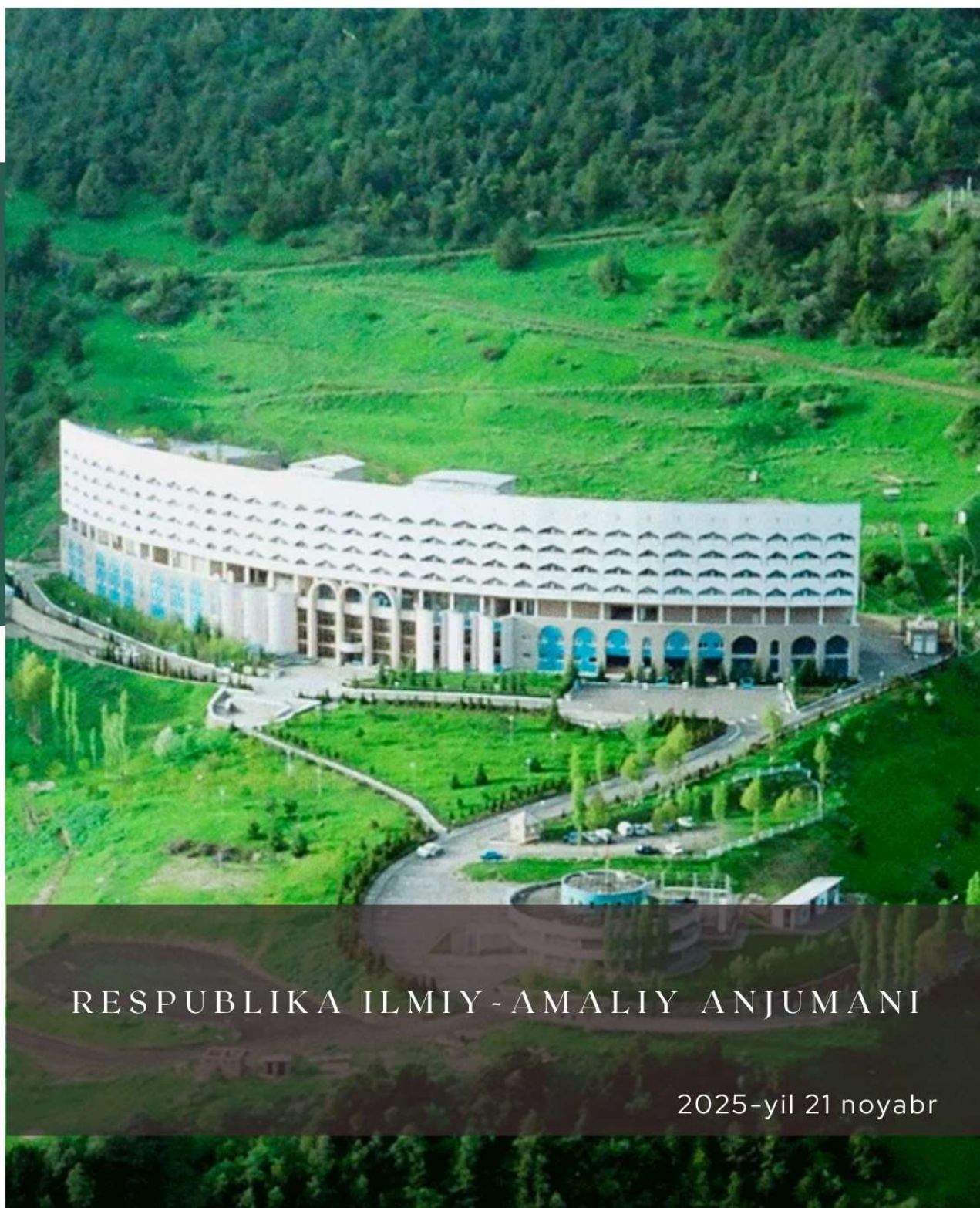


KONFERENSIYA

“JIZZAX VILOYATI IJTIMOIIY-IQTISODIY
RIVOJLANISHINING ASOSIY
YO’NALISHLARI: MUAMMO VA YECHIMLAR”



RESPUBLIKA ILMIY-AMALIY ANJUMANI

2025-yil 21 noyabr

**O‘ZBEKISTON RESPUBLIKASI OLIIY TA’LIM, FAN VA
INNOVATSIYALAR VAZIRLIGI**

**MIRZO ULUG‘BEK NOMIDAGI O‘ZBEKISTON MILLIY
UNIVERSITETINING JIZZAX FILIALI**



**JIZZAX VILOYATI IJTIMOIIY-IQTISODIIY
RIVOJLANISHINING ASOSIIY YO‘NALISHLARI:
MUAMMO VA YECHIMLAR**
*mavzusidagi Respublika ilmiy-texnik anjuman materiallari
to‘plami*
(2025-yil 21-22-noyabr)

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Jizzax viloyati ijtimoiy-iqtisodiy rivojlanishining asosiy yo‘nalishlari: muammo va yechimlar. Respublika ilmiy-texnik anjuman materiallari to‘plami – Jizzax: O‘zMU Jizzax filiali Iqtisodiyot va turizm kafedrası, 2025-yil 21-22-noyabr. 557-bet.

Respublika miqyosidagi ilmiy-texnik anjuman materiallarida zamonaviy kompyuter ilmlari va muhandislik texnologiyalari sohasidagi innovatsion tadqiqotlar aks etgan.

Globalashuv sharoitida davlatimizni yanada barqaror va jadal sur‘atlar bilan rivojlantirish bo‘yicha amalga oshirilayotgan islohotlar samarasini yaxshilash sohasidagi ilmiy-tadqiqot ishlariga alohida e‘tibor qaratilgan. Zero iqtisodiyotning, ijtimoiy sohalarni qamrab olgan modernizatsiya jarayonlari, hayotning barcha sohalarini liberallashtirishni talab qilmoqda.

Ushbu ilmiy ma‘ruza tezislari to‘plamida mamlakatimiz va xorijlik turli yo‘nalishlarda faoliyat olib borayotgan mutaxassislar, olimlar, professor-o‘qituvchilar, ilmiy tadqiqot institutlari va markazlarining ilmiy xodimlari, tadqiqotchilari, magistr va talabalarning ilmiy-tadqiqot ishlari natijalari mujassamlashgan.

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Mazkur to‘plamga kiritilgan ma‘ruza tezislarning mazmuni, undagi statistik ma‘lumotlar va me‘yoriy hujjatlarning to‘g‘riligi hamda tanqidiy fikr-mulohazalar, keltirilgan takliflarga mualliflarning o‘zlari mas‘uldirlar.

SUSTAINABLE WASTE MANAGEMENT STRATEGIES IN SOUTH KOREA AND UZBEKISTAN

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Abstract: This article presents important information, issues, and solutions regarding waste management in South Korea and Uzbekistan. Currently, South Korea is one of the most developed countries in the world. Despite numerous achievements, it faces challenges in several areas, such as waste management, similar to our country. We examine the similarities and issues between the two countries and propose solutions for them.

Key words: waste management, VBWF, organic waste, domestic waste, South Korea’s waste problem is also a polemic. The biggest problem is plastic waste. The consumption of single use plastic in South Korea is very high. In 2017, South Korea generated 4.3 million tons of plastic waste from the industrial sector, 3 million tons of domestic waste, and 658,000 tons of the construction sector. This number has increased. Although the plastic waste rate is increasing, the domestic waste rate continues to decline. In 1994, waste generated around 1.3 kg per capita. The amount of waste continues decrease. In 2015 waste decreased to almost 0.86 kg per capita per day in Seoul, in 2019 it’s 3,506.1 kg per person. In 2020 it’s 3,7770.8 kg, in 2023 it was approximately 438 kg per person, calculated from the 1.2 kg per day.

Apart from experiencing domestic waste problems, South Korea was overwhelmed with imported waste. Imported waste reduces the percentage of domestic waste recycling. This happens because the local industry is more focus on recycling imported waste.

To overcome various waste problems in the country, the government issued several waste management policies. The policies are Volume based Waste Fee (VBWF). VBWF is a waste management system that require the public to sort recyclable waste. VBWF was first put into practice in 1995. This system also demands the community to pay waste management fee according to the amount of waste produced. VBWF is a successful strategy to reduce waste. Since this system was implemented, the amount of waste generated has decreased annually. In 10 years, waste was reduced by 50,000 tons per day with a recycling percentage of up to 45%. The VBWF system has succeeded in creating a responsible waste management scheme. The community, government, and industry players are able to

work together to implement 3R. This system indirectly forces all parties to be aware of the importance of waste management. Of course, the success of VBWF is also supported by the use of sophisticated waste management technology. Besides VBWF, South Korea also launched a Pay As Your Trash system specifically for dealing with organic waste. This system obliges the community to dispose of their organic waste in a particular disposal site. The place uses Radio Frequency Identification (RFID) technology. Pay As Your Trash has succeeded in reducing around 70% of organic waste from various sources.

The scheme is, this technology will scan the user's RFID card so they can throw garbage into the bin. Furthermore, the machine will weigh the amount of waste disposed of and auto debt a fee from the balance contained in the RFID card each month. The collected waste will be recycled into animal feed, compost, and a renewable energy source.



As said previously, there are some problems and challenges in waste management of South Korea. While WBWF system was implementing, it did not receive public support because it was quite inconvenient for people. After collection, recyclable has become burden for the government. The most difficult thing is how to take advantage of non PET plastic containers (PE, PP, PS, or PVC). Although these types of plastic containers were designated as recyclable waste but at that time, South Korea did not have enough infrastructure to recycle this type of plastic. The amount of waste generated in the South Korea is huge, not only due to the increase in consumer demand, but also due to the South Korean's traditional cuisine and characteristics of food. For example: kimchi- Korean's most popular dish creates a numerous food waste when prepared. Besides, this nauseating smell is caused by food waste and this problem has become even more serious since the VBWF system was put into operation. The reason is that the paper used to wrap food has been classified as recyclable waste and is no longer disposed of according to regulations for wrapping paper. One of the most concerning side effects of the VBWF system is illegal dumping to avoid paying fees. In fact, some people threw household waste or business waste into public trash bin on the street, dumped trash in remote area, or into regular bags, not a VBWF bag



So, we examine all problems of new system in South Korea and we should consider solution as well. To change attitude and awareness of people about the VBWF System, the government made a lot of efforts to introduce new policy and system, mechanisms to prevent institutional barriers, identify the benefits, evaluate the impact of the system, as well as the problems of the VBWF system through convincing people. Therefore, authorities have also cooperated closely with civil groups. After taking part in the pilot monitoring projects of the VBWF system, civil groups began to change their attitudes. The issue of recyclable waste was solved in 2003 when the government introduced policies to support plastic recycling companies — such as providing financial support to build and operate recycling facilities, and requiring the public sector to purchase recycled plastic products instead of new plastic bags.

At the same time, Korea also introduced a regulation that required manufacturers to take responsibility for collecting and processing recyclable waste. This regulation is known as the Extended Producer Responsibility (EPR) program.

However, at first, applying EPR program to food waste faced many difficulties, since 2013, the Seoul Metropolitan Government has applied the VBWF system in food waste treatment. For types of food waste that are heavier than regular waste, the Government has proposed that authorities apply a weight-based waste fee system instead of volume. Thanks to it. Food waste has been reduced by 10 to 30 %.

Thanks to the WBF system, the amount of food waste from each resident or household is measured, and the cost is calculated every month based on this weight. The bad smell from food waste has been reduced because food waste is now collected separately. The Korean government has also started building special facilities to treat food waste.

Since 1998, Seoul alone has opened five public food waste treatment plants and allowed private companies to help manage food waste. In 2005, the Korean government also made a rule that bans burying food waste directly in landfills.

To stop people from throwing away trash anywhere, some local authorities in South Korea installed reflectors and security cameras in risky areas. They also planted flowers and moved public trash bins to the city center. The local government told waste collectors not to take garbage bags that were of the wrong type.

After some time, when garbage stayed too long and started polluting the area, local residents were made responsible for watching and reporting illegal dumping. Because of these actions, rule violations became much fewer, and environmental pollution decreased. The Korean government also set fines for anyone who broke the rules.

In conclusion, in reality, although implementing the VBWF system is not easy, the South Korean government has shown strong determination and made continuous efforts to ensure its effectiveness. Currently, Vietnam is in a similar situation to South Korea about 30 years ago, when the waste landfill rate reached up to 96%. Therefore, Vietnam can learn from South Korea's experience in managing and improving waste treatment systems.

We should review Uzbekistan's waste management and its state, challenges and solution. Uzbekistan generates 10.2 million tons of waste annually, with plastic

accounting for 10.3% of this total. In 2022, the volume of plastic waste was 2.5 times higher than in 2013. The largest consumers of plastic are the packaging sector, the transport industry, and the construction sector, according to an inventory conducted by the Ministry of Ecology.

The Ministry of Ecology, Environmental Protection, and Climate Change of Uzbekistan, together with the Center for Sustainable Development, conducted an inventory of plastic waste across the country as part of the “Plastic Waste in Remote and Mountainous Areas” project, according to the ministry’s press service.

The project is being implemented with the support of the Secretariat of the Basel, Rotterdam, and Stockholm (BRS) Conventions — international agreements designed to protect the environment and human health from hazardous chemicals and waste.

Plastic is popular because it is durable and cheap, and it is used in many industries, including packaging, textiles, construction, and medicine. However, its long lifespan and resistance to decomposition have caused a growing environmental problem.

In Uzbekistan, plastic waste is becoming a bigger issue due to rapid economic growth, urbanization, and industries that heavily depend on plastic. Carrying out a plastic waste inventory is an important way to understand the current situation and plan waste management strategies. “The inventory helped us measure the amount of plastic entering the market, how it is used and recycled, and how much waste is generated. This process has become a key tool for analyzing the situation and creating long-term waste management plans,” said the Ministry of Ecology.

The reports shows that the use of plastic in Uzbekistan is growing rapidly. The packaging industry is the largest consumer, using 22.1% of all plastic in the market in 2022. The transport sector comes second with 24.9%, and the construction sector is third at 22.2%. Together, these three sectors use more than 69% of all plastic in the country. This is because plastic is used in many ways, from single-use packaging and transport parts to long-lasting construction materials.

As plastic use increases, plastic waste also grows. In 2022, Uzbekistan generated 249,200 tons of plastic waste — 147% more than in 2013. Packaging is the main source of this waste, contributing 192,100 tons, because packaging is usually thrown away immediately after use. In contrast, waste from the transport and construction sectors increases more slowly, since plastic products in these industries last longer.

Overall, Uzbekistan produces 10.2 million tons of municipal solid waste each year, and plastic waste makes up 10.3% of this total, or 1.05 million tons. Plastic production companies operate in almost every region of Uzbekistan, making products like plastic tableware and bags. The Ministry of Ecology noted that plastic items, especially polyethylene bags, are widely used by the population.

Uzbekistan also imports much more plastic than it exports. In 2023, the country imported 158,500 tons of plastic products worth \$487.5 million, while exports were only 47,300 tons worth \$90.1 million. Plastic imports in 2023 were 54.6% higher than in 2020.



According to the Ministry of Ecology, the plastic waste inventory revealed several major problems that make effective waste management difficult.

First, the country's recycling infrastructure is underdeveloped. There are too few recycling facilities, which limits the ability to process important plastics such as polyethylene, polypropylene, and polyethylene terephthalate (PET).

Second, the lack of a waste separation system makes it harder to use existing recycling facilities efficiently. Low environmental awareness among the population makes the problem worse, as many people do not know enough about the importance of sorting waste or the harmful effects of plastic pollution.

The ministry emphasized that improving infrastructure is essential for better plastic waste management. Increasing the number of recycling companies, especially those handling polyethylene, polypropylene, and PET, would reduce the amount of waste sent to landfills and make recycling more economically viable. The ministry said that creating a waste separation system would improve the quality of recyclable materials, reduce sorting costs, and speed up the recycling process.

They also emphasized the need for educational campaigns to raise environmental awareness. These could include information programs as well as practical initiatives, like waste sorting programs in schools and workplaces.

The ministry said that the legal framework also needs improvement. This could include:

- Setting mandatory quotas for plastic recycling and limiting single-use plastic products;
- Gradually banning the production and import of plastic items and packaging, especially those with harmful chemicals and dyes;
- Introducing extended responsibility systems for producers and importers;
- Encouraging manufacturers and importers to make eco-friendly alternatives, such as biodegradable, paper, knitted, or cotton products, instead of plastic goods and packaging.

The ministry added that creating favorable conditions for investors in the recycling sector will help develop the industry and adopt advanced technologies.

It is important to note that Uzbekistan is already taking steps to improve the situation. These include introducing waste separation, restricting the production and use of certain types of plastic, and expanding recycling capacities.

The results of the plastic waste inventory will be published on the official websites of the Basel, Rotterdam, and Stockholm Conventions.

Uzbekistan is set to construct eight waste-to-energy plants by 2027 as part of its efforts to enhance environmental sustainability. President Shavkat Mirziyoyev

reviewed the projects aimed at processing household waste into electricity and other products, highlighting the country’s growing focus on circular economy practices.



the Ministry of Ecology, Environmental Protection, and Climate Change, in collaboration with foreign investors, has developed several projects. These initiatives are expected to attract investments of nearly \$1.3 billion for the construction of eight waste-to-energy plants and the conversion of landfill gas at the Ohangaron landfill into electricity.

China’s CAMC Engineering is investing \$350 million to build two waste-to-energy plants in Andijan and Tashkent regions. These plants will process 4,000 tons of waste per day and generate 630 million kilowatt-hours (kWh) of electricity each year. Another Chinese company, Shanghai SUS Environment, plans to invest \$310 million to build two plants in Samarkand and Kashkadarya regions. These facilities will process 3,000 tons of waste daily and produce 480 million kWh of electricity per year.

The UAE’s Tadweer Group will invest \$200 million in a plant serving Bukhara and Navoi regions. This plant will handle 1,500 tons of waste daily, generating 363 million kWh of electricity annually. South Korea’s Sejin company is investing \$55 million to convert landfill gas into 16 megawatts of renewable electricity at the Ohangaron landfill.

Together, these projects will process 4.7 million tons of waste per year, produce 2.1 billion kWh of electricity, and save 152 million cubic meters of natural gas annually. They will also prevent 2.4 million tons of greenhouse gas emissions and create 1,200 new jobs.

The projects will be carried out across 11 regions of Uzbekistan between 2025 and 2027, including Andijan, Bukhara, Jizzakh, Kashkadarya, Navoi, Namangan, Samarkand, Syrdarya, Fergana, Tashkent regions, and Tashkent city.

President Mirziyoyev emphasized the social importance of these initiatives: “These are not just plants; they solve one of the vital issues for our survival. The sustainability of our land, water, public health, air quality, and energy security depends on this sector. Proper waste collection and recycling will improve the environmental balance and benefit society.”

To support these efforts, the new Waste Management and Circular Economy Development Agency will oversee waste collection, sorting, disposal, recycling,

incineration, and waste-to-energy projects, helping to stabilize Uzbekistan’s environment and promote a healthier life for citizens.

South Korea is one of the most developed countries in the world. Despite its achievements, it has faced challenges in waste management. Over the years, Korea has implemented various policies and advanced systems to tackle these challenges effectively. One of the most notable initiatives is the Volume-Based Waste Fee (VBWF) system, which charges households based on the amount of waste they produce. Residents use RFID cards to dispose of waste, and the system weighs the trash and automatically deducts fees. This system encourages proper waste disposal, reduces the volume of food waste, and ensures recyclables are sorted correctly.



The VBWF system also led to the development of specialized food waste treatment facilities. Since 1998, Seoul alone has built five public facilities and authorized private ones to process food waste, turning it into compost, animal feed, or renewable energy. Additionally, South Korea introduced Extended Producer Responsibility (EPR) programs, making manufacturers responsible for collecting and processing recyclable waste. To prevent illegal dumping and promote compliance, local governments installed cameras, reflectors, and flowers in sensitive areas, and imposed fines for violations. Over decades, these measures have significantly reduced environmental pollution and improved recycling efficiency.

In contrast, Uzbekistan is currently at an earlier stage of waste management development, similar to Korea about 30 years ago. The country generates around 10.2 million tons of municipal solid waste annually, of which plastic makes up 10.3% (1.05 million tons). The consumption of plastic has grown rapidly due to urbanization, economic growth, and industrial development. The main consumers of plastic are the packaging (22.1%), transport (24.9%), and construction (22.2%) sectors, together accounting for over 69% of all plastic used. Imported plastic products are also increasing, making the total waste management challenge more complex.

Uzbekistan faces systemic problems such as insufficient recycling infrastructure, lack of waste segregation, and low public awareness about recycling. To address these issues, the government conducted a nationwide inventory of plastic waste, which will help develop strategies for sorting, recycling, and reducing waste. Legislative measures are also planned, including quotas for recycling, restrictions on single-use plastics, bans on harmful plastic products, and extended producer responsibility systems. Public awareness campaigns and educational initiatives are planned to encourage proper waste sorting in schools, workplaces, and households.

Several international investments are helping Uzbekistan develop waste-to-energy and recycling infrastructure. Chinese, UAE, and South Korean companies are investing over \$900 million in multiple plants across 11 regions. These facilities will process 4.7 million tons of waste annually, generate 2.1 billion kWh of electricity, save 152 million cubic meters of natural gas, prevent 2.4 million tons of greenhouse gas emissions, and create 1,200 new jobs. The newly established Waste Management and Circular Economy Development Agency will oversee these projects and support sustainable waste management.

Comparison Summary:

- **System maturity:** Korea has decades of experience with advanced systems like VBWF and EPR; Uzbekistan is in the early stages of implementation.
- **Waste composition:** Both countries face plastic waste challenges, but Uzbekistan’s plastic consumption is rapidly increasing due to industrial growth.
- **Infrastructure:** Korea has specialized treatment and recycling facilities; Uzbekistan’s recycling capacity is limited, and waste segregation is still under development.
- **Policy and awareness:** Korea has strong policies, fines, and public awareness programs; Uzbekistan is planning new legislation and educational initiatives.
- **Investment and innovation:** Uzbekistan is attracting international investments to build modern waste-to-energy plants, similar to the infrastructure Korea developed over decades.

In conclusion, Uzbekistan can learn from South Korea’s experience by implementing comprehensive policies, promoting public awareness, expanding recycling facilities, and applying advanced technologies. With proper planning and investment, Uzbekistan can significantly improve its waste management system and reduce environmental pollution while generating energy from waste.

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KICHIK VA O‘RTA BIZNESNING INNOVATSION FAOLIYATINI RAG‘BATLANTIRISH MEXANIZMINI TAKOMILLASHTIRISH

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Annotatsiya. Ushbu tezisda kichik va o‘rta biznes subyektlarining innovatsion faoliyatini rivojlantirishga ta’sir etuvchi omillar tahlil qilinib, moliyaviy qo‘llab-quvvatlash, raqamli transformatsiya, ilm-fan bilan hamkorlik va innovatsion infratuzilmani kengaytirish orqali rag‘batlantirish mexanizmini takomillashtirish bo‘yicha takliflar ishlab chiqilgan. Taklif etilgan yondashuv kichik va o‘rta tadbirkorlikning innovatsion salohiyatini oshirish, texnologik yangilanishni jadallashtirish va iqtisodiy o‘sish uchun zarur sharoitlarni shakllantirishga qaratilgan.

Kalit so‘zlar: kichik biznes, o‘rta biznes, innovatsion rivojlanish, innovatsion faoliyat, raqamli transformatsiya, innovatsion infratuzilma, texnopark, texnologiya transferi, tadbirkorlik ekotizimi, moliyaviy rag‘batlantirish, startap loyihalar, ilmiy-tadqiqot hamkorligi, innovatsion salohiyat, biznes-inkubatsiya, akseleratorlar, raqobatbardoshlik, iqtisodiy modernizatsiya.

Kirish

Kichik va o‘rta biznes hozirgi davrda iqtisodiy taraqqiyotning muhim tarkibiy qismi bo‘lib, u nafaqat bandlikni ta’minlash, balki yangi bozorlar, yangi texnologiyalar va innovatsion mahsulotlar yaratilishida ham beqiyos o‘rin tutadi. Rivojlangan mamlakatlar tajribasida kichik va o‘rta biznes iqtisodiyotning innovatsion faolligini oshiruvchi asosiy mexanizm sifatida qoraladi. Chunki mazkur sektor moslashuvchanligi, tezkor qaror qabul qila olishi, yangi g‘oyalarni amaliyotga tatbiq etish imkoniyati va minimal xarajatlar bilan innovatsion tajribalar o‘tkazish qobiliyati bilan ajralib turadi.

O‘zbekiston iqtisodiyoti uchun ham kichik va o‘rta biznesning innovatsion salohiyatini rivojlantirish strategik ahamiyatga ega. So‘nggi yillarda mazkur yo‘nalishda keng ko‘lamli islohotlar olib borilmoqda: soliq va kredit yukini kamaytirish, davlat xizmatlarini raqamlashtirish, startap ekotizimni rivojlantirish, texnoparklar va innovatsion markazlar tarmog‘ini kengaytirish, ilmiy ishlanmalarni tijoratlashtirishni qo‘llab-quvvatlash kabi tashabbuslar yo‘lga qo‘yildi. Shu bilan birga, kichik va o‘rta biznesning innovatsion faoliyatini rag‘batlantirishda bir qator tizimli muammolar hali ham mavjud.