

## IRRIGATION SYSTEM IN UZBEKISTAN AND ITS MAIN MEASURES

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### Abstract:

The article analyzes on the basis of primary sources, scientific literature, Internet materials and statistical data the issues of significant attention to modernizing the irrigation system of Uzbekistan over the years of independence, providing the industry with modern equipment, protecting water resources, reclamation of irrigated lands, reconstruction, repair of hydraulic structures and increasing year to year capital investment. The research also highlights the important reforms and a number of measures taken in the water management system after the independence of Uzbekistan, as in all areas.

**Keywords:** irrigation, low water, drip irrigation, land reclamation, modernization, credit, irrigation canal, reconstruction, hydraulic structures.

### INTRODUCTION

In Uzbekistan water management system has undergone significant reforms and a number of measures. Today, in the irrigation system of the republic, special attention is paid to the rational and economical use of water resources, and the process of modernization in this area is gradually improving from year to year. It was during this period that a number of laws were developed and implemented in order to develop the system and legally guarantee it. In particular, the Law "On Water and Water Use", adopted on May 6, 1993, is devoted to the rational use of water resources. In particular, Article 111 states: "The main and basin tables of integrated water use and protection shall be implemented to meet the future water needs of the population and the economy, as well as to protect water and prevent harmful effects of water. measures and other measures "[7.p.45]. During the current reform process, a special program for the development of the country has been developed, which is the basis for the successful solution of socio-economic problems, primarily to meet the needs and requirements of the next generation living in the country to maintain a balanced natural resources and environment creates. Issues of rational use and protection of

water resources in the republic have been focused on as one of the priorities of state policy. Because, agriculture is one of the most important sectors of the economy, most lands are based on irrigated agriculture and land reclamation. More decrees and resolutions adopted by the President of the Republic of Uzbekistan in order to develop the industry and increase its efficiency, as well as the work carried out on their basis, are a clear proof of our opinion. For example, it should be noted that the Address of the President of the Republic of Uzbekistan to the Oliy Majlis on January 24, 2020 includes a number of important areas, such as bringing water management to a new level, the widespread introduction of energy-saving irrigation technologies in agriculture, automation of water resources control and accounting systems. tasks were assigned. In particular, the statement reads: "In 2020, we will introduce water-saving technologies on 44,000 hectares of land, or almost 4 times more than last year. For this purpose, 300 billion soums will be allocated from the state budget. It is also necessary to automate the management of water facilities, water control and accounting systems. These issues should be reflected in the concept of water management development. Let the Cabinet of Ministers submit the draft concept for approval by April 1 of this year"

## **RESEARCH METHODS**

It should be noted that increasing the legal effectiveness of water protection is in many respects the legal basis for this work, including the fact that after the independence of Uzbekistan began to pay serious attention to this issue. In particular, great attention was paid to the creation of a legal framework for the protection of nature and water resources and the improvement of legislation in this area. Two direct articles of the Constitution of the Republic of Uzbekistan are devoted to this issue. For example, Article 50 of the Basic Law states: "Citizens are obliged to treat the environment with care" [5.p.10] and Article 55 states: "Land, subsoil resources, water, flora and fauna and other natural resources are national wealth, they must be used wisely and they are under the protection of the state "[5.p.11]. In accordance with the Constitution, a number of laws and regulations have been developed. In particular, the laws "On water and water use" and "Nature protection" are directly aimed at the protection of nature and water resources. Therefore, the Law on Water and Water Use emphasizes the protection of water resources, and the nineteenth chapter of the law directly addresses the use of water bodies for the discharge of wastewater, for example, Article 73: "Permission to use water bodies for the discharge of wastewater in accordance with the legislation on the use of water bodies for the discharge of industrial, municipal, sewage and other wastewater, and in accordance with the permission of nature protection, state sanitary control of water bodies, legislative control of state bodies of geology and mineral resources can be put "[7.p.39].

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## **RESULTS AND DISCUSSIONS**

In particular, the global problem, natural water resources and water scarcity have been of international importance for several years in the countries of the world, where the process of globalization is intensifying. In particular, every year, February 2 is traditionally celebrated by the world community as an important date - World Wetlands Day. Uzbekistan became a member of the Ramsar (Iran) Convention in 2001 (based on the Resolution of the Oliy Majlis of the Republic of Uzbekistan №278 of August 30, 2001). This Convention entered into force in the Republic on February 2, 2002. At the same time, in accordance with the decision of the UN Conference on Environment and Development (Rio de Janeiro, 1992), in order to draw the attention of the world community to water issues, the need for clean drinking water, the promotion of sustainable use of clean drinking water March 22 is celebrated as World Water Day. In particular, in accordance with the Resolution A/ RES/65/154 adopted at the 69<sup>th</sup> Plenary Session of the UN General Assembly on December 20, 2010, 2013 is the International Year of Water Cooperation [4.p.7]. The issues of strengthening comprehensive cooperation and dialogue between the UN and other international organizations, states and stakeholders on water were discussed at the meeting.

Of particular importance is the modernization of irrigation system technology and investment in it. Indeed, over the past 10 years of independence, 1.2 billion soums have been allocated for technical and technological reconstruction and modernization of the irrigation system in Uzbekistan. More than \$1 billion worth of investment projects have been completed. In addition, Uzbekistan is a full member of international organizations such as the International Committee on Irrigation and Drainage, the World Water Council, the Islamic Interstate Network for Water Resources Development and Management, the International Commission on Large Dams. Unfortunately, today the world's 1 billion. More than half of the population suffers from lack of clean drinking water [17]. According to the World Water Council, by 2050, two-thirds of the world's population will face the problem of freshwater shortages. Therefore, saving water resources and preventing waste in their use has become one of the important issues.

It should be noted that Uzbekistan's favorable geographical climate has for many years made irrigated agriculture one of the key factors in its economic development. After all, irrigated agriculture currently accounts for 98% of agricultural production in the country. At the same time, a direct analysis of the current state and potential of the irrigation system of the republic shows that "currently 4.3 mln. There are 180,000 km of canals, 140,000 collector-drainage networks and more than 1,600 hydraulic structures. Of these, 800 are large hydraulic structures, 588 are pumping stations, and 55 are reservoirs (30 of the reservoirs are located in the Amudarya and 25 in the Syrdarya river basin)"[2.p.2]. Due to this, 3,475 vertical drainage wells and 123 reclamation pumping stations have been set up to rehabilitate the country's arable lands and keep the groundwater level in check. Based on the above tasks, irrigation,

development and cultivation and maintenance of irrigated arable lands, which can be included in agricultural consumption in the country's agrarian policy, are among the key issues in accelerating the irrigation system [1].

In order to consistently fulfill these important aspects and organize the management of water resources, the Cabinet of Ministers of the Republic of Uzbekistan on July 21, 2003 adopted a resolution "On improving the organization of water management" [8.p.25-26]. According to it, the main goal is the transition from the administrative-territorial principle of management of irrigation systems in the republic to the basin principle. The main tasks of the Basin Department of Irrigation Systems include the organization of targeted and rational use of water resources based on the introduction of market principles and mechanisms of water use, the implementation of a unified technical policy in water management based on the introduction of advanced technologies, technical reliability of irrigation systems and water facilities.

In order to radically improve the reclamation of irrigated lands, construction and maintenance of irrigation facilities and accelerate the reconstruction, the Decree of the First President of the Republic of Uzbekistan "On measures to radically improve the system of land reclamation" was signed on October 29, 2007 [6]. On April 19, 2013, some additions and amendments were made to this Decree. "Construction, reconstruction, repair and cleaning of trunk (interregional), inter-district and inter-farm open collectors and their facilities, closed horizontal drainage networks, vertical drainage wells, reclamation pumping stations and monitoring networks within the state programs to improve the reclamation of irrigated lands" [9.p.36-37] It is important to take action. In accordance with these tasks, in recent years, measures have been taken to further improve the quality of irrigated lands, rational and economical use of water resources, thereby ensuring the sustainable operation of agricultural production, increasing soil fertility and increasing crop yields and this process is still ongoing.

At the same time, many irrigated areas in the country are located mainly in non-irrigated areas. The introduction of drip irrigation of arable lands in non-irrigated areas, the involvement of modern water-saving technologies in the irrigation network is improving. In order to implement these requirements, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated June 21, 2013 "On measures to effectively organize the introduction and financing of drip irrigation and other water-saving irrigation technologies" [10.p.9] practical measures for the introduction of water-saving irrigation technologies in agricultural production, rational use of water resources and the development of agricultural production. Irrigation of cotton and other agricultural crops on polyethylene film-coated furrows, intercropping, irrigation using mainly drip irrigation systems, on irrigated lands with moderate perennial depletion of water resources during the growing season, as well as on the rise of irrigation water on costly machine-irrigated lands, on large sloping land plots subject to irrigation erosion, on flat soils with light soils that are not saline and not prone to

salinization. Based on the essence of this decision, in all zones of irrigated lands, irrigation of agricultural crops with relatively clean water through portable flexible irrigation pipes and their irrigation using siphons was achieved in all areas where water is taken from trays and risers. This, in turn, indicates the development of the irrigation sector in the country.

According to the Resolution of the Cabinet of Ministers of February 24, 2014 “On additional measures to ensure the unconditional implementation of the State Program on improving the reclamation of irrigated lands and rational use of water resources for 2013-2017” [11.p.64], As a result of the implementation of measures under the State Program on Improvement of Land Reclamation and Rational Use of Water Resources, the reclamation of 264.0 thousand hectares of irrigated land in 2013 improved, which allowed to increase the water supply of the existing 163.7 thousand hectares. During the years of independence in Uzbekistan, the development of irrigation and land reclamation and strengthening the financial support of the system has risen to the level of state policy. In particular, in accordance with the Resolution of the President of the Republic of Uzbekistan dated December 23, 2016 “On the Investment Program of the Republic of Uzbekistan for 2017” [20] in the system of the Ministry of Agriculture and Water Resources in 2017, 131.49 mln. It is planned to use financial and credit funds in the amount of 198.77 million US dollars this year. Capital investments in the amount of USD (109.5%) were directed and used. In particular, the expenditures for the development of the irrigation system consisted of the following stages:

1. The project “Reconstruction of the main irrigation canals of the Toshkoka system in Khorezm region” initiated by the Islamic Development Bank was implemented primarily on the basis of resolutions of the President of the Republic of Uzbekistan dated November 6, 2012 and the Cabinet of Ministers of August 26, 2016. At the same time, the total cost of irrigation measures here is 144.2 mln. USD, of which 90.37 mln. The rest was a loan from the Islamic Development Bank and the rest from the government of the republic. Therefore, in 2017, 17.98 mln. Loans in the amount of USD were disbursed. It should be noted that since the beginning of the project, 146.2 km of main and inter-farm canals have been reconstructed, 263 new hydraulic structures have been built and commissioned. Also, earthworks were carried out in the amount of 4356341 m<sup>3</sup>, reinforced concrete works in the amount of 80029 m<sup>3</sup>, stone works in the amount of 6999 m<sup>3</sup>, 230 tons of metal construction works.

2. The project “Reconstruction of the Amu-Bukhara canal system” was sponsored by the Asian Development Bank, which was implemented in accordance with the decisions of the President of the Republic of March 28, 2014 and August 25, 2015. The total cost of the project is 406.29 million soums of which 216.75 mln. USD loan from the Asian Development Bank, 108.97 mln. dollars from Japan’s popular JICA fund, while the government’s share is \$ 80.57 million. dollars. In addition, in 2017, 6.68 mln. 15.72 km of irrigation canals have been completely cleared, 68 hydraulic structures



and 12 observation wells have been rehabilitated, and 59.9 hectares of irrigated land have been handed over to officials with the help of lasers.

3. The World Bank-funded project “Improving Water Management in Southern Karakalpakstan” will be implemented on the basis of the Decree of the President of the Republic of Uzbekistan dated March 24, 2015, with a total cost of 376.714 million soums. Of this amount, 161.8 mln. The share of the republican government was 214.9 million US dollars. dollars from the World Bank [15]. In 2017, 2.58 mln. As a result of investment in the amount of \$ 1 billion, 3 dams were repaired in the Right Bank canal, 3 new water intakes were built, the 15.0 km section was cleaned with the help of various mechanisms, and one section in the Aqkamish canal was 106 m. A steel aqueduct (suspension pipe) was built.

4. The project “Improvement of water management in Surkhandarya region (rehabilitation of the Khazarbog-Oqqopchigai canal system)”, aimed at developing the irrigation system in the southern regions, was implemented under the auspices of the International Islamic Development Bank and the April 7, 2015 decree of the First President. The project cost \$ 122.72 million. USD, of which 33.17 mln. The share of the republic and the rest was borrowed from the Islamic Development Bank. It should be noted that in 2017, 0.53 mln. dollars of loan funds were spent. Today, on the basis of this project, the tender process for determining the general contractor is being carried out in stages.

5. The second phase of the project “Management of water resources in the Ferghana Valley” with the support of the World Bank, which has international powers and capabilities, was implemented by the President of the Republic on 16 September 2015. It is obvious that during the years of independence a number of important measures have been taken to modernize the irrigation system, to reconstruct irrigation facilities. At the same time, the priorities of the Decree of the President of the Republic of Uzbekistan “On the Action Strategy for further development of the Republic of Uzbekistan” dated February 7, 2017 on modernization and accelerated development of agriculture include sentences on modernization of irrigation systems. land reclamation, development of irrigation facilities, introduction of intensive methods of agricultural production, first of all, advanced water and resource-saving agro-technologies and effective use of high-yield agricultural machinery ”[12.p.34] on a systematic basis marked.

The Resolution of the President of Uzbekistan dated April 20, 2017 “On the program of integrated development and modernization of drinking water supply and sewerage systems for 2017-2021” [13] calls for significant changes in the drinking water supply and sewerage system and modernization in this area. The purpose of the application of relevant information technologies in the field of water supply. The resolution also provides for the construction and reconstruction of about 13,000 km of important water supply and sewerage networks, more than 1,600 wells, 1,400 new water towers and reservoirs over the past six years. As a result, due to the attraction of appropriate

grants and targeted loans from international financial institutions, many settlements without access to drinking water have been provided with water that meets modern requirements for quality and safety. The resolution also acknowledged that a number of unresolved problems in the supply of quality drinking water to some regions, especially the Republic of Karakalpakstan, Bukhara, Jizzakh, Kashkadarya, Surkhandarya, Syrdarya and Khorezm regions remain.

On May 4 of this year, the President of the Republic adopted a resolution “On measures to regulate the control and accounting of rational use of groundwater resources in 2017-2021” [14], which focuses on the rational use of natural water resources direct attention was paid to the proper accounting of the volume of water resources consumed, the prevention and protection of their pollution and scarcity. In a short period of time, significant work has been done to provide the local population with clean centralized drinking water in most low-income regions of the country. In particular, the daily needs of 69 large cities, 335 special settlements and 2,903 villages in the country are currently covered mainly by available groundwater resources. The resolution states that the surface water supply networks in some areas, as well as the failure of many drains and the unsatisfactory condition of existing drainage networks, the intensive rise of groundwater levels, as well as the lack of scheduled special hydrogeological inspections have resulted in many cities and other settlements. It was noted that the groundwater level has risen in some places, and its negative aspects have been highlighted. The text of this resolution also states that the rapid development of industry and agriculture over the next 40-50 years has had a significant impact on the natural state of groundwater resources, which in turn has led to the unauthorized construction and uncontrolled acquisition of water resources. was reduced by almost 35%, and in some sources water resources were depleted.

Training of specialists in the field of irrigation and land reclamation plays a key role in the modernization of the system. In this regard, the adoption of the Resolution of the President of Uzbekistan dated May 24, 2017 “On measures to radically improve the system of training engineering and technical personnel for agriculture and water management” [16] has acquired great historical significance. The resolution is aimed at improving the quality of training. It was noted that more than eight thousand technicians were trained. In addition, on the basis of a separate study and analysis of the system of training of specialists in the agricultural sector to identify real needs and opportunities for training, strengthen the link between practice and the existing educational process, appropriate management of higher education institutions in the development of scientific and methodological framework. Problems of lack of interaction between the relevant ministries, enterprises and higher education institutions in the field of professional development and retraining were highlighted. In the Resolution of the President of the Republic of Uzbekistan dated April 17, 2018 “On measures to organize the activities of the Ministry of Water Resources of the Republic of Uzbekistan” [18] developed a special “Road Map” for the modernization

of water resources. Development of a program of promising and important organizational measures for the rational use of water resources, the formation and re-equipment of large reservoirs and dams, hydraulic structures and other water facilities of strategic importance, targeted use of natural water resources by the local population to accelerate various measures aimed at strengthening their legal awareness and legal culture on the use of water resources, to pursue a unified policy aimed at water resources management, to select important personnel and to place them in place. The development of promising cooperation in the field of water resources in the Aral Sea on a global scale with international organizations and foreign water management organizations, especially the Amudarya and Syrdarya countries, was analyzed.

In 2018, 35 water supply systems with a total length of 680 km were created under the project of the Swiss Cooperation Office "Water supply and sanitation in rural areas of Uzbekistan". Residents of Ferghana, Andizhan and Namangan regions have been provided with quality drinking water for 14 years. During this period, as a result of small-scale project activities, 160,000 people were provided with quality drinking water in 24 villages of Ferghana, Andizhan, Namangan and Syrdarya regions, and 687 km of water supply systems were built. According to the above decision, a number of organizations are currently attached to the ministry system, including 280 budget organizations, 72 economic organizations, which employ about 40,000 experienced specialists in this field. Of these, 7,400 are specialists with higher education in the irrigation sector, 18,256 are specialists with secondary special education, and 14,267 are workers with secondary education. At the same time, the training of personnel for water management in the country is carried out mainly by the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers. Therefore, according to the prospective agreement between the ministry and the institute, the students of the institute will get acquainted and carry out internships in organizations and enterprises attached to the system. In addition, the formation of a database of graduates of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers and its Bukhara branch over the past three years has yielded great results in providing the irrigation sector with mature and qualified personnel. As a result of this cooperation, about 300 young professionals were involved in the irrigation system. In 2019, more than 200 students graduated from the institute on the basis of a state grant, and they were sent to work in system organizations on the basis of a referral from the Ministry of Water Resources of the Republic. Those who were sent to work at facilities far away from their residential areas were provided with accommodation and food on a regular basis.

In 2019, the first step was taken to develop the irrigation and land reclamation sector in the country and financially strengthen the system. Based on the direct decision of the Cabinet of Ministers, which is the executive branch, a program to improve the irrigation and land reclamation system of Tashkent region for 2019-2021 was developed and approved [19]. According to the program, a number of practical



measures have been taken to radically improve the water supply of arable lands in the region, the rational use of land and water resources, the gradual development of the sector, the steady increase in crop yields. In a short period of time, the Department of Management of the Ministry of Water Resources, the State Committee for Investment, the Ministry of Economy and Finance, the Fund for Improvement of Irrigated Lands under the Executive Power have taken the following measures this year:

- Irrigation facilities and facilities included in the Program aimed at improving the irrigation system with the help of loans and funds from the Fund for Financing State Development Programs of the Republic of Uzbekistan under the Cabinet of Ministers of the Republic were built and commissioned;

- At the expense of the republican budget, a number of irrigation facilities included in the promising Program and included in it were repaired and rehabilitated;

The Irrigated Land Reclamation Fund under the Executive Power has built reclamation facilities included in this program at the expense of funds allocated for the development of the sector, and they have been thoroughly reconstructed and repaired. The draft State Program on the implementation of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in 2017-2021 in the “Year of Science, Enlightenment and Digital Economy” with the participation of the general public in order to consistently continue the comprehensive reforms in the interests of the people prepared with detailed discussion. In the course of the discussions, our people, civil society institutions were active, more than a thousand live conversations were organized with them on TV and radio channels, the proposals and recommendations of our citizens were analyzed in depth with the participation of relevant experts and expert groups. On this basis, the Cabinet of Ministers and the Central Bank of the Republic of Uzbekistan were instructed to ensure the development of concepts for the development of water resources, a program of practical measures for the widespread introduction of digital technologies in agriculture. At the same time, the Cabinet of Ministers of the Republic of Uzbekistan together with the relevant ministries and departments was instructed to ensure the timely implementation of tasks in this area, including the development of draft laws “On water supply and sewerage services”.

Among the ongoing reforms are to ensure the effectiveness of work in the field of water management in the Ferghana Valley, expand and strengthen international relations in the field of water management, timely and quality development of the concept of water management in 2020-2030, implementation of promising projects in the water sector work on construction, reconstruction and modernization of water facilities by expanding the attraction of investments, loans and grants it is envisaged that the ahas will also be carried out gradually in the future.

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## **CONCLUSION**

In conclusion, significant work and important measures have been taken to modernize the irrigation system in Uzbekistan. In order to modernize the system, a large amount of capital was spent on it, and this figure has been growing from year to year. As a result, irrigation and land reclamation areas have been provided with modern equipment. During the years of independence, a number of practical measures have been taken to further improve the water supply of arable lands in the country, the efficient use of land and water resources, the development of the sector, increasing the productivity of agricultural crops. Besides, significant work and important measures have been taken to modernize the irrigation system in the Ferghana Valley as well. In order to modernize the system, a large amount of capital was spent on it, and this figure has been growing from year to year. As a result, irrigation and land reclamation areas have been provided with modern equipment. During the years of independence, a number of practical measures have been taken to further improve the water supply of arable lands in the valley, the efficient use of land and water resources, the development of the sector, increasing the productivity of agricultural crops.

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