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Irrigation Equipment Production in Central Asia:

Industrializing the Water Sector

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Abstract

The management of water resources in Central Asia is a critical and pressing issue for the region. The sustainable development of agriculture depends heavily on the adoption of advanced irrigation systems and innovative technologies that maximize water efficiency. To address these challenges, Central Asian governments have already implemented significant initiatives aimed at improving water management. The current irrigation equipment market is valued at approximately $130–200 million, with a substantial portion of demand met through imports. Projections indicate that by 2040, the area of irrigated land in the region will increase to 10.6 million hectares, with a notable shift toward sprinkler and drip irrigation systems. This growth in irrigated land, along with the adoption of advanced technologies, is expected to drive demand for approximately 2 million units of irrigation equipment. As a result, the local production of irrigation equipment in Central Asia could generate up to $426 million annually, offering a promising opportunity to address the region's needs while tapping into the market potential.

Keywords: Central Asia, irrigation equipment, localization, manufacturing, industrial policy, water efficiency

JEL: D20, E61, L52, O14, O25.

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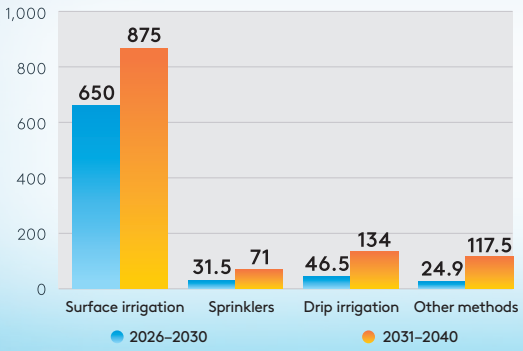
IRRIGATION EQUIPMENT PRODUCTION IN CENTRAL ASIA: INDUSTRIALIZING THE WATER SECTOR

KEY FINDINGS

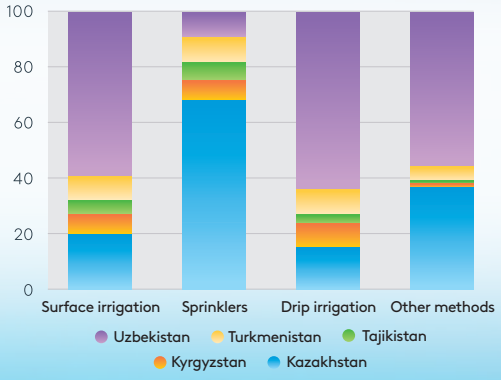
Analytical report '25

MARKET FOR IRRIGATION EQUIPMENT IN CENTRAL ASIA WILL GROW AS MORE EFFICIENT WAYS OF MANAGING WATER ARE NEEDED

Demand for technical means and equipment for irrigation up to 2040, in thousand units



Irrigation equipment demand up to 2040 across countries of the region, %



Annual investments for new irrigation equipment needed by 2030

$426 million

For sprinklers only

$114 million

For drip irrigation only

$220 million

KEY FACTORS NEEDED FOR SUCCESSFUL LAUNCH OF IRRIGATION EQUIPMENT PRODUCTION IN CENTRAL ASIA

- ACTIVE INDUSTRIAL POLICY
- DEVELOPED HARD INFRASTRUCTURE
- PREVIOUS POLICY WORK ON CLUSTERS
- SPECIAL ECONOMIC ZONES
- FAVORABLE REGULATORY BASE
- INCREASING ADOPTION OF DIGITAL AGENDA

THREE STAGES OF DEVELOPING AN IRRIGATION EQUIPMENT PRODUCTION CLUSTER IN CENTRAL ASIA

STAGE I

BUILDING CRITICAL MASS

Of irrigation equipment manufacturing enterprises through enhanced project financing

STAGE II

STRENGTHENING CLUSTER POLICY

At the national level in line with other state development programs and policies

STAGE III

ENHANCING CLUSTER FORMATIONS

To increase their synergies within the clusters and with external bodies

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SUMMARY

The formation of an irrigation equipment production and supporting irrigation services sector would enable the aggregation of capacities to provide irrigation equipment and efficient technologies tailored to the irrigation needs of Central Asian countries. Efficient irrigation technologies are a critical component of water resource management in Central Asia, which is a pressing issue in the region today. The development of agriculture in Central Asia depends on the implementation of modern irrigation and innovative technological solutions to optimize the efficiency of water use.

The United Nations Industrial Development Organization (UNIDO) and the Eurasian Development Bank (EDB) have both expressed their intention to support the production of irrigation equipment and supporting irrigation services in Central Asia. The development of irrigation equipment production can address challenges in the water sector (Vinokurov et al., 2023) and enhance industrial potential. The irrigation equipment sector would produce high quality irrigation equipment and focus on the development of high performance, multifunctional irrigation tools. In addition to industrial goods production, the sector would develop precision irrigation technologies, digital tools for water management, and centers of excellence for water resources and irrigation. It would also improve the scientific and workforce competencies and competitiveness of the agro-industrial complex of the region.

The effective management of water resources is a critical and time-sensitive issue in Central Asia. Central Asian states are already implementing tangible measures to address emerging water challenges. Governments in the region are directing particular attention to modern irrigation and water management. Currently, up to $200 million worth of irrigation equipment is imported into the region each year to meet farmers' current needs. Of these imports, approximately 80% in 2023 were destined for Kazakhstan. Kazakhstan is currently implementing extensive initiatives to address emerging water challenges, with the introduction of water-saving technologies being a key component of these plans. Over the

Annual imports of irrigation equipment in Central Asia amount to

$200 million

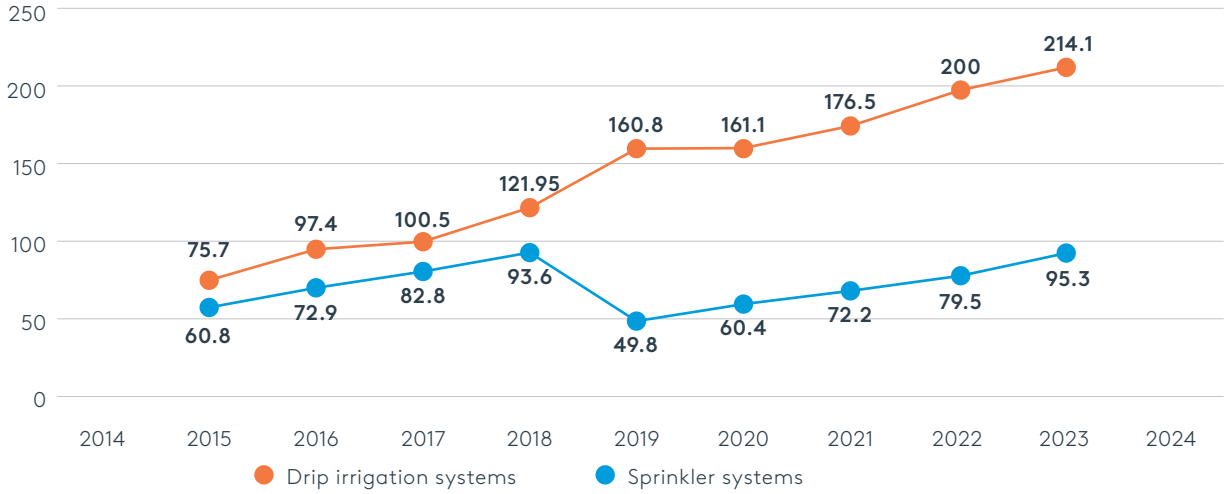
About

80%

in 2023 are destined for Kazakhstan

past ten years, the country has achieved remarkable success in introducing new water-saving technologies on irrigated land (Figure A).

↓ Figure A: Introduction of water-saving irrigation technologies in the Republic of Kazakhstan, annual deployment area in 1,000 ha



Source: Concept of Water Resources Management System Development in the Republic of Kazakhstan for 2024-2030.

Additionally, specific government programs and agencies are being established. It is worth noting that the Republic of Kazakhstan has recently adopted new Water Code, which aims to address a number of critical challenges in the country's water sector, taking into account the regional aspect.

However, the demand for irrigation equipment and methods will experience a significant long-term increase. The modernization of existing agricultural fields and the introduction of new irrigated areas in the near future will put considerable pressure on the development of new irrigation equipment.

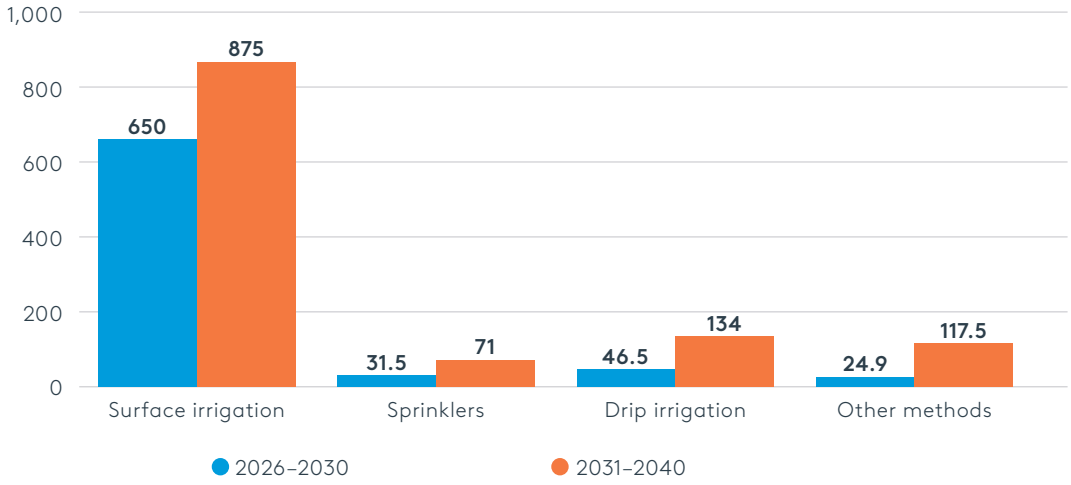
According to government plans and program documents, Central Asian countries are expected to significantly increase the area under irrigated agriculture using various irrigation technologies (Dankova et al., 2022). By 2040, the total area covered by these technologies is expected to reach 10.6 million hectares. Uzbekistan will account for the largest share with 4.3 million hectares (40.5%), followed by Kazakhstan with 2.7 million hectares (25.5%).

By 2040, the total area covered by water-saving technologies will be

10.6 million ha

Based on these projections, we have forecast the approximate demand for irrigation technologies and equipment that will be needed to meet the growing agricultural needs of the Central Asian countries (Figure B). The largest demand for irrigation equipment between 2026 and 2040 will be for surface irrigation, with an estimated 1,525,000 units required.

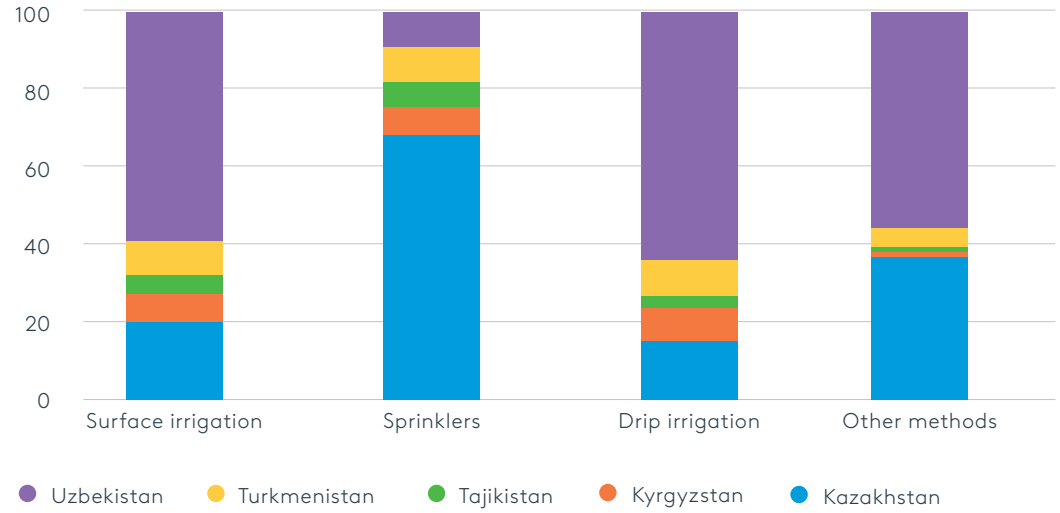
↓ Figure B. Forecast of demand for technical means and equipment for irrigation up to 2040, thousand units



Source: EDB calculations.

The surface irrigation method will remain dominant in the region, particularly in Uzbekistan, which would require approximately 900,000 units, or 59% of the total demand (Figure C). In addition, approximately 102,500 units of sprinklers would be required, with Kazakhstan being the primary market and requiring approximately 70,000 units (representing 68.3% of regional demand).

↓ Figure C. Irrigation equipment demand up to 2040 across countries of the region, %



Source: EDB calculations.

Drip irrigation systems are expected to account for a significant portion of the total demand for irrigation equipment in the region. In total, the region would require 180,500 units of new drip irrigation systems. Given the region's agricultural conditions, the majority of these systems will be required, with Uzbekistan accounting for the largest demand (115,000 units or 63.7% of the region's total drip irrigation systems).

The total investment that is necessary to introduce new irrigation equipment in Central Asia would be around $426 million annually until 2030. The introduction of sprinklers would cost $114 million a year, while drip irrigation would cost $220 million for the same period. The localization of essential irrigation equipment in Central Asia has the potential to facilitate the retention of these investments within the local economy.

The total amount of investments in the introduction of new irrigation equipment is projected to reach

$426 million

annually until 2030, including

$114 million

for sprinklers and

$220 million

for drip irrigation.

We propose the establishment of a local irrigation equipment production through clusterisation, which could prove an effective means of leveraging the region's growing potential. Based on the required irrigation infrastructure, it is possible to produce a range of irrigation equipment in the domestic market, including sprinklers, regulators, pipelines, drip pipes, connecting fittings, nozzles, valves, and mobile means of water redistribution.

To begin with, among all Central Asian countries the Republic of Kazakhstan offers an optimal environment for the development of irrigation equipment production. This is due to the country's advanced infrastructure and favorable regulatory environment. The country has an active industrial development policy that provides support for new manufacturing industries through a range of financial and non-financial instruments.

Furthermore, the Government of Kazakhstan has implemented a comprehensive cluster policy that includes approved programs and measures to support cluster initiatives. Furthermore, Kazakhstan's advanced digital agenda and affiliation with the Global Network of Fourth Industrial Revolution Centers, along with the associated center at the Astana International Financial Center, provide a platform for the professional development of digital water metering and infrastructure monitoring technologies. This will attract skilled labor and scientific expertise to develop new equipment using digital tools, including digital twins of irrigation fields, advanced analytics, sensors, and digital water meters and etc.

To reduce costs and facilitate accelerated development of a sector, we recommend that the initial production make use of existing infrastructure, including both hard and soft facilities. Special Economic Zones (SEZs) have the potential to serve as a catalyst for the growth of industrial enterprises. In the early stages of emerging industries, SEZs provide incentives to attract manufacturers, thereby facilitating the establishment of critical mass. There are currently 14 SEZs in Kazakhstan.

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in Kazakhstan

We believe that the SEZ "Jibek Joly" in the Zhambyl region of southern Kazakhstan is a promising location for the formation of an irrigation equipment production sector due to its strategic location near the Aral Sea basin and irrigated lands in Central Asia, coupled with its focus on priority industrial activities. This experience can later be shared with other Central Asian countries.

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Furthermore, the Republic of Kazakhstan and the Republic of Uzbekistan have the potential to establish a regional joint production cluster through industrial collaboration. Currently, an interstate joint project, the 'International Center for Industrial Cooperation 'Central Asia', is being implemented by both countries. Construction and installation are scheduled to commence in March 2025. However, the latest data indicates that the Republic of Uzbekistan has already granted the Center the status of a special economic zone. The status and benefits of the SEZ, as previously recommended, will be a key initial condition for the production of irrigation equipment and its subsequent transformation into a fully-fledged cluster formation.

The establishment of a cluster partnership for irrigation equipment production at this location would provide a significant boost to regional industrial collaboration and represent a crucial milestone in addressing the growing water challenges in Central Asia. Furthermore, this initiative will facilitate participation by both countries in the global

value chain and import substitution in irrigation equipment in Central Asia. Moreover, our projections indicate that Kazakhstan and Uzbekistan will be the primary consumers of irrigation technologies and equipment in the coming years. Given these circumstances, the project can be successfully implemented at the site of 'International Center for Industrial Cooperation 'Central Asia''.

The development of the irrigation equipment manufacturing as a comprehensive program for the development of the industry and the economy as a whole can be carried out in three stages. The initial stage involves the establishment and development of production, while the subsequent stages involve the cultivation of cluster competencies and the implementation of necessary policies within the country (Figure D).

↓ Figure D. The stages of irrigation equipment manufacturing sector development

Source: EDB and UNIDO estimates.

Prior to the installation of cluster initiatives, it is essential to establish a greater number of companies engaged in the production of irrigation equipment in the region. The EDB has agreed to assist in the development of irrigation equipment manufacturing projects. Significant progress has already been made in this regard. In addition to investment projects, we have been working with the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan and the United Nations Development Program on a joint initiative in the water sector. The goal of this initiative is to promote best practices in water management and irrigation in five regions of Kazakhstan. It is expected that the joint efforts of the aforementioned parties, in conjunction with UNIDO, will bring significant benefits to the water sector and the economies of the entire Central Asian region.

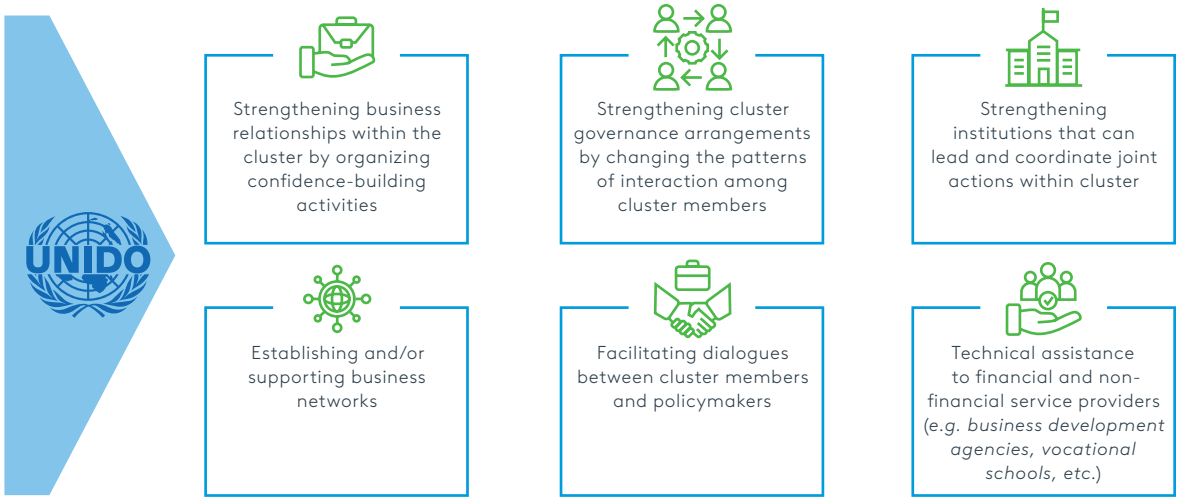
Given UNIDO's extensive experience in industrial development and the establishment of cluster initiatives, its remit could be extended to the

formulation of cluster initiatives, the enhancement of special economic zones. UNIDO is well positioned to conduct feasibility studies aimed at identifying optimal cluster structures, formulating policy recommendations, ensuring implementation, monitoring development activities and evaluating results.

UNIDO's expertise would facilitate the modernization of the industrial and cluster policy and the involvement of producers in the project. The aim of work will be to strengthen the cluster approach and equip local experts with the necessary skills for effective engagement. The initiative should be launched in parallel with the development of irrigation equipment manufacturing projects and continue as industrial facilities are established.

At last, once clusters are ready, collaboration with manufacturers to form a unified cluster is essential. UNIDO would assist by conducting feasibility studies, defining optimal structures and strengthening business relationships within the cluster (figure E). Effective cluster governance involves the establishment of business networks, public-private partnerships and dialogues between service providers and policy makers. Technical assistance is also needed to align the services of financial and non-financial service providers with the needs of the cluster.

↓ Figure E: UNIDO's role in facilitating the formation of irrigation equipment manufacturing sector



Source: UNIDO.