



MUNICIPAL WASTE MANAGEMENT FINANCING OPPORTUNITIES

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Abstract

Developing countries face various obstacles in proper and sustainable waste management. Their authorities cannot manage waste properly because this process requires significant financial resources. Our analysis highlighted the problems of poverty and unstable finances, more precisely, the main reason waste management does not appropriate is the lack of budgets at the local or state level. The administrations need to allocate more funds for integrated sustainable waste management to achieve better results. This article describes different options for municipal waste management projects' financing based on the experience of several selected countries. Particularly it focuses on problems and challenges of the Republic of Moldova in municipal waste sector financing. In conclusion, we gave several recommendations for improving the waste sector financing policy. Also, we underlined that it is necessary to develop a methodology for calculating tariffs. At present, the local public administration has developed those tariffs based on old regulations, which are already outdated in time and do not reflect actual costs for adequate waste management.

Keywords: *external assistance, ecology fund, environmental protection, municipal waste management, public financing, private financing, public-private partnership.*

1 INTRODUCTION

For many years, cities have been the engines of economic growth. At the same time, this growth has brought the immense challenge of the increasing generation of a high volume of solid waste all over the world. As the world's population

grows and rapidly urbanizes, the amount of waste generated is projected to increase by 70% over the next 30 years, which means we could create as much as 3.4 billion tons of waste annually by 2050 (see Figure 1).

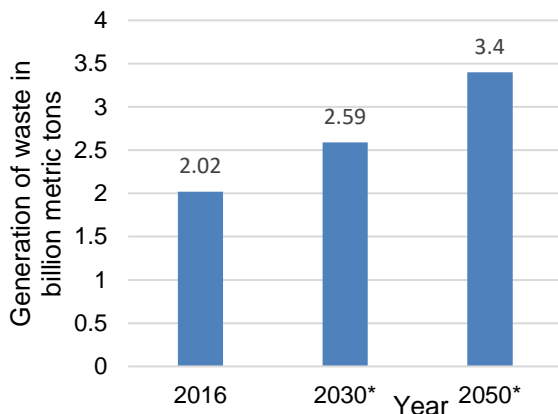
Generally, there is a positive correlation between waste generation and income level. Daily waste generation, per capita, in high-income countries is projected to increase by 19 percent by 2050, compared to low- and middle-income countries,

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where we can expect an increase of nearly 40% or more. The World Bank predicts that the total amount of waste generated in low-income countries will be increased more than three times by 2050. More than half of waste is currently openly dumped in those regions. The trajectories of waste growth will have vast implications for the environment, health, and prosperity, thus requiring urgent action (World Bank, 2016).



*Fig. 1. A generation of municipal solid waste worldwide from 2016 to 2050 (in billion metric tons, * predicted)
Source: (Eurostat, 2020)*

Waste management operations are typically a local responsibility in most countries. Almost 70 percent of countries have established institutions responsible for policy development and regulatory oversight in the waste sector. About two-thirds of countries created legislation and regulations for waste management. Direct involvement of the central government in the waste management services provision, other than regulatory oversight or fiscal transfers, is not common. Local public entities directly monitored approximately 70 percent of waste services. At least half of the services, from primary waste collection through treatment and disposal, are operated by public entities, and about one-third involve a public-private partnership (World Bank, 2016).

Developing countries face various obstacles in proper and sustainable waste management as the authorities cannot manage waste properly because the waste management process requires good financial resources. Thus, some of the significant problems are poverty and unstable finances.

2 THEORETICAL APPROACHES OF THE INVESTIGATED TOPIC IN SCIENTIFIC LITERATURE

One of the reasons why solid waste management is not adequate is the lack of budget at the municipal level. A proper waste management system requires qualified technical experts, good resources, adequate planning, and coordination with all stakeholders like those involved on the issues of roads, drainage, transportation. Detailed understandings of the stakeholders and their responsibilities are necessary to establish an efficient and effective system. Communication transfer between the different stakeholders to get a well-functioning waste management system in the cities in developing countries is highly important (Guerrero, A.A., Maas, G., & Hogland, W., 2013).

Also, waste management includes administrative, financial, planning, engineering, and legal functions, involving complex inter-disciplinary relations among sectors such as public health, political science, city and regional planning, communication and conservation, demography, engineering, etc. These things are possible only when good financial resources are available for municipalities. Less economically developed countries generally suffer from improper waste management. Also, in most cases, the private sector is not interested in engagement in solid waste management due to a low rate of return and lack of incentives.

One of the significant problems in developing countries is a lack of quality financial management and planning. Also, the annual budget allocation for the sector is weak. Another major problem is corruption. Also, the local tax system is usually undeveloped. Thus, the tremendous expenditure needed to provide the service (Sharholy, Ahmad, Vaishya, & Gupta 2007), the absence of financial support, limited resources, the unwillingness of the users to pay for the service (Sujauddin, Huda, & Rafiqul Hoque, 2008), and lack of proper use of economic instruments have hampered the realization of adequate waste management services.

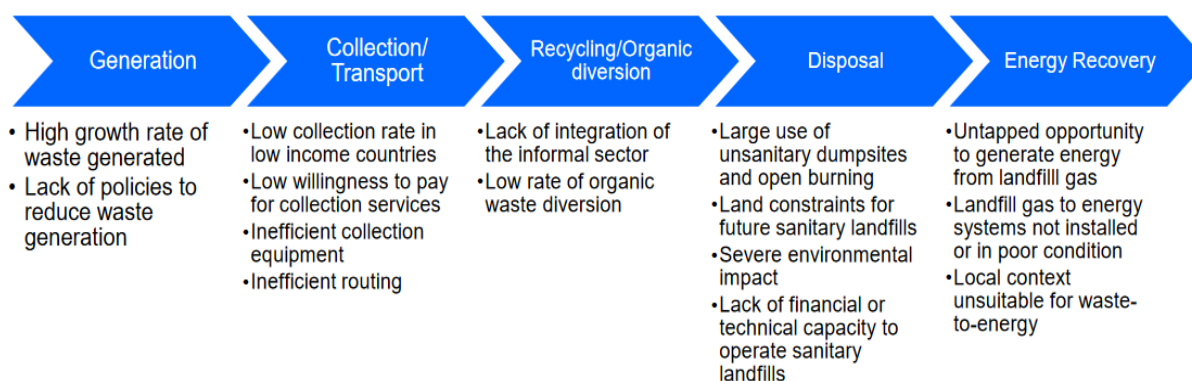


Fig. 2 Common challenges within the municipal waste value chain

Source: (World Bank Group, 2014)

Scholars have cited scarcity of funds as a major constraint to waste management in developing countries (Cointreau, 1982, 2001; Ogawa, 2002; Pacione, 2005). So, Ogawa (2002) mentioned that the finance problem in developing countries is due to inadequacy in the development of the taxation system of the municipal government level that makes the financial base of public services weak. He attributed financial problems to the low capacity of local governments for cost recovery and heavy reliance on state subsidies for these operations.

Sharholy, Ahmad, Mahmood, and Trivedi (2008) indicated that the private sector involvement could improve the efficiency of the waste management system. In general, it is to regard waste management be the sole responsibility of local authorities, and the public should not contribute (Vidanaarachchi, Yuen, & Pilapitiya, 2006). The operational efficiency of waste management depends upon the active participation of both the municipal agency and the citizens. Socio-cultural aspects mentioned by some scholars include people participating in decision-making (Sharholy, Ahmad, Mahmood, & Trivedi, 2008), community awareness, and societal apathy for contributing to solutions.

Financial difficulties of municipal authorities to finance municipal services can be attributed to overreliance on central government intervention. At the same time, some authors believe that any organization that relies on the central government interventions in operation leads to failure because they are often limited. Most of the funds for running municipal waste management operations usually come from limited municipal budgets, making it

difficult to improve overall municipal financial systems. Therefore, it is proposed that local governments generate revenues from internal and external sources of funds to finance their operations.

Scope of the research. Considering the ideas of some scholars on the problems of municipal waste management financing, we can conclude *that it is necessary to create strategies to raise funds for sustainable waste management in developing countries*. Thus, the scope of this paper is to identify best practices that would help in the process of waste sector financial strategy creation. The governments should generate more financial aid for integrated sustainable waste management.

The synthesis and methodology of scientific research. We chose the methodology of scientific research based on the context of the complexity of the topic, the diversity of areas and scientific fields of the research, by designing and applying a system of classical methods of analysis and synthesis, induction and deduction, history, and logic, comparative and systemic analysis, as well as observation, statistical methods, analysis and interpretation of data taken. As sources of information, we used the statistical data of the Ministry of Environment of the Republic of Moldova, the National Bureau of Statistics, and the international statistical database.

3 RESULTS AND DISCUSSIONS

There are four different options for waste management projects' financing. Various factors will influence the option chosen. The key factor depends on answering the question about

providing waste management service to the citizen goal. The municipality should determine it. Therefore, one can conclude that the finance option is directly related to the waste management goal of a city or state.

1. **Public Financing.** That primarily involves funding waste management services entirely by the government through budgetary allocation. The government determines how it will generate the cash for service. Funds can result from taxation or redistribution of funds generated from other sources like sales of city natural resources or a combination of various sources of funds. But the problem of developing countries is that this type of funding is inefficient due to the corruption within the municipality and lack of proper waste management capabilities. The municipality should decide to charge a service fee or not.
2. **Private Financing.** That involves including the private sector in waste management services. However, the company involved will charge a service fee determined by calculating the amount of invested funds, operating cost, and desired profit. This financing option can deliver optimal results in carrying out waste management services. The private sector needs to be controlled not to set unacceptable high fees for services to citizens. Private sector funds are usually made available through concession contracts or other forms of public-private partnership. The availability of private funds was demonstrated, in principle, by signing several concession contracts in the waste sector, as well as the construction of waste treatment objects. Private sector investment should relate to national sectoral policies and fair and appropriate coordination. In addition, it is essential whether private sector funds are to be used. They must be requested in response to projects that are defined by the public sector in a strategically planned and justified manner. Financing in this sector can provide a good investment opportunity. However, these funds usually involve higher costs for the beneficiary, as the cost of capital is higher for the private sector than for the public sector.

3. **Public-Private Partnership (PPP).** This is a special type of collaboration between the government and private sector in providing funds and management capabilities for carrying out the waste management service. *That type of arrangement is the best, as the government will be able to regulate and have a say in how the service should be delivered, especially in terms of fees' setting.*
4. **External funds from donors and grants.** That is an efficient way to develop the city waste management infrastructure. But that funding mechanism is dependent on the interest of the donor organization. Hence, it will be difficult for a municipality to dictate how the funds should be distributed within various waste management projects. However, this type of financing can be combined with a PPP agreement to control a specific waste management aspect that is in tandem with the donor's interest and can be part of the municipality's contribution to the PPP.

International practice shows that government support through grants, loans, tax exemptions, and other mechanisms represent a key part of the overall policy mix for municipal waste management. Private and public waste operators, as well as private companies alone, also can be key components of waste management financing. In framing a proper waste management process, investments by businesses are considered a key factor. The relative shares of these sectors vary significantly across countries. For example, the public sector has the largest share in Korea and Spain, while in Estonia and France, specialized producers had the largest share. In Finland and Slovenia, it is the case with the business sector (see Figure 3).

The Korean government, for example, widely used all three of these mechanisms for financing the recycling and incineration activities. In 2014, the national government offered 105.3 billion KRW of financial aid to construct waste-to-energy plants. Government subsidies, tax credits, and long-term, low-interest loans have financed recycling investments, including food waste.

In Colombia, national and regional bodies subsidized investments at about one-quarter of municipalities' investments in landfills and transfer

stations (under Colombia National Development Plan 2010-2014). The government has provided

tax exemptions for investments in recycling and energy generated by agricultural waste.

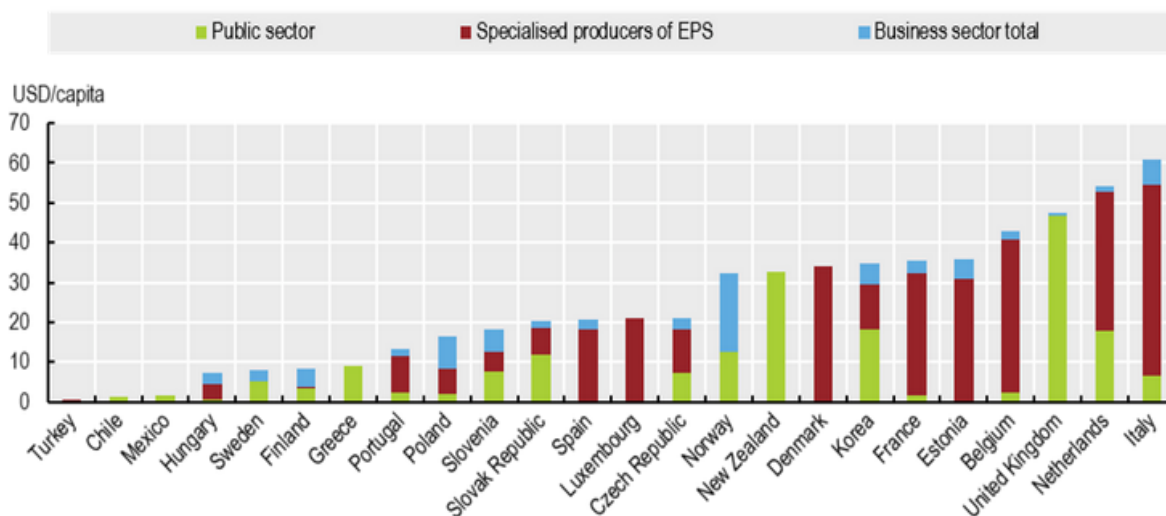


Fig. 3 The sources and levels of investments per capita in waste management across OECD countries (as for 2012)

Source: (OECD, 2017)

Generally, countries' experiences demonstrate that public environmental expenditure is effective, economically efficient, and follows sound principles of public expenditure management.

Several countries use funds resulting from revenues coming from environmental charges and taxes. These are the examples of *Estonia's* Environmental Investment Centre, the *Czech Republic's* State Environmental Fund, and *Poland's* national and regional environmental funds, whose revenues include waste charges and taxes.

Poland's National Fund for Environmental Protection and Water Management, and 16 regional funds have become the main environmental investment funding instrument. These funds receive the proceeds of environmental charges and use the revenue to make low-interest loans. Large projects, such as integrated waste management facilities in Pomerania, a region in the North of Poland, are financed through a combination of EU grants and national and regional fund loans.

In *Israel*, a landfill levy collects into a fund that is used to finance municipal and private sector waste management activities and build needed waste infrastructure. *Estonia, the Czech Republic, Hungary, Poland, and other countries that recently joined the EU*, have used these funds for

significant improvements in their environmental infrastructure, including waste management.

Other countries have experienced investments made directly by the business sector and specialized producers. In *Estonia*, for example, the government-owned energy company provided the main financing for the country's waste incineration plant (with co-financing for European Investment Bank), while private waste companies built mechanical biological treatment (MBT) facilities. Thus, specialized producers provide most of the waste financing in several European countries, including Belgium, Denmark, France, and other OECD countries. They turned to the private sector for waste management investments. In Japan, the involvement of the private sector in waste collection and treatment increased by the financing of new projects primarily relating to incineration facilities.

Across all areas of infrastructure, public-private partnerships represent about USD 0.8 trillion of investment in OECD countries, with further projects in the pipelines (OECD, 2019). However, the Environmental Performance Reviews, do not state a lot of references to public-private partnerships for waste management projects. One example was in Poland. For the construction and operation of the incinerator in Poznan, funds from national sources, EU funds, and the private sector

have been pooled. That was the first public-private partnership project in the waste sector in Poland.

The analysis of this project pointed to the need for greater capacity of state bodies to manage and implement the financing of public-private partnerships for large investment projects. The OECD set out three broad principles to manage and implement public-private partnership funding for large investment projects of this type of agreement for public authorities (OECD, 2012):

- Establish a transparent, predictable, and legitimate institutional framework supported by competent and well-resourced authorities.
- Ground the selection of Public-Private Partnerships in Value for Money.
- Use the budgetary process transparently to minimize fiscal risks and ensure the integrity of the procurement process.

Several countries have used external public financing for waste investments. In Europe, the EU funds provide grants to support environmental investments in low-income regions. Such is the example of Estonia, where the EU funds financed the separate collection of municipal waste. In Poland, the Czech Republic, Hungary, and Slovenia, grants from EU funds supported a wide range of waste treatment investments, including integrated waste facilities that combined sorting, recycling, and composting for municipal waste.

Many EU countries have received loans from the European Investment Bank, an EU institution, to finance waste treatment investments. External resources supported waste investments in Colombia: funding sources have included the World Bank and bilateral aid programs.

There is a distinction between two critical and related processes in attracting investment to waste management infrastructure by answering two questions: 'How will it be financed?' and 'How will it be funded?'

Financing is related to the sources of capital costs for building the necessary waste infrastructure, while funding refers to the source of the cash flows necessary to continue waste operating service over time.

In developing countries, where national and local government budgets are often severely constrained, the financing concept relies heavily on private sector participation through a variety of

financial instruments, while the funding one is part of public policy, i.e., political and regulatory decisions about how to tax the relevant service.

In the Republic of Moldova, the Waste Management Strategy presents the financing principles of the waste sector, which stipulates the use of internal and external sources for financing the waste strategy objectives implementation.

The Annual Budget, the National Ecological Fund, the National Fund for Regional Development, individual contributions, economic agents, and other sources not prohibited by law generate the internal financing resources.

According to Law on State Budget for 2000, for the financing of the waste sector, 63187.7 thousand MDL was planned, representing 24% out of all state budget spending for environmental protection and 0,1% out of the total volume of state budget spending. For years, the distribution of state budget funds for the waste sector financing varied, and the financial resources available for the sector management are insufficient to cover all the expenses related to waste management (see Figure 4).

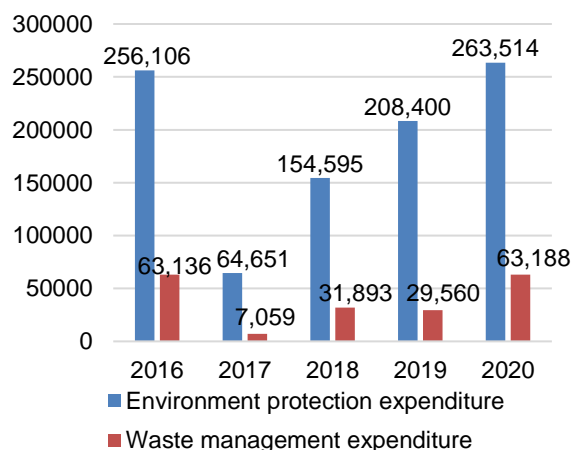


Fig. 4. The State budget expenditure for environmental protection and waste management in the Republic of Moldova, in thousands of MDL.

The National Ecological Fund (the FEN) is under the Ministry of Agriculture, Regional Development and Environment and was created 23 years ago to accumulate additional means to finance environmental activities. The FEN financial means are approved annually by the State Budget Law. They are formed from the means of payments for emissions of harmful substances by mobile sources using petrol and diesel, means intended

to compensate for the damage caused to fishery resources, as well as the voluntary contributions of individuals and legal entities. The money is intended for solving environmental and ecological problems, and the funding in the form of grants can benefit local public administration bodies, institutions, enterprises, and civil society organizations in the Republic of Moldova. Their financial contribution must be at least 15% of the project value.

According to presented annual reports on the activity of the National Ecological Fund, over the years it can be attested a low degree of money capitalization for projects directed towards the financing of the waste management sector (see Figure 5).

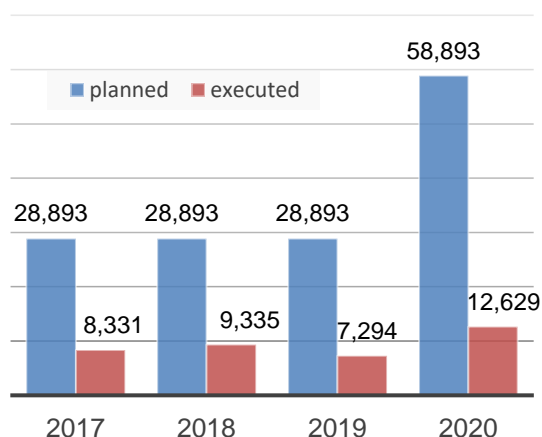


Fig. 5. A capitalization of financial resources from the National Ecological Fund for the waste management sector in the Republic of Moldova (in thousands of MDL)

Among the general causes of non-full usage of financial means allocated from FEN for the implementation of approved projects are:

- Carrying out, repeated in some cases, public procurement procedures due to disputes or non-conformities detected.
- Approvals in stages of the projects, the financial sources being insufficient for each stage completion.
- A need to review construction projects, cost estimates, and approvals for them, given the time that has elapsed from the time of study projects to de facto implementation and to change prices and needs over time.
- A lack or insufficiency of the obligatory individual financial contribution of the beneficiary.

- A failure in executing operations within the pre-established deadlines by some contractors or an inability to execute some contracted volumes within the pre-established deadlines.

After 20 years of activity, the FEN regulation does not have a methodological framework on the criteria for prioritizing the submitted investment projects, which led to their approval in the absence of competition and competitiveness procedures. According to the regulations on the ecological funds by which the FEN operates, the ecological funds exclusively finance the projects in the field of environment, which have passed the established stages of selection and evaluation based on competition. In addition to the lack of competition between investment projects submitted for approval, there is also a lack of a methodology on project prioritization criteria, which affects the approval of all submitted projects that meet the eligibility criteria, without considering the availability of financial resources for covering approved applications. One can notice that the FEN does not have systematized information regarding the results of the investments made, for example, there is no information about the length of the built and reconstructed aqueducts, the population, and the households planned to be connected and connected to the aqueduct.

Another shortcoming of the regulatory framework is that it does not ensure clarity and accuracy in terms of the regulatory limits of each act. The law does not stipulate the extent to which a subject can be developed or expanded by regulations, which can lead to the hidden transfer of competencies from one level of regulation to another. A consequence of this problem is the ambiguous regulation of the categories of FEN beneficiaries. The Law on Environmental Protection stipulates the categories of potential beneficiaries of FEN means, without mentioning that this list of categories is complete, but also without a clear stipulation on the right of certain authorities to complete this list by Regulations. If the regulation provides for a long list of beneficiaries than stipulated in the law, this leads to confusion. For the same reasons, several regulations concerning the FEN training sources, and the use of funds are imprecise and, in some cases even, contradictory.

In the context in which the activity of the Board of Directors of the National Ecological Fund conducts within a permissive and insufficiently substantiated legal framework and the lack of transparency in money management from the National Ecological Fund, we risk that the number of completed projects still will remain low. They will be carried out in the competition procedure's absence due to the lack of a methodological framework on the prioritization criteria and finance projects that do not meet all criteria.

This situation will last until the line ministry takes steps to establish transparent and written procedures, including a deadline for submitting new projects and changing the funding mechanism for projects that have already begun. This way, when forming the budget for the next year, the FEN will be able to consider already funded projects and deadlines for projects agreed between users and contractors. It will also be able to develop criteria for defining project priorities in areas or directions of use of funds managed by the FEN.

Moreover, the financial means of FEN are directed, for the most part, towards projects intended for the supply of drinking water to the population and not for solving environmental and ecological problems, which is, in fact, the purpose of the National Ecological Fund. However, the fundamental problem is the lack of clear priorities for FEN spending. It is necessary to restructure the way of accounting for expenses. First, they need to be integrated into a flexible database that allows the balancing of balances by type of criteria. These criteria may be amounts allocated by types of beneficiaries, funding area, and geographical regions. The database must offer regular monitoring, evaluation of strategies, and reshaping priorities based on the results obtained.

Poland can be an example for the Republic of Moldova in terms of the national ecological system. Poles are governed by the "polluter pays" principle, thus creating the National Fund for Environmental Protection and Water Management (NFEPWM), 16 provincial funds, and numerous local funds. Unlike the National Ecological Fund, which offers grants only to beneficiaries, the financial support of NFEPWM can be granted also through: subsidies, which represent financial aid granted to institutions for the financing of

ecological educational projects, pilot projects, or the development of ecological technologies of an experimental nature; loans, with a lower interest rate than that of commercial banks; compensation of bank loans, which is a form of assistance that compensates the difference between the interest rate offered by a commercial bank and the preferential interest rate that would have been charged to the beneficiary if he had addressed directly to NFEPWM.

It should be noted that NFEPWM does not cover more than 50% of the project value, which ensures that the beneficiary will remain interested in the success of the project and will complete it. Moreover, not only public institutions and public associations can apply for projects, as in the case of the Republic of Moldova, but also economic agents. This liberalization of beneficiaries would contribute to the fact that those who will use their means to implement green projects will be much more interested in the success of green projects.

It is also important for the National Ecological Fund to cooperate with the international donor community to attract more resources. External grants and loans are important sources of funding for environmental projects. There are environmental projects that benefit from external financing with money allocated directly.

Technical assistance is needed to support key aspects of the implementation of the strategy, including harmonization of legislation, institutional strengthening, program development, project preparation and implementation, data management, and communication. Technical assistance is a key tool for attracting and delivering programs and investments to recipient countries and is estimated at approx. 8% of the total cost of capital investments attracted.

This external assistance must be managed by the FEN, in the context in which it would have appropriate expertise on projects of national and local importance. This could only be possible if the FEN will be transformed into an institution with the status of a separate legal entity.

External sources of funding include international financial institutions (IFIs), donor agencies that can significantly contribute to the development of the sector, the European Investment Bank, the European Bank for Reconstruction and

Development, the World Bank, and the USAID, which implement projects in Moldova. The IFIs have shown their willingness to finance projects in the waste management sector, depending on what they consider viable. The state guarantee is one of the preconditions for the IFIs' participation. Several donor countries and the EU have expressed a desire to support the further development of the waste management sector. In some cases, it focuses on technical assistance and the elaboration of investment projects. Such aid is often in the form of grants, but it must be imperative that investment projects are under rigorous donor control and follow international project sustainability practices. Also, it needs a thorough analysis of all feasibility issues - technical, economic, social, and environmental.

4 CONCLUSIONS

State involvement is needed to solve the waste problem in Moldova. At the same time, residents should be responsible for separating the collected waste, signing contracts with waste management operators, and paying the sanitation fee. It is necessary to develop a methodology for calculating tariffs because now these tariffs are created by the local public administration, based on old, outdated regulations, and do not reflect actual costs for adequate waste management. Even when there is some legislation in this area, there is currently no regulation that would require that every household in the Republic of Moldova connects to a sanitation service and local public administrations have no right to demand that everyone pay for these services.

There should be set ambitious and attainable waste management targets at the municipal or the national level in consultation with all stakeholders. They need to be aligned with the Sustainable Development Goals. In this sense, local authorities should be encouraged to develop detailed action plans to reach agreed targets. These targets can make use of synergies with other economy-wide and municipal goals, for example, sustainable consumption and production, access to energy, health, clean water and sanitation, climate change, etc.

Governments should establish waste-related statistics that are reported at local, regional, and economy-wide aggregated levels and stored in a transparent database accessible by all stakeholders. Frontrunner cities could be identified through a competitive certification process and then rewarded and held as role models for other cities.

Collaborative projects, able to provide both financial and technical support, should be searched and should let the government promote public-private partnerships in the domain of waste management. Every strategy, elaborated for waste management, should be based on considering the available budget, public health, integrated approach to infrastructure development, and other factors. It is better to prefer waste minimization than waste management. Educational programs should be used to increase awareness of the harmful effects of waste. This will contribute to the reduction of waste generation from each household. Also, we must prioritize recyclable products use.

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