of the calculation was to determine how many hectares of land can be irrigated from one vertical drainage well, taking into account the irrigation time, the irrigation period, etc. For example, a field of 5 hectares of cotton sowing was selected.

Along the length of the longitudinal irrigated area there are three irrigated areas, separated by furrows, the number of simultaneously irrigated furrows-20. Water from the head water intake taking portions from the furrows connected to the irrigation. Watering begins with refueling 20 furrows of the upper section. Then refills the second section. At 20 furrows, water intake is 20 * 0.5 = 10 l / s, discharge from the left section is 2 l / s (20%), and in the second section 2 l / s / 0.5 = 4 furrows are additionally provided by resetting . Consider the irrigation regime of the farm “Rayimjon Fayz”.

The volume of irrigated water pumped out from the wells of vertical drainage is 30 l / s. The number of furrows in the field is 320 pieces, the duration of irrigation is two days, the flow rate in the furrow is 0.5 l / s. The date of the first watering falls on 07.06-09.06, the non-vegetation period falls on June 19-29. For the non-vegetation period of the second field, the third field is irrigated with pumped water from the vertical drainage. The date of the first irrigation of the third field falls on June 13-15, 2006, the intervection period of June 16-26, 2006, after which the fourth field is irrigated. The irrigation date is from June 16 to June 18, the non-vegetation period is June 19-29. After irrigation of the fourth field, we return to the irrigation of the first field June 19-21.06. According to this schedule all four fields are watered. Proceeding from this, it turns out that one well of vertical drainage during the growing season can irrigate four fields of 5 hectares, that is, 20 hectares of the sown area. Based on the results of the experiment, we found that in Kuva district it is possible to irrigate 26% of irrigated lands with pumped water from wells of vertical drainage.

II. CONCLUSIONS AND RECOMMENDATIONS.

Pumped water is discharged into the collector and, in the event of possible use, is withdrawn by the pumps in the form of collector-drainage water of degraded quality. Considering the fact that pumped water is an internal reserve of each farm, these waters can serve as an additional source of fresh water for irrigation during the growing season, which will increase the water availability of irrigated water by 15–20%.

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