PILOT CITY: ANTALYA
DUDEN WATERFALL RECREATION AREA

European Commission

Project funded by the European Community under the H2020 Programme for Research and Innovation.

Overall concept of CUTLER

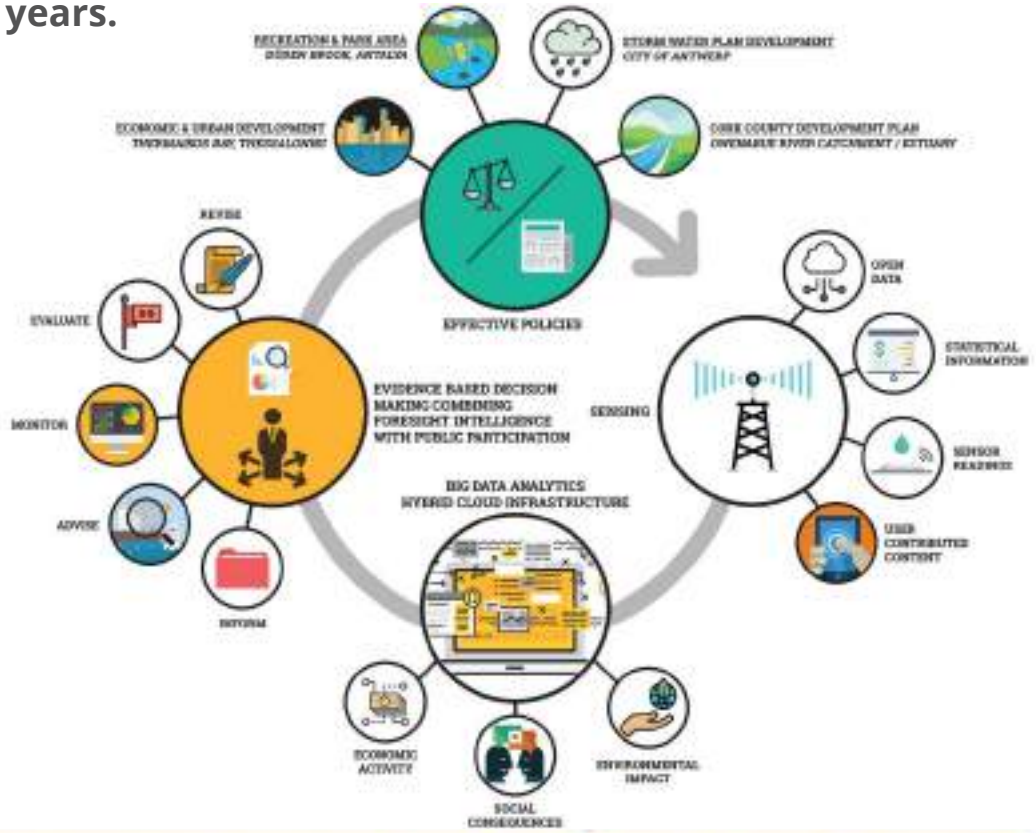
The coast, used here to refer to the area around the water element, is a dynamic place and its dynamism makes it susceptible to stresses and changes in a number of ways. Since it is the place where the land interacts with the water, it is open to the action of wind, waves, tides, and currents that may not only erode the waterfront or the river basis but also can expand it with sedimentary deposits.
In addition, social and economic forces also bring stresses to coastal areas. Population growth, land development, and resort development are all particularly intense along these areas, which experience high growth rates. Finally, development along these areas can be also vulnerable to hurricanes, nor'easters, and other kinds of severe weather phenomena.

The concept underpinning CUTLER is to guide decision makers, citizens, public officials and planners in the development of policies that build community, enrich the economy, and protect the environment.

Big-data driven policy making methodology

The proposed methodology foresees the use of CUTLER platform to facilitate the decision required to reach the strategic goals of each city that reflect the vision and priorities of the administration.

More specifically, CUTLER will be used to decide on the administration's technical program that defines the projects, policies and programs to be implemented during the forthcoming years.




ANTWERP, BELGIUM


CORK COUNTY, IRELAND


THESSALONIKI, GREECE


ANTALYA, TURKEY


VICENZA, ITALY

WHY DUDEN WATERFALL AREA?

Antalya had over 15 million visitors per year while Düden Waterfall only had 450.000 visitors in 2019. The Municipality of Antalya aimed to use the CUTLER platform as a decision making tool that will allow them to design policies for increasing recognition in the first waterfall attraction area, while also protecting the environment.

- **TURKEY NUMBER OF TOURIST (2023): 45.000.000**
- **ANTALYA NUMBER OF TOURIST (2022): 15.000.000 (%30)**
- **VISITOR NUMBERS OF DUDEN WATERFALL RECREATION AREA (2023): 790.000**

YEAR	ANTALYA NUMBER OF TOURIST	VISITOR NUMBERS OF DUDEN WATERFALL RECREATION AREA
2018	12.000.000	680000
2019	15.000.000	723000
2020	3.500.000	342000
2021	9.000.000	524000
2022	13.500.000	755000
2023	15.000.000	790000

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Main Goal of the Project: **To increase recognition and the visitor number of Düden first waterfall attraction area.**

Measures / Policy decisions:

- **how to increase number of visitors by maintaining the water level and quality,**
- **how to increase satisfaction on experiences of visitors (planning new events or redesigning the area according to age or social groups of visitors, maintaining water amounts, etc).**

As seen in the picture, the water level in Düden Waterfall is not always in the same density and differs depending on the seasons. We aim to protect the vitality of the Düden Stream Recreation area by continuing the waterfall effect by making arrangements at the water level.

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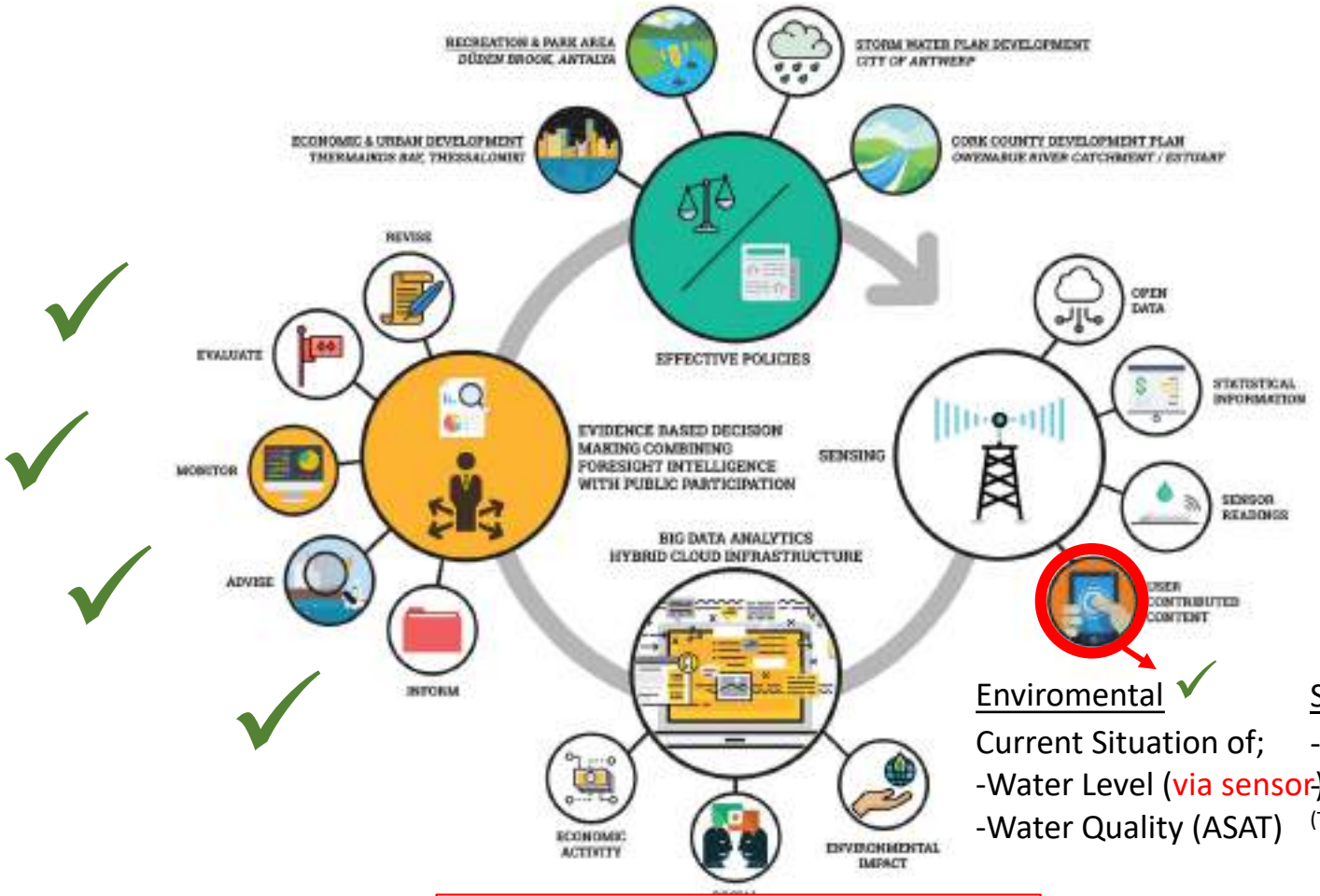
The Concept of CUTLER



The data obtained

-Weather Data ✓

-Air Quality Data ✓

-Number Of Visitors to Antalya ✓

-Data On Rental And Sales Values Of Commercial Areas ✓

-Regional Economic Data of Antalya ✓

-Water Level Measurement ✓

-Measurement of Visitor Number and Visitor Profile ✓

-Parking Capacity Measurement ✓

<u>Enviromental</u> ✓

Current Situation of;

-Water Level (via sensor)

-Water Quality (ASAT)

<u>Social</u> ✓

-Surveys

-Social Medya (Tripadvisor, Twitter,etc.)

<u>Economic</u> ✓

-Electrical Cost of Water Pump

-Personnel/Staff Expenses

-General Expenses

-Visitor Revenue

-Parking Income

-Rental Income

Tecnical Parners

Main Problems and Solutions Before & After CUTLER Project

Environmental Impact

Problem : Manual and intuitive use of existing water pumps in the field was causing electricity consumption and economic inefficiency was occurring.

Aims&Benefits:

Maintaining the water level will provide the continuity of the life of plant organisms and all the creatures living in the channel,
Water cleaning and high water flow will improve visitor satisfaction,
Reduction of electricity costs

Social Impact

Problem : Before the CUTLER Project, monthly visitors could only take measurements due to the lack of a Smart Entry System.
Therefore, it was not possible to determine which week of the month the visitor density was or at what time of the day the density increased.
Intuitively adjusting the number of employees in the area caused personnel costs to increase unnecessarily. On the other hand, when the number of visitors to the area reached seasonal density, the number of employees and, accordingly, the service quality were insufficient. This situation caused the satisfaction rate of visitors to decrease and the attractiveness of the region was weakened due to negative comments.

Aims & Benefits:

To determine the relationship between the measured values and the perception of the visitor and to take environmental precautions
Making new activities/facilities in the area when the number of visitors are decreasing
Redesigning the area considering the results of surveys and co-creation (resolution of different problems in the field)
Ensuring visitors to come more than one to duden waterfall and ensure to make positive comments to friends

Economical Impact

Problem : While economic efficiency remained weak due to the loss of the attractiveness of the area and the decrease in the number of visitors, it was necessary to increase incomes and reduce uncontrolled expenses (electricity consumption, etc.) in order to achieve a self-sufficient and sustainable economic structure.

Aims & Benefits:

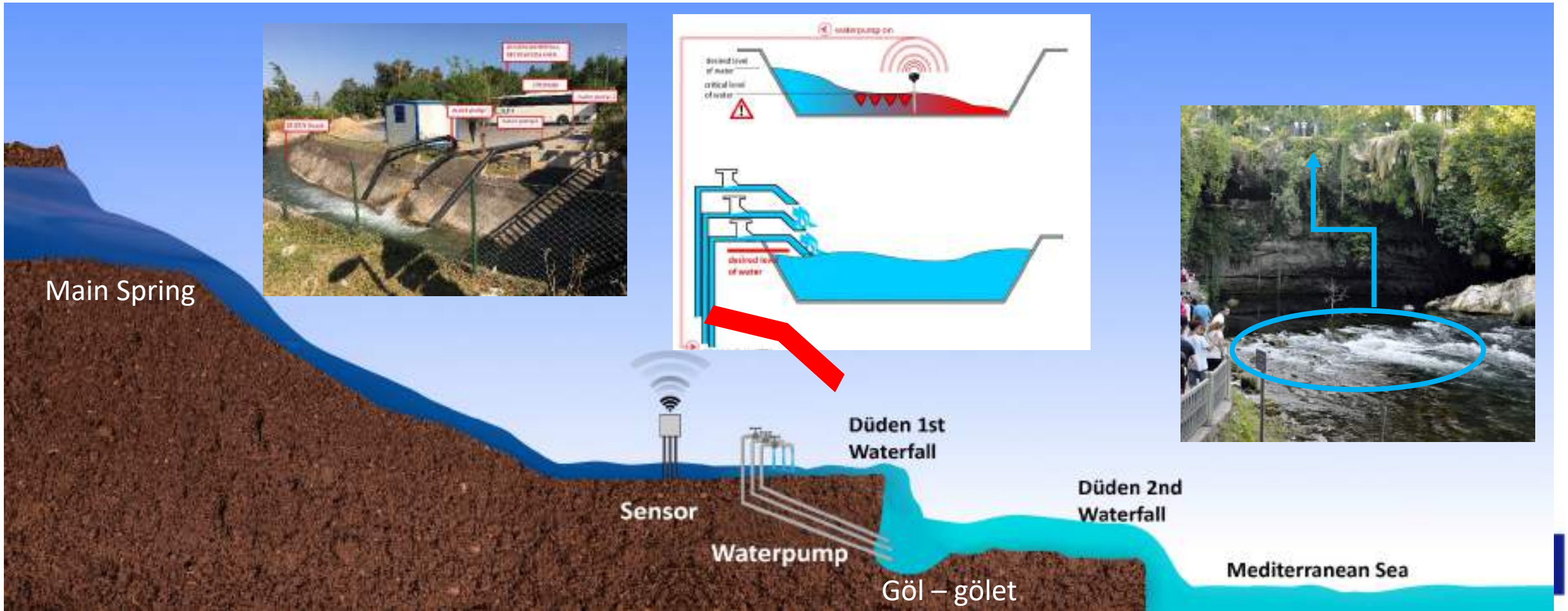
Optimizing the cost of staff (regulation of the number of employees in the area regarding the number of visitors)
To determine the ticket prices for the next periods
To determine the rental prices for the next periods
Providing sustainable income increase and balance of income and expenses

MAIN GOAL : TO INCREASE THE VISITOR NUMBERS OF DUDEN FIRST WATERFALL ATTRACTION AREA			
GOALS	**PURPOSE**	**MEASUREMENT**	**BENEFIT**
MAİN GOAL INCREASING THE SATISFACTION OF VISITORS BY PROTECTING THE LEVEL OF WATER	MAINTAINING DÜDEN WATER LEVEL	1- Water Flow (m3/s) 2- Water Level/Depth (depth (m)	MAINTAINING THE WATER LEVEL WILL PROVIDE THE CONTINUITY OF THE LIFE OF PLANT ORGANISMS AND ALL THE CREATURES LIVING IN THE CHANNEL
	PROTECT THE QUALITY OF WATER	1-Dissolved Oxygen (mg/L), 2-Fecal Coliforms, (number/100mL), 3-Fecal Streptococcus (number/100mL), 4-COD (mg/L), 5-pH, TN (mg/L), 6-TP (mg/L), 7-Total Coliforms (number /100mL).	
	VISITORS EXPERIENCE THE WATERFALL EXPERIENCE	Number of Visitor	WATER CLEANING AND HIGH WATER FLOW WILL IMPROVE VISITOR SATISFACTION.
	OPTIMIZING ELECTRICITY COSTS (PUMP COSTS)	Electricity Consumption	REDUCTION OF ELEKTRICITY COSTS
(SOCIAL IMPACT) INCREASING THE SATISFACTION OF VISITORS MANAGING VISITOR EXPERIENCE	TO MAKE IMPROVEMENTS BY RECEIVING ENVIRONMENTAL FEEDBACK	The Comments And Thoughts Of The Visitors On Environmental Factors (Water And Air Quality) On The Survey	TO DETERMINE THE RELATIONSHIP BETWEEN THE MEASURED VALUES AND THE PERCEPTION OF THE VISITOR AND TO TAKE ENVIRONMENTAL PRECAUTIONS
	TO MAKE IMPROVEMENTS BY RECEIVING SOCIAL FEEDBACK	Determining The Services For The Visitors, Visitor Satisfaction, And Requests / Suggestions	1-MAKING NEW ACTIVITIES/FACILITIES IN THE AREA WHEN THE NUMBER OF VISITORS ARE DECREASING 2-REDESIGNING THE AREA CONSIDERING THE RESULTS OF SURVEYS AND CO-CREATION (RESOLUTION OF DIFFERENT PROBLEMS IN THE FIELD)
	IMPROVING PROMOTIONS	Comments and "Likes" from Social Media (Tripadvidor, Twitter…)	ENSURING VISITORS TO COME MORE THAN ONE TO DUDEN WATERFALL AND ENSURE TO MAKE POSITIVE COMMENTS TO FRIENDS
(ECONOMİC IMPACT) MAXİMİZE REVENUES	DETERMINE THE POLICY REGARDING EMPLOYEE STAFF	Number of Visitor	OPTIMIZING THE COST OF STAFF (REGULATION OF THE NUMBER OF EMPLOYEES IN THE AREA REGARDİNG THE NUMBER OF VISITORS)
	DETERMINE TICKET PRICE POLICY	1-Number of Visitor 2-the Inflation data, 3-Euro Currency Rates, 4-Expense 5-Income Data	TO DETERMINE THE TICKET PRICES FOR THE NEXT PERIODS
	DETERMINATION OF RENTAL POLICY	1-Rental incomes, 2-Property rents, 3-Property sale indexes	TO DETERMINE THE RENTAL PRICES FOR THE NEXT PERIODS
	INFORMATION FOR FUTURE IMPROVEMENTS IN THE FIELD AND BALANCED DISTRIBUTION OF INVESTMENTS	1-Income 2-Expences	PROVIDING SUSTAINABLE INCOME INCREASE AND BALANCE OF INCOME AND EXPENSES

Coastal Urban developmenT through the Lenses of Resiliency

ANTALYA METROPOLITAN MUNICIPALITY

Düden Water is coming all the way from the spring to the waterfall. When the level of water falls down, natural and ecological life of the site will be in danger. Insufficient water can be cause of change in land cover, urban or surface heat islands which will effect urban resiliency and energy efficiency on urban area. As further result, Düden Waterfall would lose its reputation, raising a depression on tourism sector as an economic impact. Currently, there are 3 water pumps. These pumps were operating intuitively. These water pumps take the water from the lake where the waterfall flows when the water is low and pump it up. The aim of the Project was to make effective decisions by maintaining the water level in the light of measurable data using the Cutler Dashboard, taking into account the social economic and environmental factors.



<u>Pilot Scenario</u> : Pump operation based on instantaneous measurements of water level and visitor number;

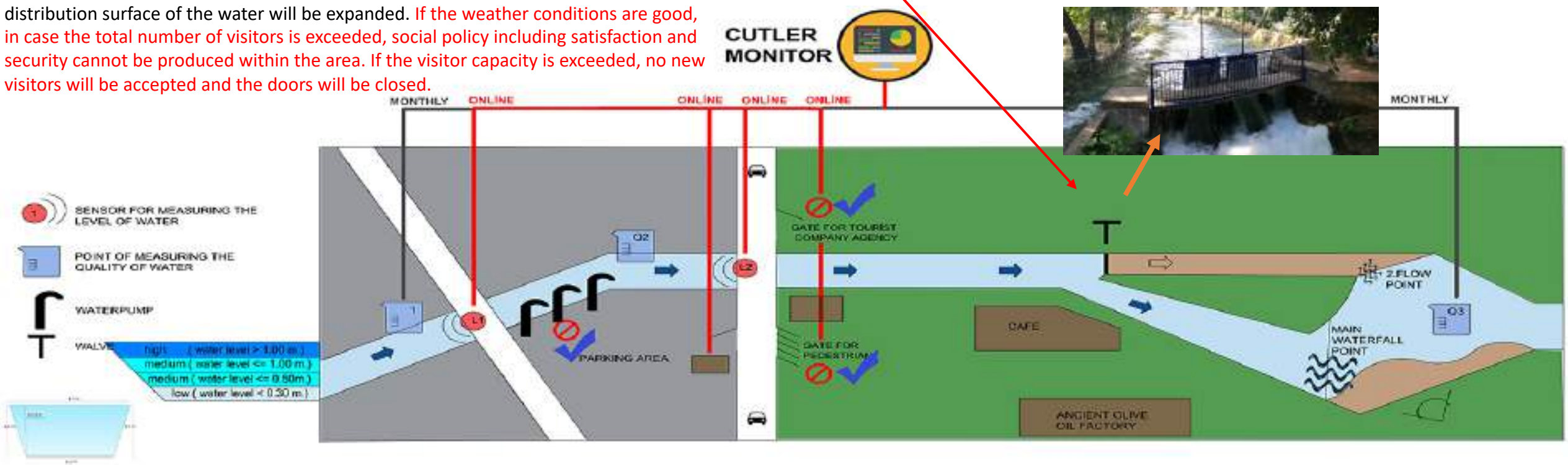
a1) If the water level is **low,** the weather conditions are good and visitor input is present / expected, three of the three pumps (pump 1, 2,3) will be operated. If the number of visitors is low despite the good weather, events will be organized to increase the number of visitors on those days.

a2) If the water level is **low,** the weather conditions are negative and no visitor input / is not expected, one of the three pumps (pump 1) will be operated for the vital functions of water ecology and environmental factors. To optimize economic impacts, the number of staff will be kept to a minimum during hours when the number of visitors is low.

b1) If the water level is **medium** and visitor input is present / expected, one of the three pumps (pump 1) is operated. To increase social impacts (visitor satisfaction), part-time employees will be added to provide adequate service on busy days.

b2) If the water level is **medium** and no visitor input / is not expected, the three pumps will not operate. In the range of hours where the number of visitors is high / expected to be high, adding part-time employees to ensure adequate service in the field as well as regular employees.

c) If the water level is **high**, the Water pumps are not operated. To prevent the risk of flooding, the water valve (water stopper covers before the second waterfall point) will be opened and the distribution surface of the water will be expanded. If the weather conditions are good, in case the total number of visitors is exceeded, social policy including satisfaction and security cannot be produced within the area. If the visitor capacity is exceeded, no new visitors will be accepted and the doors will be closed.



1.Sensor (before water pumps)

2.Sensor (after the water pumps)

Sensors were installed to provide data flow to the platform,
Instant data flow provided

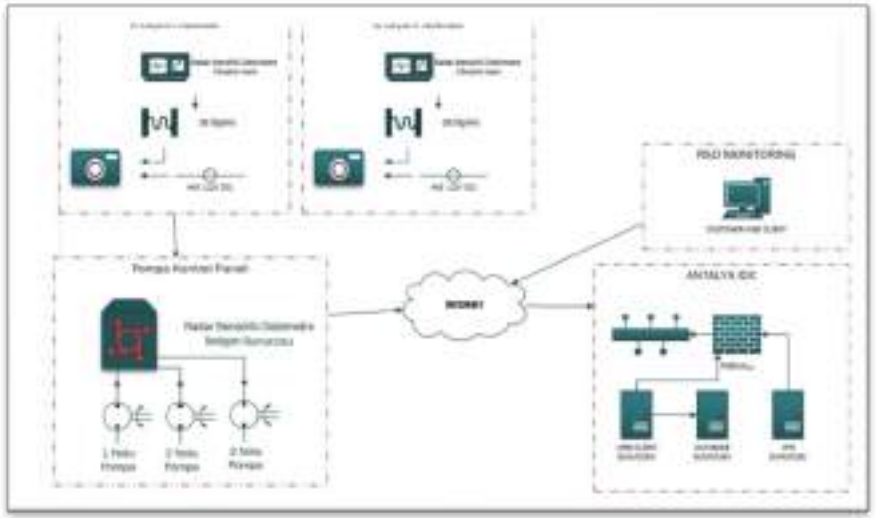
Sensor: After the motorpumps

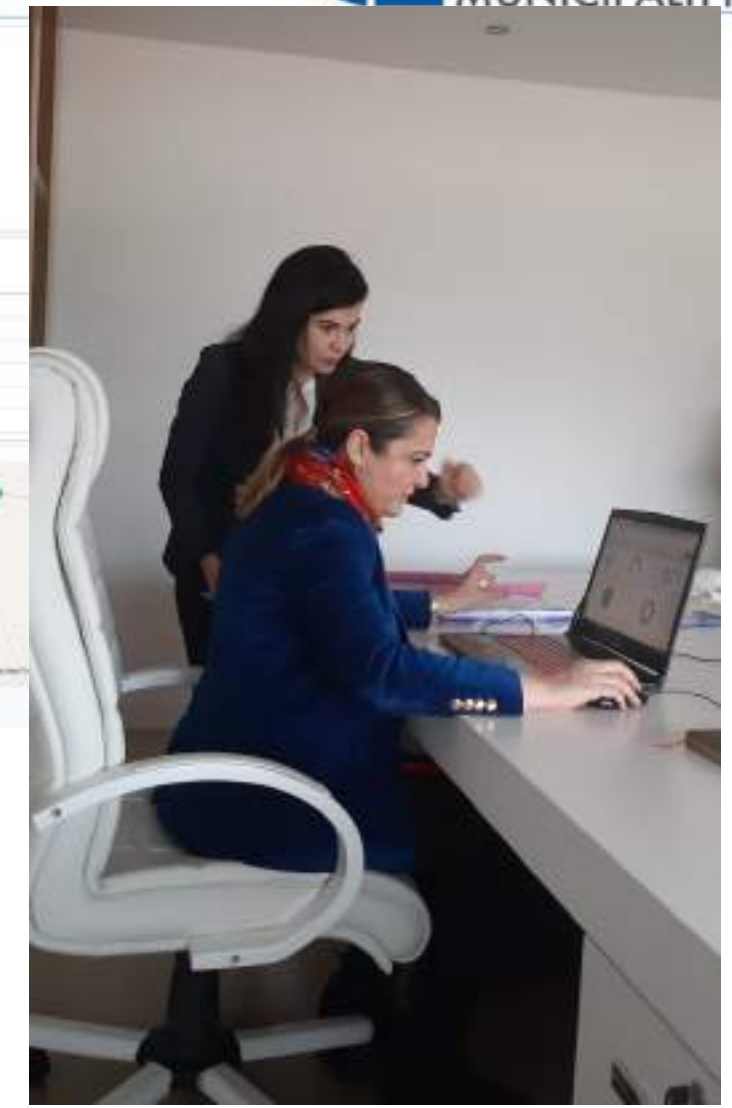
*Receiving requests from managers

*Installing water sensors for water level measurement

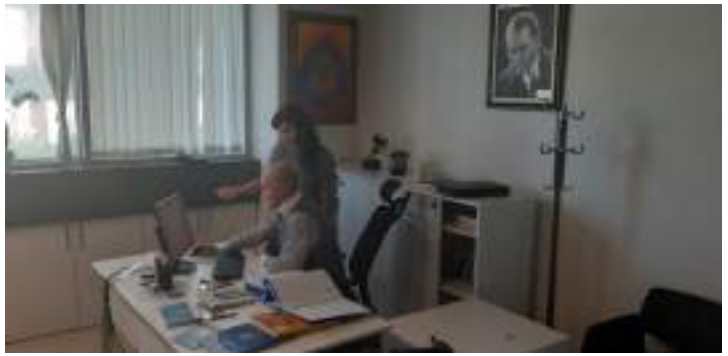
*New entry system

* Visitor surveys





- Using of the dashboard by decision makers.



Through the CUTLER platform desicion-makers will be able to see the environmental and economic gains than previos periods.

They will also able to see the when they schould planning and organizing new activities in the site and making the area more functional.

Awareness will increase as visitor satisfaction increases.

As awareness increases, the number of visitors will increase and economic incomes will increase.

As economic income increases, the Düden Waterfall Area will become self-sufficient by maximizing its own revenues.

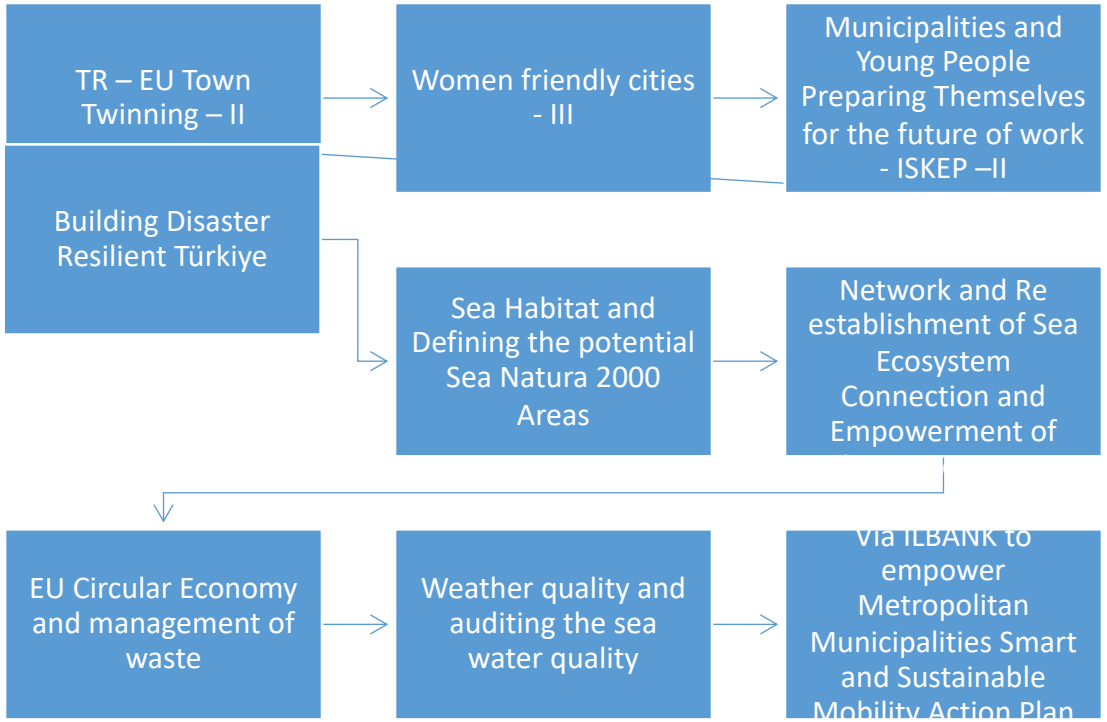
Thus, Duden waterfall, one of the most important tourist spots of Antalya, the most touristic city of our country, will be integrated to the coastal city of Antalya and provide resiliency.

WHAT'S NEXT?

Lakes Region of Turkey


For more colloboration …

- Local level strengthening participation mechanisms
- Local level capacity building to strengthen climate change implementations
- Zero waste intervention program



IPA for Municipalities
(12 New programmes are going to be launched soon)

- https://www.enicbcmed.eu/projects/funded-projects

CUTLER

Thank you for your kind attention !

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