ASSESSMENT FORMATION OF RATIONAL DEMANDED MELIORATIVE AGRICULTURE

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ABSTRACT

The relevance and timeliness of this article is due to the fact that the amelioration of agricultural land is, on the one hand, the basis for solving the food problem, on the other - one of the main factors determining the state of the main components of the natural environment. Both in that and in another quality, the amelioration of agricultural land has a significant impact on the ecological and socio-economic conditions of human existence.All these points to the need to ensure the inextricable link between the effective use of reclaimed land and compliance with environmental restrictions in the development of land reclamation for agricultural land. This is evidenced by global experience.

KEYWORDS: aeration, problems of land reclamation, water management, assessment of formation, rational, agriculture.

INTRODUCTION

With regular irrigation in Uzbekistan, where soils formed on the basis of heavy soils (clay and loam), the existing. The methods for calculating the irrigation norms and the justification of the irrigation regimes for agricultural crops were aimed at fully satisfying the needs of plants in moisture, but the requirements of the soil for optimizing soil processes were not taken into account at all. Due to the fact that irrigated soils with this type of irrigation are practically under conditions of constant anaerobiosis, degradation processes occur water logging and water logging, secondary salinization, salinization, alkalinity, dehumification, nitrification, and others.

It is impossible to create conditions for the optimization of soil processes with regular irrigation due to the constant over moistening of the soil, therefore the development of a new type of irrigation was required.

At the moment, this type of irrigation is formed as cyclical. Cyclic irrigation is a new direction in the development of irrigated agriculture and involves the consistent use of land in irrigated and non-irrigated regimes.

MATERIALS AND RESEARCH METHODS

In preparing this article, we used: the laws of the Republic of Uzbekistan in the field of land reclamation and environmental protection; the concept of environmental and food security of the country, the concept of socio-economic development of the agro-industrial complex and the strategy of biodiversity conservation Uzbekistan; materials of the State Committee on Statistics of the Republic of Uzbekistan, the Department of Land Reclamation of the Ministry of Water Resources of Uzbekistan; analytical materials of research institutions; reports of LLC “UZGIP” by design and survey and research organization of the Republic of Uzbekistan and agricultural enterprises; programs of socio-economic and environmental development of regions; literary sources; authoring and calculations.

In the process of research, ideas and principles of sustainable development and environmental management were used, as well as a system of methods for analyzing natural and economic processes — historical, geo system, geographical, balance, statistical, biological, ecological, and economic. In addition, the theoretical and methodological basis of the research is the fundamental works of domestic and foreign scientists on problems of land reclamation and water management and improving the efficiency of using budget funds for the maintenance and operation of land reclamation systems.

RESULTS AND DISCUSSION

Let us consider the main irrigation methods used in the Crimea and analyze their use over the past 10 years in order to determine the most promising of them, based on the existing climatic, economic and political conditions.

As a result of the above calculations, we have analyzed the water-salt equilibrium practically formed in the area's total irrigated area. It should be noted that the calculations do not fully cover the process of continuous water and salt exchange between the soil and the aerated layer of the irrigated land. For the quantitative evaluation of the changes in water-salt balance formed in the aeration layer, we have solved the equation:

$$\Delta W_a = O_p^{бр} + O_c + (1\text{-}\alpha)\ ф_{в/х} - ET_п - C_{бр} \pm q, \quad m^3 / ha \quad (1)$$

where: ΔW_a – change of moisture reserve for a certain period in the aerosol layer of the study area; $O_p^{бр}$ - the amount of irrigation water (brutto) given to the irrigated field; $(1\text{-}\alpha)\ ф_{в/х}$- the amount of water lost through filtration from the domestic irrigation network; $ET_п$–amount of evaporation and transpiration; $C_{бр}$ – the amount of water that can be lost by the surface of the sown area; ± q – The amount of water used between the aerosol and the waste water (all elements are expressed in m^3 / ha).

We have addressed the following scientific approaches to solving this equation for the object under consideration. Hydrogeologist and meliorator scientists (N.N.Xojiboev 1975, AAArchinskiy, 1964, F.M. Rakhimboev, G.K.Gasanova 1986, H.Ya.Yakubov, A.Kkirkov 1991, V.G.Nasonov According to IZZ 1983 and others, moisture stock (DWa) in the aeration layer of the crop area grows and declines over the course of irrigation and evaporation during the year, and at the end of the year it regains its balance, which is why it is equal to zero. Therefore, to find out the amount of water (± 1) found between the aeration layer and the gassing water, English Simplified solution:

$$\pm q = O_p^{бр} + O_c + (1\text{-}\alpha)\ ф_{в/х} - ET_п - C_{бр}, \ m^3 / ha \ (2)$$

We have collected data on irrigation rates, FAQs and SSMs, and information on the FSEC change in the internal irrigation networks by collecting and analyzing data from the regional and district water management departments by filling them with our own observations. The amount of atmospheric precipitation was met by the observations of the Karshi Meteorological Station. We use the formula X.A.Amanov (1967) to calculate the total evaporation rate over the vegetation period:

$$ET_p = 11{,}64 \cdot \beta \sqrt[4]{\frac{\Sigma t^0 \cdot У}{h}}, \quad mm \qquad (3)$$

where: β – the coefficient of water consumption of cotton over different periods,
b - According to SANIRI, it changes as follows: 0.314% in April, 0.57 in May; in July - 1.54; 1.38 in August; 121 in September; 0.57 in October. St0 - sum of average daily temperatures; O - cotton fertility, ts / ha; h - Depth of waste waters, m.
The total evaporation rate for the Novegetext period was calculated using the Blaine-Kridla (1979) formula.
Directly distributed water at the farm to find the amount of water flowing directly to the crop area ($B_{хоз}^{гр}$)

BWK of internal irrigation systems ($\eta_{в/х}$)multiplied by $O_p = B_{хоз}^{гр} \cdot (1\text{-}\alpha)\ ф_{в/х}$, (4)

where: α = 0,8 – the part of water that flows into the filtration from the internal irrigation canals to the surface of the surface water.
Quantitative changes in salt balance are achieved by increasing the water balance elements by their level of mineralization.
According to the water-salt equilibrium calculated for the aeration layer of the irrigated field, if the total amount of water entering the hectare (ie the amount of accumulated water and atmospheric precipitation) is greater than the total amount of evaporation and transpiration then the molten salts in the upper layer of the soil q) flows downwards. Conversely, if the amount of evaporation is greater than the threshold, then the molten salts on the surface of the water rises to the upper layer of the soil and causes salinity to rise.

Based on the above-mentioned theoretical and methodological approaches, we calculated the water-salt balance formed in the aerosol layer for different periods of time, depending on the amount of specific water available per hectare in the Kashkadarya region (Table 1).
As the results of the calculations show, the average amount of water taken from the irrigated land area in 1993 was 8940 m3 / ha and the balance of water balance (O + O + Fv / x) = 11280 m3 / ha, which is the sum of the total water balance (Sbr + ETp) was large. In this case, the water balance in the aerosol zone of the region provided salt washing procedures and reduced 3.73 tonnes of salt per hectare per year.

When we consider the next epochs, ie 2000 and 2017, we can see that the amount of water in the region is significantly decreasing. Since 2000 and 2017, the amount of water withdrawn from each hectare of land was 6950 and 6970 m3, the balance of water balance was smaller than the sum of its waste component. As a result, the addition of 7,99-8,17 tonnes of salt per year to the soil's aerosol layer has evolved from evaporation.

It is possible to conclude from the calculations that in recent years, water and salt balance in the aeration zone of the poor and districts of the poorer districts has changed for the worse, with annual order of 7-11.6 t / ha of salt in the upper layer of the soil. Moreover, in the past few years, the autumn-winter salt-washing procedures and standards have also been abandoned (Table 1). Obviously, in most of the observed years, the autumn-winter salinity was estimated at 2 or more times less than recommended values.

Table 1.
Recommended and effective salt-washing principles in the autumn-winter period

№	Indicators	Years						
		1970	1980	1985	1990	1995	2000	2017
1	Recommended salt washing norm for thousand m^3 / ha (netto)	2,5	2,5	3,0	2,5	2,5	2,5	2,5
2	Principle (netto), thousand m^3 / ha	0,4	1,1	1,3	1,0	1,2	1,7	2,04

As a result of these meliorative procedures, the irrigated lands in the region have been salinized at varying degrees.

The water-salt balance calculation calculated per hectare of land), which was actually formed in 1993-2017 in the aeration layer of irrigated land in the Kashkadarya region

Кўрсаткичлар	Periods			
	1993	2000	2008	2017
The beneficial coincidence of the irrigation system	0,67	0,65	0,64	0,64
The beneficial work coefficient of the domestic internal irrigation system	0,85	0,79	0,78	0,78
Mineralization rate of irrigated water, g / l	1,06	0,99	1,11	1,17
Potable Water Salinity, g / l	5,9	4,25	4,8	4,86
Water balance:m^3 / ha Input: $O_p^{бр}$ O_c $(1-\alpha)F_{w/m}$	 8940 1750 590	 6950 1176 458	 6970 1260 460	 5980 1090 465
Total:	11280	8584	8680	7535
Output:C_b ET_n	1320 7850	1030 7950	1030 7910	680 7780
Thedifference: $\pm g$	-2110	+396	+260	+925
Salt balance, t / ha Introduction:$CO_p^{бр}$ $C(1-\alpha)Ф_{б/х}$	 9,48 0,62	 688 0,45	 7,74 0,58	 6,9 0,54
Output:Cc $\pm C_g$	1,39 -12,44	1,02 +1,68	1,14 +1,06	0,8 +4,5
Saltdifference: t / ha	-3,73	+7,99	+8,17	+11,14

Note: FIC - useful utilization coefficient of irrigation networks; Orbr - the amount of water supplied per year to each hectare of farmland, m3 / ha; Os - atmospheric precipitation; (1) Fv / x - the portion of water to be immersed in the soil for moistening the aerosol layer; SBR - the amount of water discharged into the field; ET - general evaporation; the amount of water exchange between the anatomical layer and the gassing water; SOrbr, S (1-) Fv / x; - amount of salts or excrements with each element of water balance.

The productivity of agricultural crops in one or another natural-economic environment is a criterion for climatic parameters of the area, water availability, soil salinity, agro-technical measures and, ultimately, the effectiveness of such activities.

As you know, the level of water supply to the soil and its moisture regime play an important role in the physiological growth and development of plants. The result of summarizing the experience of the above scientists shows that the soil moisture content in the soil should be at least 0.65-0.8 points of the Constrained Field Density (WMD) before irrigation to obtain high crop yields. It is advisable to keep it at 60-65% during the cultivation of the crop, if it is optimal for light mechanical composition, in poor saline soils, to be 70-75% relative to the moisture content of the crop during growth and development. According to B.F.Fedorov (1953), VA Kovda (1967), when the moisture level is maintained at about 70-80% in the interstellar erosion between the strong saline soil and the vegetation period, the concentration of soluble salts in the soil decreases, comfortable conditions are created.

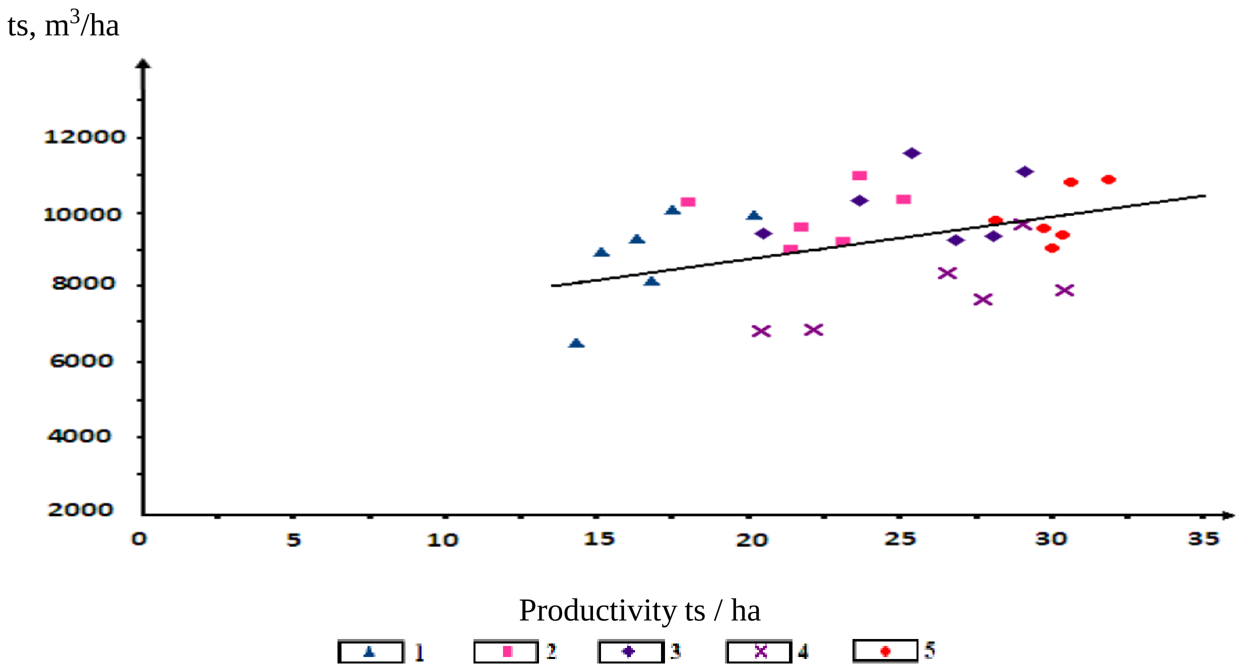
According to SN Ryzhov (1967), if the surface water level is close to the surface, it is desirable to maintain soil moisture at the level of 65-70% of the CNDS. Because they are close to water and they have low mineralization, they allow the capillary to maintain sufficient moisture in the soil. In recent years, the research conducted by scientists at the Institute of Water Resources, Institute of Water Resources and other organizations confirmed the results.

According to the Uzmeliosuvproject Institute, in Kashkadarya region, we need to supply 5500-6900 m3 / h (netto) during vegetation period to obtain high yields from the crop. In fact, 3800-4500 m3 / ha (netto) water is supplied and the crop yields the same: The average crop yield in the region was 27.01 t / ha in 2004 and 25.57 ts / ha in 2008 -table).

Table 3 Information on cotton fertility planted in Kashkadarya region, ts / ha

Regions	Years								
	2003	2004	2005	2006	2007	2008	2009	2017	average
Averageforther egion	22,24	27,01	25,24	24,6	25,49	25,57	24,48	26,7	25,0
Guzor	15,16	20,28	16,06	16,62	16,91	14,29	17,41	17,4	16,68
Kamashi	20,52	30,36	28,55	27,74	26,78	22,17	27,72	29,5	26,26
Kasbi	28,0	31,8	29,23	26,56	28,76	30,46	30,23	30,7	29,29

Low water supply (66-69%) in Guzar district was between 14.29 and 20.28 centners per hectare in 2003-2009. If we take enough water for Kasbi, the yield here is 28.27 - 29.29 c / ha. Thus, in areas with stable water supply, cotton yields are also high. As a result of calculating this data in mathematical statistics, we have found a link between the level of water supply in the districts and the cotton-fertility (Figure 1).



Picture 1. The dependence of cotton yield on Guzar (1), Hedon (2), Kasan (3), Kamashi (4), Karshi (5) districts depends on the annual yield of grape in annual yield (data for 2003-2017)

One of the factors that adversely affects the crop productivity is the degraded soil salinity and land degradation resulting from the change in water-salt balance. Researchers (VKKovda, I.P.Aydarov, NF.Bespalov, V. Legestayev and others) determined that, depending on soil salinity, yields also fall: up to 30% in weak saline lands; average - up to 50%; and on strong saline lands - up to 80%.

It is clear from the long-term data that the water-salt balance in recent years, especially in the region and in the separate districts, does not allow the salinity of the aquifer to pass to the negative order of irrigated lands, which does not allow to maintain an optimum level of reclamation, is holding. Table 2.10.2 summarizes the reclamation state of cotton and wheat crops for the Kashkadarya region for the period of 1993-2017, and yields from these degraded areas.

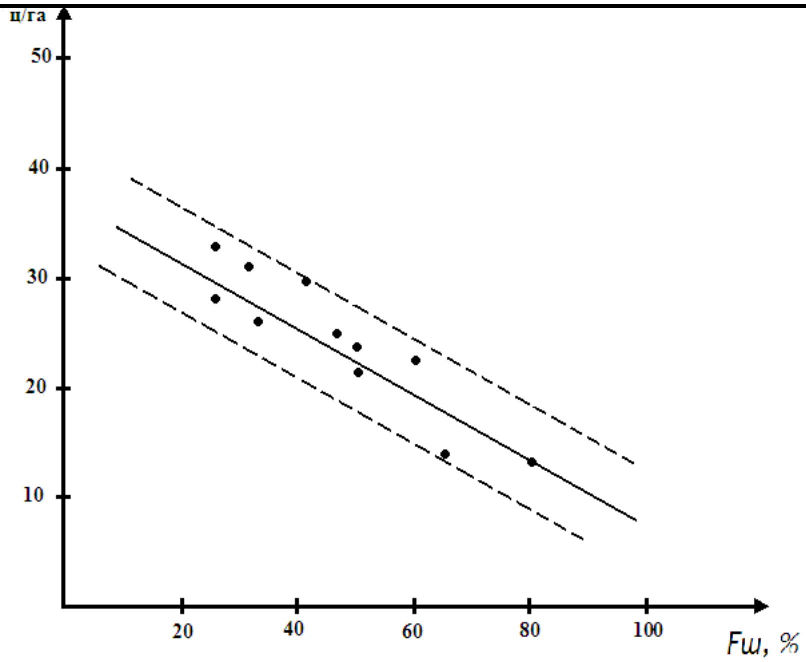
Table 4. Linkage of agricultural crops to salinization in Kashkadarya region

Years	cotton			cropped		
	averageproductivity, ts / ha	Productivity in lands with ameliorative condition	difference (+), (-)	averageproductivity, ts / ha	Productivity in lands with ameliorative condition	difference (+), (-)
1993	25	19,4	-5,6	18,1	13,9	-4,2
1994	24,2	18	-6,2	17,7	13,6	-4,1
1995	21,6	20,5	-1,1	18,8	14,4	-4,4
1996	20,7	17,3	-3,4	18,0	12,4	-5,6
1997	20,7	17,6	-3,1	18,0	14,4	-3,6
1998	22,9	17,4	-5,5	16,8	14,5	-2,3
1999	22,9	17,3	-5,6	22,2	15,5	-6,7
2000	16,8	14,1	-2,7	17,8	12,6	-5,2
2001	20,0	14,9	-5,1	23,1	11,9	-11,2
2002	24,7	16	-8,7	35,9	14,8	-21,1
2003	22,24	15,16	-7,1	41,84	29,87	-11,9
2004	27,01	20,28	-6,7	39,60	30,0	-9,6
2005	25,24	16,06	-9,2	50,88	46,86	-4,2
2006	24,6	16,62	-8,0	47,93	37,58	-10,3
2007	25,49	16,91	-8,58	51,51	43,43	-8,1
2008	25,57	14,29	-11,28	53,21	45,14	-8,0
2009	24,98	17,41	-7,57	49,84	38,40	-11,4
2011	25,1	18,47	-6,63	49,2	38,9	-10,3
2015	26,3	16,01	-10,29	61,1	37,8	-23,3
2017	26,7	17,4	-9,3	74,9	45,3	-29,6

As it can be seen from the data, the average productivity of cotton in the degraded lands is lower from 1.1 to 11.28 c / ha, and the yield of wheat is from 2.3 to 21.1 centners per ha, Indicators also allow for the calculation of the profit or loss that has not been finalized in agricultural production. This data was calculated by calculating the statistical equation of the equation between salinity and cotton yield (Figure 2).

$$R^2 = -0,8114$$

$$Y = 38,4176 - 0,2967 \sum_{F_ш} солей \pm 5,0387 \text{ ts / ha}$$



Fsh - saline areas

Picture 2. Graphs of dependence of cotton fertility on saline fields

CONCLUSIONS

Because of the high temperatures, low air temperature, vaporizers, dry weather, and winds with frequent overwhelming winds, Kashkadarya region has a high level of mineralization of groundwater and groundwater, and salinity of soil. and so on.

As a result, the share of total saline soils in the region has also increased: in 1990 such areas amounted to 172.2 thousand hectares (35%) and by 2017 their area was 234.7 thousand ha (46%).

Changes in the supply of water in the region, sharp variation in the amount of water equivalent to the districts, and the adverse changes in water and salt balance in the general and soil aeration layer have also influenced crop yields. In areas with low water availability and soil salinity, cotton yields were found to be 2.0-11.0 t / ha less than average yield in the region and wheat yield was below 2.3-2.1 ts / hr. Statistical calculations have revealed the relationship graphs and equations between these parameters.

As a result of these research, it was recommended to use the drainage water as an additional source during the critical years in the soil, hydrological, hydrochemical, hydrogeological and meliorative farming zones.

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