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# Call for Papers Winter Issues Journal of Environmental Management and Tourism

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## The Solid Waste Management System and Its Impact on the Sustainable Development of the Resort Area. A Case from Kazakhstan

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### Abstract:

The article examines the current management system for heavy household waste (MSW) in resort areas in Kazakhstan. The work carried out an assessment of the municipal solid waste management infrastructure, which used the data of experts in the field of sustainable development in terms of environmental impact. The analysis of the prerequisites for the creation of a solid waste management system in the Shortandy-Burabay and Bayanaul resort zones has been carried out. Analysis of the dynamics of production and consumption waste generation shows a sharp tendency for their increase in recent years in the areas of resort areas. This is mainly due to the improvement in the general economic situation. The sanitary situation in resort areas is significantly complicated by environmental pollution by waste from settlements, recreational complexes, industrial and agricultural enterprises. Waste from production and consumption is stored in certain places, the organization and content of which in most cases does not meet regulatory requirements. The article proposes an integrated solid waste management system. The introduction of an integrated management system will reduce the volume of waste disposal, as well as bring economic and social effects in the considered resort areas.

**Keywords:** sustainable development; economics; municipal solid waste; resort area; environmental protection; ecological safety.

**JEL Classification:** O13; O18; R11; I31; E24.

### Introduction

The population in Kazakhstan is constantly growing, resource consumption is also steadily increasing and more waste is entering the environment than ever before. And the consumption of renewable and non-renewable resources is accompanied by an increase in the amount of waste. At present, the following methods of collection, processing and disposal of solid waste are used in world practice: separate collection; disposal of waste at landfills; natural methods of decomposition; thermal processing. There are relatively few publications that use complex methods to solve problems related to the management of environmental protection and, as a result, to improve the economic and social characteristics of territories.

The article provides an overview of the development of resort areas most visited by both domestic and foreign tourists, which have the potential for growth. Shortandy-Burabay and Bayanaul resort zones can be assessed as steadily developing. At the same time, due to the massive visits by tourists to these resort areas, there is an increased load on the local environment and infrastructure. The regional natural environment, under the influence of heavy household waste and other waste, is negatively affected, therefore, constant monitoring and regulation is necessary.



After analyzing the management of solid waste in Kazakhstan and the indicators of the solid waste management system, recommendations are proposed for improving the solid waste management system adapted to the conditions of the considered resort areas.

## 1. Literature Review

The tourism industry is currently one of the fastest growing industries in the world, having grown by almost 40% since 1960. As the industry is growing rapidly, it has received a lot of research attention given its impact on the depletion of the natural resources of host countries to meet the needs of tourists (Goodwin 2002; Bello *et al.* 2017; Buckley 2018; Canteiro *et al.* 2018). Thus, there is a need to develop, based on research, new approaches that combine ecotourism and sustainable development through the introduction and implementation of a zero waste strategy (De Bercegol *et al.* 2017; Eriksson *et al.* 2005). At the global level, the impact of tourism on the environment includes the loss of biodiversity, ozone depletion and climate change, these issues are studied by the authors to formulate sustainable development policies.

The phenomenon of sustainable tourism has developed due to the rapid growth of mass tourism and the negative impacts associated with the tourism industry. The importance of developing sustainable tourism was first discussed at the World Summit on Sustainable Development in Rio de Janeiro in 2002. As tourism is mainly associated with natural areas, it poses a serious threat to biodiversity and natural resource deposits around the world. The tourism industry is highly dependent on the environment, which receives the least attention from responsible stakeholders, including community members, government officials and visiting tourists.

The impact of municipal solid waste, which is considered one of the most important types of waste due to its characteristics and impact on the territory, is considered in scientific studies (Fiorentino *et al.* 2015; Ghisellini *et al.* 2016). According to scientists, the level of solid waste generation is expected to double by 2025. Regions with higher incomes, industrialization and urbanization generate more solid waste (Rahmasary *et al.* 2019; Agovino *et al.* 2018). MSW management is challenging due to its heterogeneous nature. This problem is increasing in rural and developing countries due to two factors: the low socio-economic level of the majority of the population and a lack of awareness, as well as the lack of a technological platform required for solid waste management (Bespalyy 2021; Bespalyy *et al.* 2021).

The goal of sustainable development is to bring closer 100% recycling of non-hazardous MSW using non-renewable resources, eliminating the problems caused by MSW and reducing the cost of MSW management and introducing the concept from cradle to cradle, this is the subject of research by many authors (Wilts *et al.* 2016; Shelomentseva *et al.* 2017).

## 2. Methodology

The research is based on the theory and applied practices of sustainable development of resort areas and tourism in general as one of the largest industries, which requires effective strategies for managing waste that affect the state of the environment. Comparative analysis and systematic analysis are used to analyze the sustainable development of resort areas. Along with general scientific methods, forecasting and planning methods are used.

In the course of the study, an assessment was made of the impact of the heavy domestic waste management system in the Shortandy-Burabay and Bayanaul resort areas. To assess the actions and forms of tourism development, the international experience in the study of ecotourism, sustainable tourism, sustainable development of territories falling under resort zones has been investigated.

Statistical data were used, such as the number of populations, general information about the surveyed resort areas, the annual number of tourists visiting the surveyed areas, information on the amount of household waste, and others. For a qualitative assessment, the existing solid waste management infrastructure was assessed. Methods of deduction, comparison, measurement and observation were used. A review of the main indicators of the MSW management system in the resort areas was carried out by choosing various categories that revealed weaknesses in waste management and indicated those areas that need to be carried out systematically and scrupulously. Recommendations for the implementation of an integrated solid waste management system in the surveyed resort areas will reduce the level of solid waste generation and develop tourism and related infrastructure.

In the context of urbanization, there is a complex problem of neutralization and disposal of solid household waste. This process is influenced by the following criteria:

- due to the improvement in the quality of life, the volume of waste increases;
- there are more and more harmful components in this waste, and they are diverse.

According to the laws in different countries, the disposal of waste in settlements is prohibited, but practice shows that the laws are violated and waste is destroyed by burning it in yards, on the streets, burying it in the soil, while not using any protective devices, and this leads to atmospheric pollution air and soil.

The practice of burying waste in the ground based on the mineralizing capacity of the soil has been preserved until now. It is impossible to solve the problem in this way. As a result, a catastrophic picture is observed, which forces us to look for ways and methods of waste disposal, their neutralization during burial, while adhering to environmental requirements and standards. It is becoming important to carry out waste accounting, develop and apply methods for utilization and destruction of waste, use economic motivators, and bring environmental standards.

The study of the experience of countries with legislation on waste shows that they deal with the issues of disposal and disposal of waste better than in countries without such laws. So, for the destruction of landfills in developed countries, there is sorting and processing into various types of fertilizers, the production of secondary raw materials.

Up to 6 million tons of waste is accumulated annually in Kazakhstan. The vast majority are disposed of in landfills. There are about 4 thousand of them in different regions of the country. In Kazakhstan, no more than 10% of solid waste is processed. The rest of the garbage is taken to landfills, where about 100 million tons have already accumulated. In Kazakhstan today there are only 130 enterprises that sort and process waste. The construction of one waste processing plant will cost from \$ 30 to 40 million, and, often, it is impossible to do without government subsidies.

The current situation in the field of waste management in Kazakhstan is characterized by the following problems: the legacy of historical industrial and domestic waste. Over the previous decades, significant historical volumes of waste from heavy industry, agro-industrial complex, mining and solid domestic waste have been accumulated.

In fact, Kazakhstan needs to rebuild an integrated waste management system, as there is essentially no organizational and legal framework. There are not enough norms for sound waste management, and responsibility for the construction and operation of an integrated system is not assigned. There is a lack of funds to ensure stable financing for the development and operation of infrastructure.

Key problems of the municipal waste management system:

- only in large cities, and not in all, the population can receive services for the collection and removal of garbage;
- in rural areas, most of the landfills for the disposal of household waste are completely absent, as well as services for their removal and disposal, often household waste is simply burned in households;
- in view of the absence of authorized places for receiving household waste, there is an increase in unauthorized landfills, without systemic waste disposal sites, where there is no selection and sorting of waste;
- the absence or insufficient number of container sites leads to the creation of an unsanitary environment.
- in general, in Kazakhstan, the share of sorting and recycling of waste is extremely small, and at the same time there is no capacity for generating "green" energy.

One of the difficulties that hinder the development of the direction is the lack of economic opportunities for enterprises in this industry. In the OECD countries in the field of waste, the main part of financial resources is generated from tariffs from the population for the collection, removal, processing and disposal of waste or from legal entities for processing and disposal of waste. In Kazakhstan, the main source of compensation for the costs of removal and disposal of solid waste is also payments from the population, but it is quite obvious that the existing tariffs for neutralizing household waste are inadequately low, and they are not even able to cover the costs of waste disposal and disposal. The lack of funds for recycling is compensated by subsidies from the state budget, but all the same, the housing and communal services do not have financial resources for the development of a separate collection system, such as has long been used in Europe. The tariff for the management of solid waste is not differentiated - it does not matter at all whether you collect waste separately or simply dump everything into one common container - you have to pay for waste disposal in the same way.

It is believed that the tariffs in Kazakhstan are very small, but it is impossible to raise them for the population. According to Operator ROP LLP (extended obligations of producers), legal entities are playing a tender to reduce the price for the transfer of waste for further utilization, processing, burial. These actions are not effective, all of the above operations have a threshold of economic feasibility. All these factors contribute to the low profitability in the processing industry.

It turns out that enterprises are not interested in processing. In addition, there are such problems as low technological development, distance factor, low qualification of personnel. Finding a specialist, for example a technologist, in the field of waste is quite difficult or impossible. If we talk about "separate collection", then there is a low interest on the part of the population. But according to experts, this situation is fixable. When training and creating conditions for the population, the interest on the part of citizens will increase.

An important role in the successful implementation of separate collection of solid waste is played by the environmental awareness and culture of the population. Despite the measures taken to install containers and conduct explanatory and other informational work, today, with a high level of production and consumption, the ecological culture of the population, the culture of respect for the environment remains at a low level.

Another problem that exists in Kazakhstan's solid waste management system is a rather limited market for secondary raw materials - many waste processors face problems in the sale of raw materials that were obtained from waste. To increase this market in developed foreign countries, various mechanisms of influence are used today - the requirements for the mandatory use of recyclable materials when releasing new goods (in percent) and preferential lending to such industries. Also, in the European public procurement system, benefits are provided for such enterprises and organizations that produce or supply goods and products that are made from secondary raw materials or using recyclable materials.

Shortandy-Burabay resort area (ShBKZ). The resort area is located in the Burabay district of the Akmola region. According to the administrative-territorial division, the district is divided into 10 rural districts, the city of Shchuchinsk and the village of Burabay. On the territory of the district there is 1 settlement, 1 city of regional significance, classified as small towns, 50 rural settlements. Taking into account the sectoral specialization of the Burabay region, a high level of development of agriculture and tourism business is characteristic. A positive trend is the growth in the level of development of the manufacturing industry, which was facilitated by the implementation of large investment projects focused on gold mining, the creation of enterprises for processing agricultural products. Explored reserves of gold, ore occurrences of iron, copper, nickel, asbestos, refractory raw materials and various building materials, mineral waters and mud are concentrated in the Burabay region.

The presence of a unique natural complex - the Shortandy-Burabay resort zone located on the territory of the state national natural park (SNNP) "Burabay" creates conditions for the formation of a world-class tourist complex, which will have a positive effect on the increase in the number of tourists and tourists, allowing the region to become one of the leaders in tourism. business in Kazakhstan. State National Natural Park "Burabay" is located in the Burabay region of the Akmola region of Kazakhstan. Within the protected areas of the national park, any economic activity, recreational use is prohibited, and a regime is in place that corresponds to the regime of reserves.

The largest settlement in the Shortandy-Burabay resort zone is the village of Burabay - a climatic-kumyso medical resort. On the territory of the resort area there are mud clinics, sanatoriums and other health-improving facilities. The resort is open all year round. The main diseases that are treated at the resort are tuberculosis, including in the open form, as well as respiratory diseases. About six thousand people work and live in the resort area itself. The resort is located on a hill, at an altitude of about 500 meters, in a pine forest, between lakes Burabay and Bolshoye Chebachye.

There are 14 large lakes in the Burabay National Park, including Burabay, Shchuchye, Katarkol, as well as many small lakes. Mount Kokshetau (Sinyukha) with a height of 947 meters is called Borovoy's visiting card. About 300 species of vertebrates live in Burabay, and eight hundred species of various plants grow.

Ecological situation of ShBKZ. Every year Borovsk lakes grow shallower and are covered with silt. This process began to be considered already irreversible and almost natural. The resort lakes, which people go to for treatment, are polluted today. So, according to the register of environmental problems of the Akmola region, 9 local environmental problems are identified, including 5 regarding the Burabay region:

- deterioration of systems of wastewater disposal facilities in settlements;
- the need to build a wastewater treatment system for the Shortanda-Burabay resort zone (ShBKZ);
- deterioration of sewerage systems in settlements and health resorts located on the shores of lakes and rivers ShBKZ;
- protection and rational use of water bodies.

Utilization of solid waste remains an urgent problem of the ecology of the district. To date, only 1 solid waste landfill has been registered in Shchuchinsk. The need to close and recultivate solid waste landfills and dumps on the lands of the Burabay village, Katarkol, Abylaikhansky rural, Atameken aul districts, only 80 hectares, located in the buffer zone of the State Scientific and Production Enterprise "Burabai" and, accordingly, the construction of new landfills in these territories.



Bayanaul resort area. Bayanaul resort area is located in Bayanaul district of Pavlodar region. The territory of the region is 1805 thousand hectares. The area is located in the Pavlodar region. The population of the district is 26.7 thousand people, 100% of the rural population. The regional center - with. Bayanaul. There are 38 villages, 1 settlement, 13 rural districts in the region. The region accounts for 96% of lignite mining, 5.2% of gold, 3.7% of copper in Kazakhstan are concentrated here. Bayanaul region is a livestock and industrial region. Specially protected natural areas is 68.4 thousand hectares. The resort area is about 450 km<sup>2</sup>. The kuroptny zone includes the territory of the Bayanaul State Natural Park (BGNPP), the villages of Bayanaul, Shonai, Toraigyr, Karazhar and 4 lakes (Sabyndykol, Zhasybai, Toraigyr and Birzhankol).

At present, tourism, as a branch of the economy, on the territory of the Bayanaul region does not have significant advantages, thanks to which it could be distinguished against the background of other regions. The existing tourist infrastructure does not fully allow using the natural and tourist potential in Bayanaul in order to develop the tourist market. The scale of outbound tourism is small. There are resources in the resort area, but there is no modern infrastructure and experience for the development of a tourist and recreational complex.

35 objects have been created in the state national park: a tourist base, two rest houses and children's health resorts, in which more than 100 thousand Kazakhstanis rest annually. The Barnaul Mountains stretch from west to east for 40-50 km. The mountain-forest oasis covers an area of 450 km<sup>2</sup>, attracting tourists with quaint rocks, beautiful lakes Sabyndykol (area 7.4 km<sup>2</sup>), Zhasybay (area 4 km<sup>2</sup>), caves (Auzshetas, 22 m long), and grottoes (Draverta - with rock paintings; A jug - with a waterfall 3 m high), sheer narrow gorges.

The current state and use of the resources of the Bayanaul resort zone does not develop the territory and economy of the region. The limiting factors for this are the lack of a sustainable development strategy for the resort area and the corresponding infrastructure, including:

- undeveloped infrastructure (objects and events of the Soviet type) and engineering and transport infrastructure;
- lack of effective management of territories;
- "price-quality" ratio, in the market there are inadequately overpriced prices for recreation services, which are not provided with a sufficient level of service;
- lack of a range of various tourist products corresponding to the season;
- there is no concept and strategy for the comprehensive year-round use of territories;
- negative image of the tourist service;
- lack of a legislative framework at the state and local levels;
- organizational and financial mechanisms have not been developed to increase the attractiveness of the resort area for potential investors, tourist flows.

These provisions necessitate a set of measures in the following areas:

- attracting investments in the development of tourist infrastructure facilities, which would make it possible to bring the quality of provided tourist services to a higher level;
- advanced training of personnel employed in tourism;
- improving the proposed and developing new regional tourism products;
- promotion of tourist services in the Bayanaul resort area.

The morphological composition and volume of consumption waste generation will contribute to the introduction of separate collection, sorting and processing of consumption waste throughout the resort area.

Assessment of the infrastructure of solid waste in resort areas. Despite the fact that the village of Bayanaul and the village of Burabay are regional centers, the issues of waste management have not been resolved there, therefore, there is no full-fledged infrastructure for solid waste management on the territory of the regional centers. So, in the village. From the infrastructure of Bayanaul, there is only an unsettled landfill and containers are installed near 2-storey residential buildings. On the territory of the village of Bayanaul and the entire Bayanaul district, there is neither infrastructure for waste management, nor a waste management system: sources are not identified and no records are kept of places of waste generation, there is no centralized collection and removal of solid waste from the entire territory of the village, separate collection and sorting of waste is not organized and disposal of waste and tailings after sorting.

Due to the fact that today the accounting and control of the sources and volumes of solid waste is not carried out, respectively, the rate of waste accumulation has not been determined. In with. Bayanaul MSW removal is carried out by self-collection to the existing solid waste dump located 600 m from the complex of sewage treatment facilities. The landfill is not guarded, accounting and control of incoming waste is not carried out. Consequently, the tariff for collection, removal and disposal was not determined. A similar situation is observed in other settlements of the Bayanaul resort zone. Now in the Bayanaul resort area, as well as in the

Bayanaul district as a whole, there is no sufficiently complete, reliable and objective information on waste management.

There is no information about the conditions for collection, removal, storage, disposal of solid waste and waste equated to them from the population and infrastructure facilities. There is also no statistical reporting, so the total volume and mass of generated, removed and stored waste cannot be determined. There is no systematic integrated approach to waste management in the technological, economic, financial part, including the legal mechanism of interaction and responsibility of all participants in this field of activity.

As the well-being of the population and, accordingly, of visitors to resort areas grows, the amount of waste generated will increase, so it is necessary to organize accounting, control over the generation and movement of waste, substantiate the quantitative and qualitative characteristics of the necessary specialized equipment, equipment, including containers for separate collection. In addition, in parallel, it is necessary to prepare an action plan for training the population and specialists who will be employed in the waste management system. Today, there are no specific methodological developments and legislative norms for the development of a modern waste management system in the resort areas, and in the Bayanaul region in general.

Now, when the issue of deep processing of solid waste is sharply raised, and the waste itself becomes a raw material, and, accordingly, has and changes its owners, it is necessary to talk about the formation of a full-fledged branch of the economy - "Waste management", supported by a well-thought-out legislative framework.

It is necessary to develop rules for handling consumer waste, including a territorial scheme for handling them, and approve them as a normative act of "local" significance. However, the legislation of Kazakhstan is limited to the development of "Model rules for the maintenance and protection of green spaces, the rules for the improvement of the territories of cities and towns", which are approved by the governing body of the regional administration. The section "Waste management" in the rules is formal and does not address the issues of solid waste management, including the need for their separate collection.

Review of the main indicators of the MSW management system in the resort areas.

SHBKZ. The main sources of solid waste in the resort area are the permanent and temporary population of ShBKZ, including the city of Shchuchinsk with a population of 46,500 people, visiting tourists living in the territory of 83 objects, where up to 40 thousand people / year have a rest. As well as the population and enterprises of large, medium and small businesses in the city of Shchuchinsk. As well as the population and enterprises of large, medium and small businesses in Shchuchinsk.

Today, in the territory of Akmola region, there are 4 enterprises that carry out separate collection and processing of solid household waste. The following enterprises collect, sort, process and dispose of solid waste directly on the territory of ShchBKZ: EcoService Burabay LLP, Arka Communal Center LLP, Eco Prom Burabay LLP, Eco Lime KZ LLP, Eco Group LLP, GKP at the PVC "Tazalyk service". Akimat agitates the population for the separate collection of solid waste (meetings, brochures, leaflets, videos, lectures in educational institutions, actions, etc.). Recycling points were opened in Kokshetau and Shchuchinsk. Special containers for waste collection have been installed (Kokshetau, Stepnogorsk, Burabaysky district, Tselinograd district). At present, in Shchuchinsk, Eco Prom Burabay LLP, a municipal waste sorting line with a capacity of 30 thousand tons / year has been opened and is operating.

In the security zone of the State Scientific and Production Enterprise "Burabay", which is part of the ShBKZ, 28 unauthorized dumps were found, the area of which is 62 hectares, with a volume of solid waste 115,000 m<sup>3</sup>. The structure of household waste is heterogeneous, there is construction waste in landfills, the structure of solid waste mainly consists of plastic, polyethylene, glass.

The tariff for the removal of solid waste for the local population is 185 tenge per person. The potential collection of funds from the local population in Shchuchinsk alone is 8602.5 tenge per month, the annual amount for services to the local population is 103230.0 tenge. Burial and utilization rate is 300 tenge m<sup>3</sup>. Only for the solid waste landfill in Shchuchinsk for the services of burial and utilization of solid waste, the receipt of funds is 6,600,000 tenge / year.

An acute problem today in the State Scientific and Production Enterprise "Burabay" is the formation of spontaneous dumps. Despite the annual three-month sanitation work in Akmola region, unaccounted spontaneous unauthorized dumps are constantly and everywhere being formed again near settlements, due to weak control by local executive bodies and the lack of the necessary infrastructure for collection, sorting, transportation, and disposal of municipal waste at landfills.

Considering the fact that, in general, there is no solid waste management system in Burabay district, there is no solid waste landfill, waste collection and disposal is not organized in settlements, the occurrence of unauthorized dumps should be considered a forced measure. At the same time, local executive bodies had to

take measures to reduce the negative impact of the dumps in question on the environment. In particular, it was at least necessary to fence off these landfills in order to limit the area occupied by the landfill. There are 28 unauthorized landfills in the park's protective zone, the volume of garbage is more than 100,000 m<sup>3</sup>. There are no solid waste landfills in Burabay region that meet sanitary and environmental standards and requirements. The technology of separate collection is not fully implemented and there is no plant for the disposal of solid waste.

BKZ. The sources of waste generation at the BKZ are: the local population, enterprises and organizations (55 state institutions and organizations, including the BGNPP, 7 public funds and associations, 55 limited liability partnerships that produce products and provide services), vacationers at the tourist facilities of the BKZ.

On the territory of the BKZ, there is no register of sources and accounting of generated consumption waste, and, therefore, the volumes of their formation and morphological composition are not clear. The accounting and control of solid waste and other consumption waste entering the landfill is also not carried out. For the development, creation and further operation of a waste management system on the territory of the BKZ and planning of measures for their management, it is necessary to develop a computational model of the volume of their generation and accumulation, or the so-called model for predicting the amount of waste generated. The Waste Forecast Model is a tool that can be used to estimate different scenarios for future waste generation depending on economic and demographic parameters. The model should be updated periodically to obtain more accurate results, since it depends on changes in parameters (for example, growth or decline in the population, increase / decrease in the purchasing power of the population, an increase in the temporary (seasonal) population, etc.).

Container sites on the territory of settlements included in the Bayanaul resort zone are not organized. There is no register of container sites. Only on the territory of recreation areas and tourism facilities under the jurisdiction of the Bayanaul State Scientific Research Enterprise container sites have been organized and separate containers with a capacity of 0.75 m<sup>3</sup> have been installed.

There are 36 rest houses on the territory of the Zhasybai tourist zone, of which Kristall, Berezka and Karlygash are major sources of solid waste. There are no specialized enterprises in settlements for the collection and removal of solid waste.

It is impossible to control the place of waste dumping at the present time. There are no local regulations on the regulation and control of collection and storage sites for exported waste. There is no separate collection of consumer waste.

The object of disposal of consumption waste is an authorized landfill in the village. Bayanaul. There is no landfill that meets all environmental and sanitary standards and requirements on the territory of the Bayanaul district and the BKZ. Due to the absence on the territory of the Bayanaul district, including the BKZ, accounting for the collection and removal of solid waste both during their collection and placement at an organized landfill, as well as the absence of specialized enterprises that carry out the export of solid waste to waste disposal facilities, information on the volume of collected and transported waste to the landfill not available. And the absence of design, legal documents does not allow taking into account the exact volumes of solid waste, which not only harms the environment, but also leads to budget losses.

The BKZ does not have specialized enterprises for the collection and removal of solid waste, the annual rates of waste accumulation per person have not been determined and calculated, and therefore the tariff for the removal of solid waste for the local population has not been determined. There are 38 rural settlements in Bayanaul district, where 33 land plots are located for permanent use as landfills. The total volume of landfills is 124.3 hectares.

On the territory of the village of Bayanaul, a dump with an area of 22.5 hectares. The existing landfill in the village of Bayanaul, designed as a landfill, is sufficient in area, but does not fully comply with the environmental legislation of Kazakhstan in terms of requirements for a sanitary landfill and its operation. In the villages of Toraigyr and Karazhar, MSW is removed by the population and legal entities by self-collection, and municipal facilities are serviced by a local organization of housing and communal services. Containers are installed in the Bayanaul SNPP in places where tourists visit.

Problems of operating landfills on the territory of resort areas. Let's consider the problems during the operation of landfills on the territory of resort areas:

- the waste is not compacted, not covered, there is no wind protection;
- without proper covering and isolation of the landfill, water can easily reach the landfill body, causing more hazardous chemical components to be washed into groundwater, which can seriously affect the quality of groundwater (lack of a leachate management system, leads to soil, ground and surface water pollution);
- ignition of waste, as a result of which harmful emissions affect the health of landfill workers and cause

hazardous air pollution;

- there are no facilities for cleaning the wheels of garbage trucks to prevent the possible removal of infections from the landfill;
- the working conditions of employees do not correspond to qualified labor safety standards. There is no clean water or sanitation systems for use in the workplace.
- the faulty condition of access roads leads to regular technical malfunctions and vehicle breakdowns.

Creation of a consumption waste management system. Recommendations and alternatives for the development of a waste disposal system on the territory of resort areas. To solve the key problems identified in this segment, we offer the following recommendations:

- To develop a regional consumption waste management system (DCMS) for the territory of resort zones and the zone of their influence - existing settlements.
- When developing the DCMS, take into account the introduction of separate collection of consumption waste both for the population and for legal entities. When developing a DCMS in order to optimize capital costs for the construction and operation of waste disposal facilities (sanitary landfills for solid waste), take into account an integrated approach to waste management, including not only sorting and further processing, but also determining the technical and economic indicators of the landfill.
- Fulfill the requirements of the legislation of Kazakhstan on waste disposal facilities, including:
  - elimination of the landfill in Shchuchinsk;
  - closure and reclamation of the existing landfill for solid waste in the village. Bayanaul;
  - creation of a green fence to protect the adjacent lands from debris carried by the wind from waste

landfills;

- covering the landfill with a soil layer of 40 cm and a layer of technical humus of 20 cm;
- installation of a rainwater drainage system (canals);
- installation of an environmental monitoring system, including well monitoring, sampling;
- phased closure and reclamation of the existing landfill prior to the opening of a new landfill;
- as an alternative, it is proposed to process the current landfill (landfill) in Shchuchinsk and all unauthorized landfills in the area into an alternative source of RDF fuel, to obtain useful fractions of secondary raw materials and to reclaim the old landfill (landfill), receiving technical humus (compost);
- at the landfill with. Bayanaul to conduct a survey and determine the morphological composition of the accumulated waste in order to further substantiate the economic and environmental feasibility of their processing or disposal, including the choice of the optimal processing technology.

The successful implementation of the technological scheme for waste management on the territory of resort areas depends on the organization of an effective regional system of integrated waste management. The modern approach to waste management should be based on a model of a system for managing waste streams and treatment regimes, integrated into the regional industrial sector and the country's economy. Taking into account the current state of solid waste management in Burabay and Bayanaul districts, for the development of the territory of resort zones, it is necessary to develop a number of measures to improve the life of the population and sustainable development of tourism, to create a waste management system in the territories of resort zones, including a feasibility study for its creation.

The absence of such a System is a deterrent, a technical barrier to the development of an effective infrastructure for the management of consumer waste in the resort area.

In order to improve the living standards of the population, service guests and environmental safety on the territory of resort areas, when developing a Waste Management System, it is necessary:

1. Develop a regulatory framework in terms of informing and involving the population and vacationers in solving waste management problems, including:
  - development of subprograms aimed at improving the culture of waste management;
  - development of normative legal acts aimed at regulation and control of the area of waste management;
2. Conduct seminars / trainings to improve the level of professional training in the field of waste management for:
  - specialists of local self-government bodies whose work is in one way or another related to waste management;
  - employees of enterprises providing services in the field of waste management, including employees of the housing and communal sector, at all levels;
  - specialists of environmental services.
3. Personnel and managers of enterprises involved in waste management should receive the appropriate



training necessary to meet the challenges of environmental safety, technical efficiency and economic viability of enterprises. Prepare and distribute information materials on waste management issues in the resort areas. Develop and implement environmental educational programs and implement them both in educational and preschool institutions. To develop a concept and a strategy for advocacy among the population for the period up to 2030 according to the rules for separate collection, disposal of household waste from households (animal husbandry, crop production, poultry farming) and hazardous waste.

4. Develop a territorial scheme for the management of consumer waste in the resort areas, on the basis of which to determine the required amount of specialized machinery and equipment. Introduce a centralized waste collection system that covers all sources of waste generation. To create on the territory of resort areas specialized enterprises for the collection and removal of consumption waste, create capacities for sorting waste as secondary raw materials (plastic, waste paper, glass, aluminum cans). Solve the issue of arranging sites for temporary waste accumulation and regulatory and technical documentation. Separate waste from infrastructure and economic entities with high resource potential into a separate stream.

5. To organize the reception of secondary raw materials from the population and organizations at stationary and mobile receiving and procurement points. To develop technologies for processing secondary raw materials. After determining the volume of generated organic waste in the resort areas, introduce their processing, taking into account environmental and economic efficiency.

6. Ensure accounting and control over waste management on the territory of resort areas, determination of waste generation rates and calculation of tariffs for collection and removal of consumption waste with centralized collection.

7. To equip container sites in accordance with the requirements of the legislation of Kazakhstan and with the specifics of resort areas. Determine their legal affiliation. Create a registry. On container sites and directly at the facilities, install Eurocontainers with lids of different volumes and with the appropriate color, as well as closed mesh containers. On the territory of resort areas, a national park, on beaches and in places where tourists gather, install large street bins for collecting associated waste and work out a collection and removal system.

8. On the territory of resort areas, a national park, on beaches and in places where tourists gather, install mobile dry closets and work out a cleaning and disinfection system. To develop a typical integrated and environmentally friendly sanitary waste landfill specifically for resort areas that meets the requirements of legislation and special regulatory and technical documentation. To install on the territory of the proposed sanitary waste landfill furnaces for environmentally friendly incineration of both small and large animal carcasses.

9. Carry out processing and reclamation of the existing landfill on the territory of Shchuchinsk and with. Bayanaul. Eliminate old and prevent the formation of new unauthorized landfills in the resort areas. Consider the possibility and necessity of using a waste transfer station.

10. Decide on a method and place for processing BRO into a more efficient product (eg compost).

11. Organize separate collection of waste from the population, tourists, enterprises and organizations with the provision of a container system for the used fraction (also called "dry" waste, a mixture of secondary raw materials) and mixed waste (also called "wet" waste, MSW). Organize the collection of hazardous solid waste in special containers and determine the procedure and responsible persons, both for their condition and for organizing the removal. Consider installing PET containers and aluminum cans in stores in resort areas for a set fee.

12. Develop measures to create new jobs both for the provision of services in the tourism industry and for the development of the "Waste" industry (including the attraction of labor to work with waste). Akimats, administrations of SNPP and garbage collection companies to develop a joint action plan for organizing and introducing separate collection of solid waste in settlements and recreation areas, for carrying out educational information work both with the population and with tenants of recreation areas located on the territory of SNPP, visitors to resort zones on separate collection of solid waste. Akimats of the district, city, village to pay attention to the condition of roads and access roads to container sites. Include in the regulation on the improvement of resort areas the requirements for the compulsory organization of separate collection of solid waste and the collection of hazardous waste both for legal entities, individuals and for holidaymakers. Akimats of the district to strengthen the work of the environmental police with waste owners regarding their responsibility for meeting the requirements for separate collection and sorting of solid waste. Consider the issue of imposing fines on officials of individual entrepreneurs and legal entities of resort zones in connection with violation of the rules for handling municipal waste in case of non-compliance with separate collection.

Economic and social efficiency. The economic effect of creating a Waste Management System may be as follows:



- providing residents of resort areas with services for solid waste;
- development of infrastructure for the development of production from recycled materials, and as a result, a reduction in the volume of solid waste at the landfill;
- tax inflow to the local and republican budgets, from waste processing enterprises, as well as the development of small and medium-sized businesses for the recycling of solid waste;
- the introduction and use of technologies that allow the transformation of MSW into primary processing items, thereby saving resources.
- release of land occupied by landfills for agriculture, construction and recreational purposes;
- rendering assistance to the preservation and reproduction of soil fertility, through the implementation of organic fertilizers in agricultural formations, to introduce organic farming through the use of environmentally friendly organic fertilizers;
- generation of electricity and heat through the use of alternative sources;
- obtaining new products after processing waste, including biowaste. Small and medium-sized businesses to increase the volume of processing, launch new products.

The social effect is as follows:

- creation of new jobs and a decrease in the percentage of unemployment;
- cleanliness of the resort areas;
- decrease in morbidity;
- involvement of the population in the process of sorting and collecting plastic, tin products and other waste in order to popularize the policy of environmental protection;
- fostering respect for natural resources;
- ensuring the safety of workplaces in the sector.

## Conclusion

Analysis of the modern solid waste management system in Kazakhstan using the example of the considered resort areas shows that there are the following problems:

- the presence of historical household waste (significant historical volumes of solid waste have been accumulated over the previous decades);
- growth in the volume of solid waste, due to the development of tourism, service infrastructure and the growth of the welfare of the population;
- it is forecasted that the volume of solid waste will grow by more than 50% by 2030.

In Kazakhstan, a regulatory and legal framework has been created in the field of solid waste management. The "Environmental Code of the Republic of Kazakhstan" was adopted, in which the appropriate adjustments were made to the legal regulation of solid waste management systems.

On the territory of the Shortandy-Burabay and Bayanaul resort zones, the existing infrastructure for the management of solid waste is poorly developed or absent and does not meet modern requirements.

Today, the main source of compensation for the costs of removal and disposal of solid waste are payments from the population, and the tariffs are inadequately low, they are not even able to cover the costs of disposal and disposal. The lack of funds is compensated by subsidies from the state budget, but still, this is not enough for the development of a separate collection system for solid waste. Currently, organizations that are engaged in the utilization and processing of solid waste are unprofitable. Therefore, they do not have the funds to develop the latest waste management systems. In principle, the collection and processing of waste should be carried out by specialized enterprises capable of improving the current system of solid waste management.

In Kazakhstan, and in particular in the surveyed resort areas, private initiative with the disposal and processing of solid waste is limited. At the same time, international experience shows that private firms can create a more efficient system of solid waste management. There is no long-term planning in this area at the district level. To develop an effective solid waste management system in the Shortandy-Burabay and Bayanaul resort areas, it is necessary:

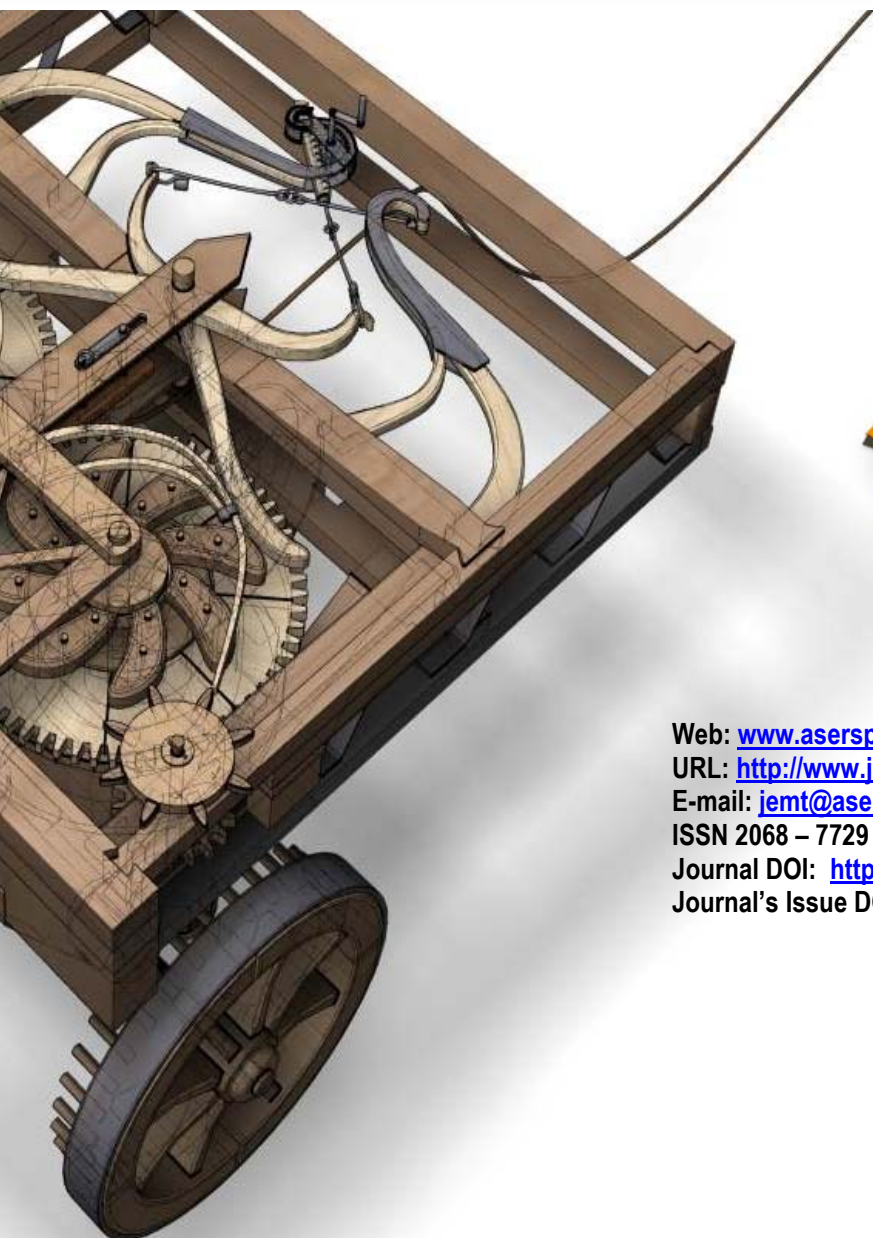
- creation of an agreed waste disposal system;
- reduction of landfills and the creation of processing industries, with the extraction of useful substances and materials, obtaining fuel or energy through waste disposal;
- reusable use of products within a circular economy;
- reduction of technogenic impact on the environment;
- conducting a thorough audit of all large solid waste dumps and determining measures for their reclamation in resort areas;

- revision of the standards for processing and storage of solid waste with the use of new technologies;
- creation of a regulatory legal framework to control the turnover of solid waste until 2030;
- improving the collection, processing and provision of statistical information to monitor the achievement of targets in the field of solid waste management.

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