



WITHOUT WASTE

WIWA

Closing the Resource Loop in the South Balaton Region

**CIRCULAR ECONOMY ACTION PLAN
2020**

Table of Contents

EXECUTIVE SUMMARY	3
PREAMBLE	6
POLICY BACKGROUND	7
TARGET: TERRITORIAL FOCUS AND RELEVANT STAKEHOLDERS	8
NEEDS ASSESSMENT, JUSTIFICATION	10
Bio-waste.....	12
Packaging materials.....	14
Electronic waste and batteries.....	15
Textile waste	15
Construction and demolition waste	16
OBJECTIVES	17
ACTIONS	19
Action 1 Development and expansion of selective waste collection system in the South Balaton region	19
Action 2 Recycling bio-waste to produce soil fertilizer for agriculture	21
Action 3 No waste is good waste – awareness-raising campaigns for local citizens and tourists	23
GOVERNANCE MODEL AND PARTICIPATION	26
MONITORING	27

EXECUTIVE SUMMARY

The **EU needs to accelerate the transition towards a regenerative growth model** that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries and therefore strive to **reduce its consumption footprint and double its circular material use rate in the coming decade.**

To fulfil this ambition, the European Commission has published the **new Circular Economy Action Plan COM(2020) 98**, which provides a future-oriented agenda for achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens, and civil society organisations.

To reduce waste in every relevant sector, especially **addressing product groups** identified in the context of the value chains featuring in the Action Plan, such as electronics, **ICT and textiles, furniture, high impact intermediary products, food, and biological resources** the stakeholders have to make effort on increasing recycled content in new products and on the enforcement of applicable sustainability requirements for products.

Fulfilling these EU-level goals is essential for every member state and their regions, like the **South Balaton region** which consists of 113 settlements in the southern side of Lake Balaton, which is the largest Lake in Central Europe with significant tourism. These 113 settlements have a joint waste management system, thus they have the same public service company for waste collection, transportation and management.

The development of a circular economy has to be based on the **partnership** between the waste management municipal associations of the region and the waste management public service company called DBR Ltd. Moreover, a wide spectrum of associations has to be involved in a possible partnership building up circular economy development actions, for instance local SMEs, non-profit and public companies, civil society associations, higher education institutions, governmental agencies, clusters and umbrella organizations.

The high priority waste streams in the region are **bio-waste and packaging materials, such as paper and plastics**. In the lakeside of Lake Balaton, especially the South Balaton region, where population can be doubled in the tourist season, there is a heavy pressure on local logistics, services, community the environment, mainly thanks to tourism. When it comes to waste management, a common problem is that waste produced by tourists is not, or just partly recycled due to the lack of possibilities for selective waste collection at accommodations, touristic attractions, festivals etc.. Besides packaging waste, **food waste and generally bio-waste reduction must be one of the key objectives** of the circular economy development projects and actions in the South Balaton region.

The **overall objective** is to build up a circular economy in the South Balaton region for closing the loop of the waste chain and minimize the amount of the generated waste. The transition of waste management in the South Balaton region from linear to circular will improve the resilience and resource management capacities of the region facing challenges imposed by seasonality, tourism and external shocks (e.g. COVID-19). An efficient waste management

system is an essential building block of a circular economy, so it is crucial to modernise the waste management system in the region.

The Specific objectives are:

1. Increasing the ratio of selectively collected and recycled municipal waste in the South Balaton region,
2. Boosting the use of secondary raw materials in the region in collaboration with waste operators, industrial, commercial and agricultural companies and associations,
3. Preparing the South Balaton region to meet and exceed the targets defined by EU directives for bio-waste collection and management by the end of 2023,
4. Foster engagement of citizens and tourists in changing consumption patterns (especially food and biodegradable goods).

The Action Plan has to implement and demonstrate circular systemic solutions for the territorial deployment of the circular economy (including the circular bioeconomy) in the South Balaton territorial cluster. For the sake of the cause the AP operates with three key actions (additional actions will be developed further on):

Action 1 Development and expansion of selective waste collection system in the South Balaton region

The objective of the action is to integrate and to optimize waste collection streams and logistics from the source (households, hotels and accommodations, restaurants and festivals) to the end-points (waste treatment plants). The action focuses on increasing the availability of the separate waste collection at the settlements of the region by building out an effective door to door collection (for households) and collection at source system (for hotels and accommodations, restaurants, festivals, and other seasonal events).

Action 2 Recycling bio-waste to produce soil fertilizer for agriculture

The objective of the action is to turn the bio-waste collected in the region into products. Compost and soil fertilizer made of bio-waste can contribute to the protection of soil by using compost as a natural fertilizer. The composting of bio-waste is a well controllable process, which can also contribute to the substantial improvement of soil by increasing the proportion of nutrients. It is necessary to plan new capacities for the preparation and processing of bio-waste into products. Sales and marketing of the compost and other bio-products like biogas are also essential in the frame of the action. Launching demonstration, educational and R&D projects based on the application possibilities of bioproducts (such as compost) are also part of the action.

Action 3 No waste is good waste – awareness-raising campaigns for local citizens and tourists

In order to successfully implement the circular economy model, it is essential to foster an environmentally conscious approach and change the behaviour of the population and visitors, as they are the main waste producers in this region. To achieve this, citizens and tourists should learn about the harmful environmental and ecological effects of waste and the importance and benefits of waste recycling.

The suggested governance model to implement the above-defined actions consists of three-level of governance and administration:

The **Steering committee (SC)** is the main responsible body for the implementation of the Action Plan. The role of the SC is the administration of the AP, making strategic decisions and monitoring the progress of the AP.

The Working groups (WG) are responsible for establishing and approving the Action Plan for the main relevant waste streams in the South Balaton region.

Within the WGs, **cooperation teams (CT)** will be created along the main working processes, such as waste collection, waste treatment, bio-based products, sales and marketing.

PREAMBLE

By the directive (EU) 2018/851 of the European Parliament and of the Council ‘**Waste management in the Union should be improved and transformed into sustainable material management**’, with a view to protecting, preserving and improving the quality of the environment, protecting human health, ensuring prudent, efficient and rational utilisation of natural resources, **promoting the principles of the circular economy**, enhancing the use of renewable energy, increasing energy efficiency, reducing the dependence of the Union on imported resources, providing new economic opportunities and contributing to long-term competitiveness”.

As half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress come from resource extraction and processing, the **European Green Deal** launched a concerted strategy for a climate-neutral, resource-efficient and competitive economy. **Scaling up the circular economy from front-runners to the mainstream economic players** will make a decisive contribution to achieving **climate neutrality by 2050** and decoupling economic growth from resource use while ensuring the long-term competitiveness of the EU and leaving no one behind.

Therefore, the **EU needs to accelerate the transition towards a regenerative growth model** that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries and therefore strive to **reduce its consumption footprint and double its circular material use rate in the coming decade**.

To fulfil this ambition, the European Commission has published the **new Circular Economy Action Plan COM(2020) 98**, which provides a future-oriented agenda for achieving a cleaner and more competitive Europe in co-creation with economic actors, consumers, citizens and civil society organisations.

The Action Plan presents a set of interrelated initiatives to establish a strong and coherent product policy framework that will make sustainable products, services, and business models the norm and transform consumption patterns so that **no waste is produced in the first place**.

Nowadays the linear pattern of “take-make-use-dispose” does not provide producers, merchants, and other actors of product chains with sufficient incentives to make their products more circular yet. Thus a huge scale of the **products are not fit for a climate-neutral, resource-efficient and circular economy**.

To reduce waste in every relevant sector – especially **addressing product groups** identified in the context of the value chains featuring in this Action Plan, such as electronics, **ICT and textiles, furniture, high impact intermediary products, food, and biological resources** – the relevant stakeholders have to make effort on increasing recycled content in products and on the enforcement of applicable sustainability requirements for products.

POLICY BACKGROUND

The main relevant regulations and strategies in connection with circular economy and sustainable product lines at European and national level are the following:

EU regulations
Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste COM/2005/666
GREEN PAPER On a European Strategy on Plastic Waste in the Environment COM/2013/0123
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS ON RESOURCE EFFICIENCY OPPORTUNITIES IN THE BUILDING SECTOR COM/2014/0445
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Closing the loop - An EU action plan for the Circular Economy COM/2015/0614
Directive (EU) 2018/849 of the European Parliament and of the Council of 30 May 2018 amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on batteries and accumulators and waste batteries and accumulators, and 2012/19/EU on waste electrical and electronic equipment
Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018 amending Directive 1999/31/EC on the landfill of waste
Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste
Directive (EU) 2018/852 of the European Parliament and of the Council of 30 May 2018 amending Directive 94/62/EC on packaging and packaging waste
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A new Circular Economy Action Plan For a cleaner and more competitive Europe COM/2020/98
National and regional strategies in Hungary relevant to WIWA
4 th National Environmental Program 2015-2020 (the forthcoming 5 th NEP is under preparation)
National Waste Management Plan and National Prevention Program (as part of the NWMP)
National Waste Management Public Utility Plan
Regional Waste Management Plan

TARGET: TERRITORIAL FOCUS AND RELEVANT STAKEHOLDERS

The overall target area is the so-called **South Balaton region** which consists of 113 settlements on the southern side of Lake Balaton, which is the largest Lake in Central Europe with significant tourism. These 113 settlements have a joint waste management system, thus they have the same public service company for waste collection-, transportation- and management.

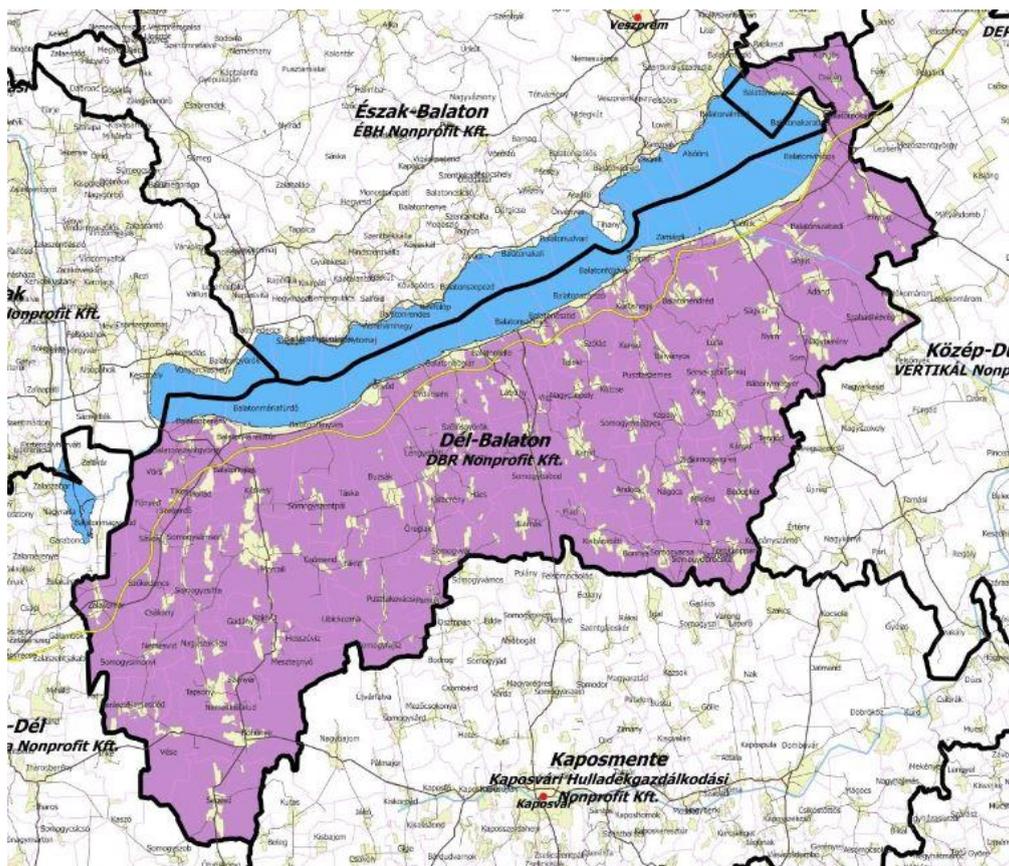


Figure 1: The location and the area of the South Balaton region

The region is formed by two regional waste management municipal associations, the South Balaton and the South-West-Balaton.

The DBR Ltd. is responsible for waste management in the territory of the South Balaton region. Waste management is distributed based on a territorial subdivision with Local Government Associations and with the following subcontractors:

- SIÓKOM Non-profit Ltd.
- PELSO-KOM Non-profit Ltd.
- MTKSZ Marcali Non-profit Ltd.

Developments in the field of circular economy, especially circular waste management, cooperation has to be based on the above-mentioned waste management municipal associations and the waste management public service company called DBR Ltd.

Moreover, a wide spectrum of associations has to be involved in a potential partnership that builds up and implements circular economy development actions. Such stakeholders include SMEs, non-profit and public companies, civil society associations, higher education institutions, governmental agencies, clusters, and umbrella organizations.

The key stakeholders from the public and private sectors along the waste value chains in the South Balaton region are:

- Regional waste management municipal associations,
- Chamber of Commerce and Industry (Somogy county-level office),
- Chamber of Agriculture (Somogy county-level office),
- Waste Management Authority (a newly established county-level office within the Government Bureau)
- Hungarian Waste Management Federation (HOSZ) is the main important industry federation of recycling companies in Hungary
- Lake Balaton Development Coordination Agency (LBDCA),
- Local and regional political decision-makers (eg. chairman of the county council, parliamentarians of the region)
- The University of Kaposvár (as research institute),
- Pannon University of Veszprém Institute of Environmental Engineering (as research institute),
- Szent István University Georgikon Campus Keszthely (as research institute),
- Environmental NGOs working in the South Balaton region.

The following local stakeholders have already shown interest in joining the initiatives proposed in the frame of the present CEAP of the South Balaton Region:

- Municipality of Tab
- DBR Nonprofit Ltd.
- South Balaton Regional Waste Management Local Governmental Cooperation
- Koppányvölgy Rural Development Public Benefit Association
- Lake Balaton Development Council (BFT)
- National Coordination of Waste Management and Asset Management Plc (NHKV)
- Touristic Association of Balatonföldvár Region
- Siófok Vocational Training Center
- Municipality of Balatonfenyves
- Balatonlelle Wine Community
- Kötöcse-Szólád Joint Wine Community
- Balatonboglár Wine Community
- HUBERTUS Bt.

- Balaton Association
- Women for Lake Balaton Association
- Multipurpose Association of Marcali Micro-region

NEEDS ASSESSMENT, JUSTIFICATION

In most regions of Europe, there are municipalities with a low population density that usually achieve significantly higher participation and engagement rates in their separate collection systems. However, several European case studies indicate that municipalities with low population density should pay specific attention to the cost-efficiency of their separate waste collection systems, mainly because of transport distances. Taking this into consideration the South Balaton region should apply small-scale solutions, deliver efficient, high-quality results locally in a short time.

The South Balaton region covers 113 settlements, with a population of 152,107 (*Data source: KSH database, 2018*). This region is characterized by high seasonality as a result of tourism. These settlements are located in the Balaton region, which is a popular tourist destination for both domestic and foreign visitors. During the tourist season, nearly 33,900 people are present in this area, (with tourists, festival visitors, and second home-owners) which means that compared to off-season, the population doubles in the summer months. The large number of tourists result in also an increased food consumption (both in commerce and private accommodations, event venues, and on the beaches of the Balaton region). The amount of packaging, food, and bio-waste ending up in waste is so significant that the waste management system is not prepared for such an increased amount of waste and the fluctuation in demand for their services in the season.

The HORECA sector (hotels, restaurants and cafés), festivals, local events and beaches are responsible for a huge amount of the generated bio-waste (food and green waste). There are 12,574 private and 252 commercial accommodations in the region, out of which 80 are hotels. Catering units such as restaurants and buffets are also significant, numerically there are 2,243 in the region. Overall 53 beaches are operating in the target area (*Data source: KSH database, 2018*). The beaches of Siófok and Zamárdi play a dominant role because these beaches are famous festival venues in the summer with hundreds of thousand visitors.

The data mentioned above is accompanied by the amount of communal waste generated in the region: the amount of waste collected in the settlements of the South Balaton region is 86,190 tons, of which 49,120 tons are collected only during the tourist season. The internal ratio of the whole region differs significantly in the settlements of the shores of Lake Balaton. Among the coastal towns, in Balatonföldvár this ratio is 2,429 (total) vs 1,753 tons (in season), in Fonyód is 5,638 (total) vs 4,142 tons (in season), while in Siófok this ratio is 21,669 (total) vs 14,438 tons (in season). This ratio is the most significant in Zamárdi, which is a popular festival venue. The amount of waste generated in this area is 5,561 tons, out of which more than 4,800 tons of waste are generated during the tourist season (*Data source: DBR report, 2020*).

The Somogy County Environmental Program (2020-2024) also points out that the residential municipal waste per capita is exceptionally high in the case of settlements on the Southern shore of Lake Balaton, exceeding half a ton/person.

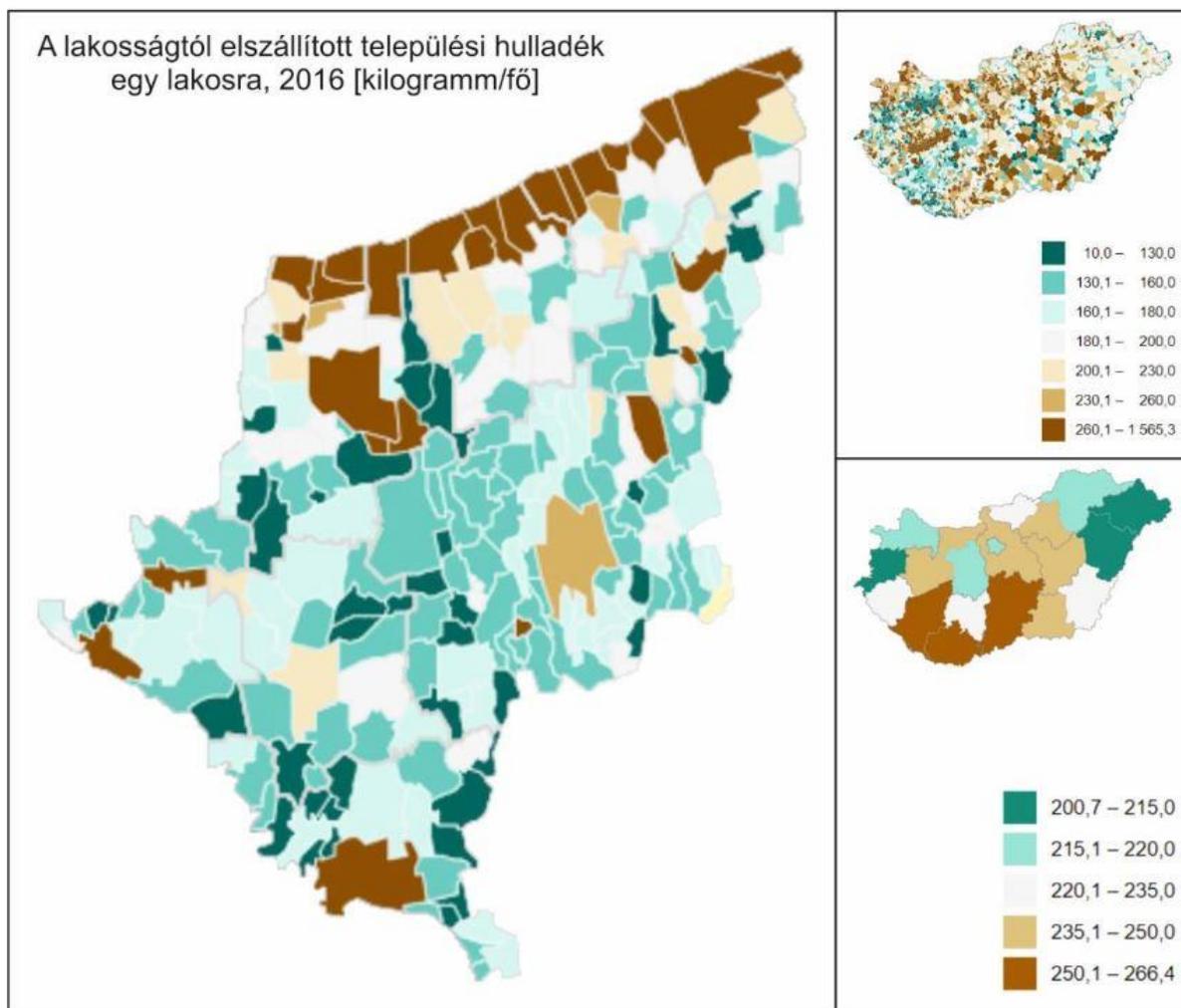


Figure 2: The total amount of the collected communal waste per capita (kg/capita) in 2016 Source: Somogy County Environmental Program 2020-2024)

The recycling of the generated waste has increased significantly during the tourist season. The recycling and the conditions for recycling still fall short of the requirements expected by the circular economy model, especially in the face of the increased amount of waste generated in the tourist season. The amount of selectively collected waste in the entire region is 24,720 tons which is only 28.7% of the total waste generated and collected. In the season this ratio is higher (39.8%) as many beaches, festivals and event venues provide possibilities for selective waste collection on the spot (mainly for glass, plastic and paper).

However, it is important to highlight that the separate waste collection in the region (both in the case of door-to-door collection and recycling points) primarily focuses on the separate collection of packaging materials. The proper collection, treatment, and utilization of food waste generated in large quantities (during the tourist season) and green waste generated in family houses and vacation houses (collectively known as bio-waste) are not resolved yet.

The above-mentioned numbers reflect well the importance of the South Balaton region from a waste-management point of view. The extreme fluctuation of the amount and composition of waste requires the development of specific solutions for waste collection, processing, and recycling.

In the 113 settlements of the South Balaton region, the public waste management service activity is performed by the DBR Ltd. with the involvement of subcontractors.

The public waste management activity includes the following tasks:

- Collection and transportation of municipal solid waste
- Operation of collection points
- Operation of waste treatment facilities: pre-treatment, manual-handling, junkyard, landfill
- Pre-treatment of waste for recycling: sorting, baling
- Disposal of non-recoverable waste by landfill

Among waste streams, bio-waste and packaging materials (such as paper and plastics) have to be given high priority in the region.

Bio-waste

While the food value chain is responsible for significant resource and environmental pressures, an estimated 20% of the total food produced is lost or wasted in the EU. At Lake Balaton, especially in the South Balaton region the amount of food waste generated in the commercial chain and the hospitality sector is much higher, mainly thanks to the seasonality of tourism. Statistics show that the population of Lake Balaton can be doubled in the season, imposing heavy pressure on the local logistics, services, community and the environment. When it comes to waste management, a common problem is that bio- and food waste produced by tourists is not, or just partly recycled due to the lack of possibilities for selective waste collection at accommodations, touristic attractions, festivals, etc.

Therefore, the reduction of bio-waste **must be one of the key actions** of the circular economy development projects and actions achieved in the South Balaton region.

The definition of bio-waste by the New Waste Framework Directive (WFD)- 2018/851 for bio-waste is “biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants”.

Currently, a significant proportion of the settlements covered by public waste management services do not carry out the door-to-door green waste collection. This is the case mainly in smaller settlements further away from Lake Balaton due to financial and economic reasons. Therefore, the Action Plan shall put special emphasis on the collection, processing and recycling of bio-waste generated in large amount in the area, with the help of accessible and efficient technologies offered by the circular economy.

Besides, both EU and national directives require the separate treatment of biodegradable waste, including green waste, with the aim of reducing the organic matter of landfilled waste.

The most common technology is organic waste composting, which can be a well-regulated process that meets the above-mentioned aims as well as restores valuable nutrients for the arable land. Currently, the amount of organic waste recovered in the area is not significant. At the same time, the ISPA/KA project in Sió Valley, in the South Balaton region has recently created conditions for recycling the organic fraction of municipal waste, gradually improving the share of bio-waste to be recycled.

The following facilities are present in the area of DBR Ltd. for the processing of waste and the sale of waste-based products (*Data source: DBR Business plan, 2018*):

- Waste sorting plant: 8655 Som, 0159 LRR, waste treatment center
- Mechanical waste treatment facility: 8655 Som, outdoor area 0159 LRR optical pre-treatment; 8700 Marcali, outskirts 097/6 LRR. Mechanical Biological Waste Management.
- Composting facility, stabilizer: 8655 Som, outdoor waste treatment center; The site operated by OS-PELSO in Balatonlelle; 8700 Marcali, 097/6 LRR waste facility
- Landfill: 8655 Som, 0159 LRR, landfill; Kaposmérő (Hetes-) landfill.

It is important to note that most of the facilities are apt only for the selection, processing and logistical preparation (baling) of the separately collected packaging waste.

The collected green waste is currently utilized by composting at two locations: in Marcali at the waste treatment plant, and in Balatonlelle, in the external location of the wastewater treatment plant of DRV Ltd. By increasing the amount of the bio-waste fraction collected from the area, the efficiency of the composting plant capacities will be also improved.

Currently, the door-to-door collection of green waste does not operate in all settlements, such as in smaller settlements further away from the shore of Lake Balaton. In order to solve the problem, it is necessary to foster the separate treatment and collection of green waste at the local governments. The short-chain utilization of green waste streams in a circular system can be supported by local governments, together with the public service provider, that could jointly carry out campaigns for the dissemination and promotion of home composting with the involvement of the local media.

When we are estimating the amount of bio-waste and planning bio-waste processing capacities, it is necessary to take into account the amount of green waste collected from the public areas of the settlements, as well. Especially given the fact that the settlements in the area possess large green areas managed by the municipality. Accurate data is available for Somogy County for the year 2019. According to this data, the size of green areas owned by municipalities in the county exceeds 893 hectares (*Data source: KSH database, 2018*).

At the same time, by increasing the volume of bio waste processing, it will be necessary to create sales and utilisation pathways for the end-products of the recycling process, such as compost. Bio-waste can be exploited as a source of high-quality fertiliser and soil improver, but only if it is collected separately at the source while keeping impurity levels low.

In the South Balaton region – especially further from the shores of Lake Balaton - in the so-called “background settlements” – the proportion of agricultural lands is high. Additionally, the size of arable lands is prominent, with more than 94,00 hectares in the region. Also, the importance of viticulture is decisive on the shores of Lake Balaton. The size of vineyards in the area is 2,934 hectares. Besides viticulture, the weight of small-scale farming is also significant, with a total of 5,292 land users in this area (*Data source: KSH database, 2018*).

In total 8320 agricultural enterprises can be found in the region, most of which are self-managed enterprises (8,108), while there are 212 agricultural companies and joint ventures in the region (*Data source: KSH database, 2018*).

The utilization of compost produced from bio-waste as an organic fertilizer and soil improver in arable lands and vineyards is contributing to the development of sustainable land use. Besides that, it ensures the circularity of waste streams. By improving the structure and water retention capacity of the soil, compost will help to combat the harmful effects of climate change and it also contributes to reducing the risk of soil erosion.

Within the different fractions of bio-waste, there is data available from year 2019 on the amount of kitchen and canteen waste, measured at the regional level. Based on this data, these food waste fractions have the highest proportion among selectively collected bio-waste streams. At the regional level, overall 15,426 tons were collected in 2019, which is exceeding the amount of metal and packaging waste in the region (*Data source: National Environmental Information System (OKIR), 2019*).

Packaging materials

Based on EU regulations, EU Member States must achieve a target of 70% for recycling packaging waste by 2030. In the South Balaton region, paper, plastic, and metal packaging waste is collected in the framework of recycling points and door-to-door collection. It is usually the case, that holiday house owners do not pay attention to the separate waste collection, and all of their packaging waste end up mixed with communal waste.

The following packaging materials are collected in the framework of separate waste collection:

Paper packaging waste:

- Cardboard, food box
- Newspaper (black and white and coloured)
- Books, office papers, paper bags

Plastic packaging waste:

- Plastic foil (bag; shrink film)
- PET bottle
- HDPE/PP bottles
- TetraPak (milk and soft drink boxes)

Metal packaging waste:

- Drink cans (soft drink, beer)

- Tin cans

A special fraction of packaging waste is glass waste (beer, wine, champagne, jar, coffee glass) and it is collected separately from the above-mentioned materials.

Larger amount of plastic waste (such as plastic garden furniture) can be disposed of as part of the annual junk-clearance.

Pre-treatment of selectively collected packaging waste is possible in Som and in Ordacsehi.

Regional level data is available on the amount of each selectively collected packaging waste fraction. Based on this data, in 2019, more than 900 tons of paper and cardboard waste, 724 tons of plastic waste, 13,126 tons of metal waste, and only 90 tons of glass waste were collected and pre-treated in the region (*Data source: National Environmental Information System (OKIR), 2019*).

Electronic waste and batteries

Electronic waste collection is possible before the annual junk-clearance. The waste management service provider offers the opportunity to hand over electronic equipment to the certified waste management company. Besides that, it is possible for citizens to go dispose their electronic waste from their households at waste collection points. The collection of batteries and accumulators – as hazardous waste – is also possible at recycling points, and at waste treatment sites. Furthermore batteries can be collected selectively at main public institutions and in larger commercial facilities, where used battery containers are available.

Regional level data is available on the amount of electronic waste, batteries, and accumulators. Based on this data, in 2019, 5299 tons of discarded electrical and electronic equipment and an additional 411 tons of discarded electrical and electronic equipment with hazardous materials were collected in the region. Although the amount of collected batteries and accumulators is only 13 tons, they contain a significantly higher amount of harmful substances for the environment than other waste fractions, therefore their treatment is of high priority (*Data source: National Environmental Information System (OKIR), 2019*).

Textile waste

The door-to-door collection of textile waste is not handled by the waste management company of the area. Clothing waste can be disposed of at public waste collection points or in containers placed by various charity organisations in shopping centres. Clothing waste is also collected as part of the annual junk-clearance.

The amount of clothing waste collected through the waste management system in the region is only 14 tons. Another 3 tons comes from other textiles within this waste fraction (*Data source: National Environmental Information System (OKIR), 2019*). This low number can be explained by the fact that a significant amount of clothes are not thrown away by the citizens, but they dispose them at collection points operated by charity organisations. Another option is to donate clothes to disadvantaged families or giving them to friends.

Construction and demolition waste

Collection and organized removal of construction and demolition waste from citizens is not possible in the present framework of selective waste collection or at the annual junk-clearance. However, by paying a fee, citizens can order a container for this type of waste from waste management companies. Citizens can also dispose selectively collected construction and demolition waste from their households (such as bricks, concrete, tiles, windows, and door frames) at waste collection points. This option, for household quantity, is available for free for permanent residents in the area.

The basic condition for developing circular economy in the region is to ensure the widest possible collection and use of (selectively) collected waste. County level statistics are available on the treatment and utilization of municipal waste generated in the area at the county level.

The KSH (Hungarian Central Statistical Office) data for 2018 shows that the waste utilization rate is still significantly lower than the level required by EU directives. The majority (55%) of the transported municipal waste is landfilled directly, while only 1/3 of the total amount is recovered in its material and 11% of the total amount is recovered by energy (mostly by incineration).

All these shortcomings show that significant steps should be taken to improve the separate waste collection systems of municipal waste in the region. At the same time, developments are needed in the technological and capacity development of waste treatment facilities (such as pre-treatment, manual sorting, waste yards, landfills). The same applies to the pre-treatment of waste for recycling (sorting and bailing) and for the development of a sales system for waste-based products

OBJECTIVES

The **overall objective** is to build up a circular economy for closing the loop of the waste chain and minimize the amount of the produced waste in the South Balaton region.

The transition of waste management in the South Balaton region from linear to circular will improve the resilience and resource management capacities of the region facing challenges imposed by seasonality, tourism, and external shocks (e.g. COVID-19). An efficient waste management system is an essential building block of a circular economy, so it is crucial to modernise a waste management system by demonstrating and transferring easily-adaptable, medium-scale systemic solutions. The first step has to be spreading the selective collection system for the most common waste chains like paper and plastics (the mainstream packaging materials), textiles, electronics, furniture, and bio-waste. Recycling the bio-waste fraction is the easiest and most common way to start up the circular economy system, but besides that, it is a high priority to manage plastic waste recycling, because of the high level of environmental risks of microplastic pollution.

The Specific objectives are:

1. Increasing the ratio of selectively collected and recycled municipal waste in the South Balaton region,
2. Boosting the use of secondary raw materials in the region in collaboration with waste operators, industrial, commercial and agricultural companies and associations,
3. Preparing the South Balaton region to meet and exceed the targets defined by EU directives for bio-waste collection and management by the end of 2023,
4. Foster engagement of citizens and tourists in changing consumption patterns (especially food and biodegradable goods).

Increasing the ratio of selectively collected and recycled municipal waste in the South Balaton region

The main aim is to expand the use of door-to-door selective waste collection system in the region, to the detriment of waste collection points. The door-to-door collection system can be adapted to the needs of consumers and it would increase the quantity of the collected waste. It is important to improve conditions for and enhance the purity level of selectively collected waste fractions. Thus not only the quantity, but also the quality of collected waste fractions has to be improved.

In the case of selectively collected materials, the aim is to increase the ratio of machine sorting over manual sorting, as it takes a tenth as much time and results in a much cleaner material based on the experience of the test plant so far. In order to achieve the above-mentioned goal, it is important to improve the quality and expand the facilities of the waste processing industry.

Boosting the use of secondary raw materials in the region in collaboration with waste operators, industrial, commercial and agricultural companies and associations

In order to close the 'waste for raw materials' cycle, the priority is to establish cooperation between market operators and market channels for sales. It is also important to adapt the parameters of waste processing technology and output products to the needs of companies that are utilizing secondary raw materials (e.g. production of compost with a substance that is in line with the needs of farmers and horticulture). There is a need for further developing and refining existing recovery technologies for waste, including the utilisation for energy generation. It is also important to monitor the expected environmental impacts with the involvement of research institutes of the region.

Preparing the South Balaton region to meet and exceed the targets defined by EU directives for bio-waste collection and management by the end of 2023

At the moment, in smaller settlements of the region further away from the shores of Lake Balaton, the door-to-door collection of green waste does not operate everywhere. A key objective is to organize the separate collection and treatment of bio-waste in all settlements of the region in cooperation with the local governments. Another goal is to promote home composting with the help of the local media. This would help to ensure that the generated municipal waste contains as little amount of organic material as possible. Besides, the legal regulations for the reduction of the organic matter content in the disposed waste also require the separate treatment of biodegradable waste, including green waste. Also, in order to reduce the amount of food waste, alternative utilization of food waste need to be explored.

Foster engagement of citizens and tourists in changing consumption patterns (especially food and biodegradable goods)

One of the main pillars of the sustainable bioeconomy is sustainable consumption. The workload of circular waste management systems can also be significantly lowered by reducing the amount of waste generated. The spread of low-waste production technologies and products, and environmentally conscious consumption patterns also contribute to the reduction of waste. In particular, the reduction of overconsumption and the spread of eco-conscious shopping habits have to be fostered (such as the purchase of products that have biodegradable packaging or which have a high proportion of recyclable components). In order to handle the separately collected waste efficiently, it is essential to increase the purity of separately collected waste fractions. By doing so, it is important to improve the environmentally conscious and responsible behaviour of citizens. In order to achieve the above-mentioned goals, regular and innovative awareness-raising campaigns have to be organized for citizens, tourists, accommodation and catering providers of the area.

ACTIONS

The Circular Economy Action Plan (CEAP) has to implement and demonstrate circular systemic solutions for the territorial deployment of the circular economy (including the circular bioeconomy) in the South Balaton territorial cluster. The CEAP will be implemented following upon the European Commission's Circular Cities and Regions Initiative (CCRI).

Action 1 Development and expansion of selective waste collection system in the South Balaton region

The objective of the action:

The objective of the action is to integrate and to optimize waste collection streams and logistics from the source (households, hotels and accommodations, restaurants and festivals) to the end-points (waste treatment plants).

Description of the activities:

Increasing the availability of separate waste collection at the settlements of the region by planning an effective door-to-door collection (for households) and collection at source system (for hotels and accommodations, restaurants, festivals and other seasonal events). Activities in the framework of this system development:

- Procurement and placement of selective waste collection containers (small and medium tanks, collection bags based on municipal needs) made of recycled plastic. In the case of particularly cost-sensitive consumers (for example the population of small settlements, municipal institutions) it is recommended to introduce alternative methods (like mixed method instead of only bag method) that can be used for the collection of green, paper, and plastic waste. It is also possible to collect several fractions selectively just by using bags of different colours. These bags must be made of recyclable or biodegradable material.
- Establishing collection points in public areas, as close as possible to the area of waste generation, ensuring the most convenient separation as possible
- Logistic optimization of collection routes
- Creating technical conditions for the co-collection of food and green waste
- Preparing conditions for the co-collection of packaging waste (paper, plastic, metal) where the pre-treatment and waste technology makes it possible.

Responsible body and possible participants:

The coordination and implementation of this action is led by the waste management public service company of the region called DBR Ltd. in collaboration with the regional waste management municipal associations (and through that, with the local municipalities).

Estimated cost and possible financial sources:

The total estimated cost of the action is highly dependent on the number of involved municipalities and the chosen type of waste collection method (bins, biodegradable plastic bags, etc.), but in general, the estimated cost is at least 600.000.000 HUF.

In the 2021-2027 programming period, various EU funds will be available for financing the actions, for instance:

Green Infrastructure and Climate Prevention Operational Program (Hungarian abbreviation: ZIKOP). The no.2 priority axis is dedicated to circular economy projects.

Competitive Hungary Operational Program (Hungarian abbreviation: VMOP). There will be dedicated sources for the development of municipal services and sustainable urban developments.

There will be also direct EU funds available in the topic of circular economy, for instance Horizon Europe and Interreg Central Europe programs. Some of the CBC programs will have applications for that kind of development in the border regions (the South Balaton region is mainly part of the Somogy county which is eligible to the Croatian-Hungarian CBC program).

Besides the above co-financed possibilities, there are also Hungarian Governmental Programs and funds:

- Hungarian Village Program
- Modern Cities Program
- Applications in the frame of the National Environmental Protection Program

Expected impacts:

Increased number of settlements in the South Balaton region covered with separate waste collection services.

Unit of measurement: Number of settlements

Base year: 2020

Target date: 2025

Increased rate of selective waste from the total amount of the waste collected in the region.

Unit of measurement: percentage

Base year: 2020

Target date: 2025

Action 2 Recycling bio-waste to produce soil fertilizer for agriculture

The objective of the action:

The objective of the action is to turn the bio-waste collected in the region into products. Compost and soil fertilizer made of bio-waste can contribute to the protection of soil by using compost as a natural fertilizer. The composting of bio-waste is a well controllable process, which can also contribute to the substantial improvement of soil by increasing the proportion of nutrients.

Description of the activities:

- The first step is the planning of bio-waste treatment to ensure the required quantity and quality of biodegradable waste and the expected high quality of the output. It is also necessary to build up new capacities for the preparation and processing of bio-waste into products. Choosing and testing the effective recycling technologies of bio-waste are needed to meet customer needs. Activities in the framework of this system development: Selection and cleaning of the collected bio-waste, preferring machine technologies,
- Processing bio-waste into products, resulting in a products mix that consists of:
 1. Composting (aerobic thermophile technology) by testing different recipes involving research institutes, like the universities near the region. The most common recipe is prismatic composting which has two different methods: the so-called windrow process and the aerated static pile. The first method needs a smaller place but it has to be rotated during the process of composting. It is mainly used for composting green (garden) waste. The second method needs a triple place compared to the first method, but it is suitable to compost mixed bio-waste and could be mixed with sewage sludge. The third, but not so common technology is the composting reactor, which needs prismatic post-curing, too.
 2. Producing biogas (anaerobic technology) mainly from the food waste components. When applying this bio-fermentation technology it is particularly important to ensure the high purity of bio-waste exempt from sulphates and other chemicals. As the result of the process, the end-products are pure methane and CO₂ gases.
 3. The third, but not preferred way of exploiting bio-waste is direct energy recovery. This solution is suggested only if the quality of the collected bio-waste is inadequate for composting or biogas production.
- Sales and marketing of the produced compost and biogas. Introducing the products to the local agricultural companies and farmers as 'green' fertilizer and 'green' fuel. It is suggested to plan innovative ways of distribution and collaborations with the so-called agricultural integrator companies (like KITE and IKR). Local markets represent another important distribution opportunity for the compost products.

- Planning and implementing demonstration, educational and R&D projects based on the applied producing methods and the application possibilities of bio-products, such as compost.

Responsible body and possible participants:

The coordination and implementation of this action is led by the waste management public service company of the region called DBR Ltd. in collaboration with the third-party companies dealing with composting (e.g. DRV Plc.) and research institutes. Important partners could be the operator organizations of the local markets and the agricultural integrator companies.

Estimated cost and possible financial sources:

The total estimated cost of the action depends on the chosen bio-waste processing technology and the number of developed composting plants, but in general, the estimated cost is at least 120.000.000 HUF/ location plus 40.000.000,- HUF for sales and marketing activities, and further 200.000.000,- HUF for a demonstration (pilot) development project.

In the 2021-2027 programming period, various EU funds will be available for financing these actions, for instance:

Green Infrastructure and Climate Prevention Operational Program (Hungarian abbreviation: ZIKOP). The no.2 priority axis is dedicated to circular economy projects.

Competitive Hungary Operational Program (Hungarian abbreviation: VMOP). There will be dedicated sources for the development of municipal services and sustainable urban developments (composting in connection with green infrastructure development).

Business Development and Innovation Operational Program (Hungarian abbreviation: VINOP). There will be calls for funding available for technology development and R&D pilot projects.

There will be also direct EU funds available in the topic of circular economy, for instance Horizon Europe and Interreg Central Europe programs. Some of the CBC programs will have applications for that kind of development in the border regions (the South Balaton region is mainly part of the Somogy county which is eligible to the Croatian-Hungarian CBC program).

Besides the above co-financed possibilities, there are also Hungarian Governmental Programs and funds:

- Hungarian Village Program
- Modern Cities Program
- Applications in the frame of the National Environmental Protection Program

Expected impacts:

Decreasing the amount of deposited bio-waste in landfills in the South Balaton region covered with separate waste collection services.

Unit of measurement: ton

Base year: 2020

Target date: 2025

The total amount of produced compost from the bio-waste collected in the region

Unit of measurement: ton

Base year: 2020

Target date: 2025

Action 3 No waste is good waste – awareness-raising campaigns for local citizens and tourists

The objective of the action:

In order to successfully implement the circular economy model, it is essential to foster an environmentally conscious approach and change the behaviour of the population and visitors, as they are the main waste producers in this region. In order to prevent waste generation and to improve the efficiency of the generated waste recycling, it is necessary to change the consumption habits of the population. To achieve this, citizens should be reminded of the harmful environmental and ecological effects of waste and the importance of waste recycling. Introducing good practices and organizing regular actions and campaigns are necessary in order to foster positive behavioural change.

Description of the activities:

The planned activities should promote the expert recommendations of the Action Plan and its efficient implementation in a horizontal way with the overall aim of improving eco-conscious behaviour of citizens

Proposed actions:

- Organizing information campaigns and actions for the population and tourists (holiday house owners, festival visitors) of the area about the necessity for the transition to the circular economy. The population needs to be aware of the environmental and sustainability aspect of waste utilization
- Informing the public about the environmental and economic benefits of recycling bio-waste, the range of products that can be made from bio waste and the benefits of using these products
- Regular media presence in the local media. Communicating the results of waste recovery on social media platforms and engaging citizens in local events and participatory activities.

Responsible body and possible participants:

The coordination and implementation of this action are led by the regional waste management municipal associations in collaboration with their member local governments. As partners, the local NGOs in the field of environment protection could be involved. Local elementary and secondary schools, as well as the local media could also have an important role as main dissemination channels of the awareness-raising campaigns.

Estimated cost and possible financial sources:

The total estimated cost of the action is highly dependent on the number and the chosen type of the campaigns, but in general, the estimated cost is 80.000.000,- HUF in the case of 4 campaigns per year for five years.

In the 2021-2027 programming period, various EU funds will be available for financing these actions:

Green Infrastructure and Climate Prevention Operational Program (Hungarian abbreviation: ZIKOP). The no.2 priority axis is dedicated to circular economy projects.

Competitive Hungary Operational Program (Hungarian abbreviation: VMOP). There will be dedicated sources for the development of municipal services and sustainable urban developments.

Business Development and Innovation Operational Program (Hungarian abbreviation: VINOP). There will be applications available for local community lead development especially in rural areas and the settlements in the shoreline of Lake Balaton.

There will be also direct EU funds available in the topic of circular economy, for instance Horizon Europe and Interreg Central Europe programs. Some of the CBC programs will have applications for that kind of development in the border regions (the South Balaton region is mainly part of the Somogy county which is eligible to the Croatian-Hungarian CBC program).

Besides the above co-financed possibilities, there are also Hungarian Governmental Programs and funds:

- Hungarian Village Program
- Modern Cities Program
- Applications in the frame of the National Environmental Protection Program
- So-called OFA Non-profit Ltd. applications are available for NGOs.

Expected impacts:

The increasing number of inhabitants involved in the awareness-raising programs in the South Balaton region.

Unit of measurement: capita

Base year: 2020

Target date: 2025

An increasing number of tourism companies and associations are involved in the awareness-raising programs in the South Balaton region.

Unit of measurement: number of the organisations

Base year: 2020

Target date: 2025

GOVERNANCE MODEL AND PARTICIPATION

The **Steering Committee (SC)** is the main responsible body for the implementation of the Action Plan. The role of the SC is the administration of the AP, making strategic decisions and monitoring the progress of the AP. The head of the SC is a delegated member from the regional waste management municipal association. The members of the SC are the coordinators of the working groups (WGs), detailed hereinafter and a delegated member from the waste management public service company of the region, DBR Ltd.

Working Groups (WG): the working groups are responsible for establishing and approving the Action Plan for the main relevant waste streams in the South Balaton region:

WG1: Bio-waste (green and food waste chain)

WG2: Packaging materials (paper, plastic, and metal)

WG3: Electronic waste

Within the WGs, **Cooperation Teams (CT)** will be created along the main working processes, such as:

CT1: waste collecting at the source and public relations

Potential members are from: Local governments of the regional waste management municipal associations, waste management public service company, local media, Association of Hungarian Hotels and Restaurants (some of their relevant territorial members), Environmental local NGOs.

CT2: waste treatment (selection and cleaning of waste)

Potential members are from: waste management public service company, waste treatment companies, research institutes (relevant R&D organizations, universities)

CT3: processing waste into products

Potential members are from: waste management public service company, waste treatment companies, environmental industry companies, research institutes (relevant R&D organizations, universities)

CT4: Sales and marketing of circular products generated from waste

Potential members are from: waste treatment companies, environmental industry companies, research institutes (relevant R&D organizations, universities), commercial companies, agricultural and viticultural companies.

Each WG has a **coordinator** who is responsible for the efficient collaboration between the CTs of the respective WGs. The coordinator manages the annual work of the respective WG and participate in the work of the steering committee of the AP.

The participation of further professional organizations and civil associations is optional. Their representatives can be invited experts, supporting the workflow of the WGs and CTs.

MONITORING

The following table shows the planned indicators for the proposed activities.

Table 1: Planned indicators of the action plan

Name of the indicator	Data source	Base year	Unit of measurement	Frequency of measure
Number of settlements in the South Balaton region covered with separate waste collection service	Central Statistical Office (KSH)	2020	number	yearly
Rate of selective waste from the total amount of the waste collected in the South Balaton region	Central Statistical Office (KSH)	2020	%	yearly
Amount of deposited bio-waste (as landfill waste) in the South Balaton region covered with separate waste collection service	Data collection	2020	ton	yearly
Total amount of produced compost from the bio-waste collected in the region	Data collection	2020	ton	yearly
Number of inhabitants involved in the awareness-raising programmes in South Balaton region	Data collection	2020	capita	yearly
Number of tourism companies and associations involved in the awareness-raising programmes in South Balaton region	Data collection	2020	number	yearly

The achievement and monitoring of the proposed actions and objectives summarized in this Action Plan will be carried out by the joint management committee established by the two regional waste management associations, the South Balaton and the South-West Balaton region. The necessary data for data collection is provided by the local governments of the settlements and by the DBR Ltd. who performs waste management tasks in region.