Final design of Pilot Actions

Action A2

LIFE ADAPTATE LIFE16 CCA/ES/000049

Final design of pilot action

CREATION OF A WOODED AREA WITH DRIP IRRIGATION USING TREATED WATER

Región de Murcia, Águilas

Región de Murcia

Ayuntamiento de Águilas

LIFE ADAPTATE LIFE16 CCA/ES/000049

Contents

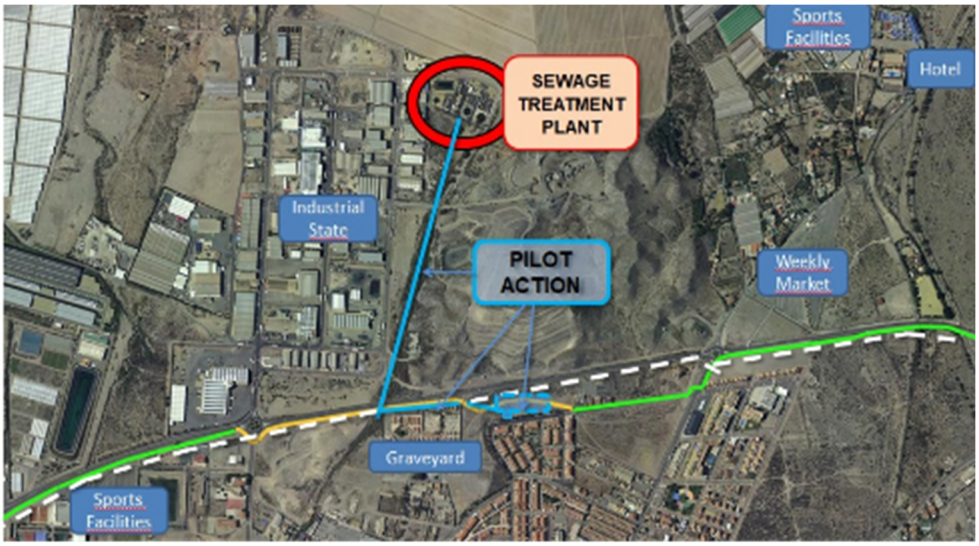
1. Summary

The areas susceptible to desertification in Spain are arid, semi-arid and dry sub-humid areas, that is, those areas where the ratio between annual precipitation and potential evapotranspiration is between 5% and 65%. Desertification already affects more than 30% of the entire southeast Spain territory. In three communities (Murcia, Valencia and Canary Islands) the risk of high or very high desertification affects almost 100% of the territory (in Murcia it is 99.09%)

According to the study of environmental risks published by Miguel Ángel Esteve, professor of Ecology at the University of Murcia, the droughts in Águilas will be increasingly hard and long, with less precipitation and higher temperatures, which will cause greater evapotranspiration favouring the processes of desertification suffered by the territory. In these areas, the soil is totally unprotected against erosion, washing of elements that can serve as nutrients to the vegetation and progressive loss of sediment. Another important problem is that this vegetation supposes important carbon sinks, fixing large amounts of CO_2 from the atmosphere, and if these plant populations disappear, the rate of CO_2 fixation will decrease as well as certain areas, as the sediment moves, could act as CO_2 emitting sources.

The municipality of Águilas suffers from a great demand for water which is intensified due to the incipient growth of the population during the holiday season - going from 34,706 inhabitants to 86,579 inhabitants during summer - and the enormous amount of water needed to carry out the main activity of Águilas economy, which is agriculture. Therefore, there is a great problem related scarcity of available water for the maintenance of wooded urban areas. To reverse this situation, a system has been designed to take advantage of the water resulting from the

wastewater treatment plants, which would otherwise be discharged into the sea.



Using this treated water produced by the treatment plant, which is not given any urban use, the pilot project of " Installation of wooded area with drip irrigation with treated water ", is to be implemented in Águilas municipality. This project will not only reuse this water, but also it will increase the volume of water available for irrigation, increasing then the tree mass in the urban area which will retain rainwater and reduce temperature during summer, as well as increase the use of clean energy in urban irrigation projects.

For the realization of this project it is necessary to build a small building where to install a water pump that will work thanks to the energy provided by a photovoltaic panel. This pump allows the water to rise to a sufficient height where, due to its own weight, will fall through a system of pipes until the green areas to be irrigated.

2. Core information

2.1. Project title

CREATION OF A WOODED AREA WITH DRIP IRRIGATION USING TREATED WATER

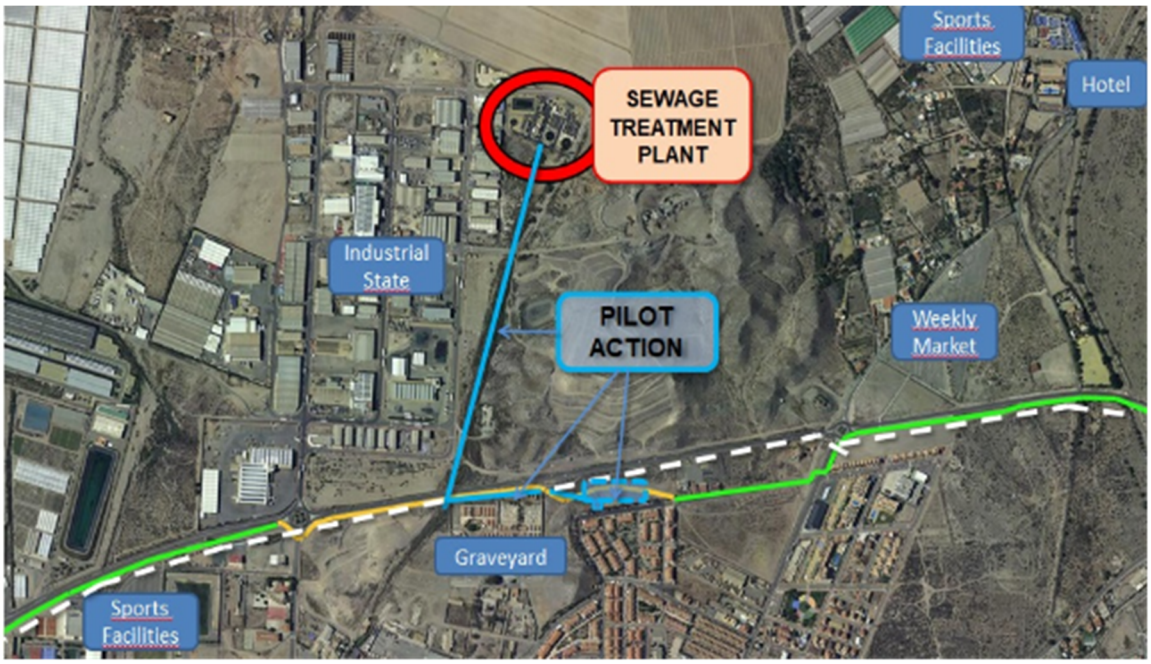
CREACIÓN DE UNA ZONA ARBOLADA CON RIEGO POR GOTEO A PARTIR DE AGUA PROCEDENTE DE UNA EDAR

2.2. Description of location and spatial scale of pilot actions

The development of the pilot project will take place in the Municipality of Águilas, located in the southeast of Spain and south of the Region of Murcia.

The action will start from the water treatment plant located in Las Mascaras Street (Las Majadas) from where a pipeline will flow to the water pump responsible for raising the treated water to a 50m^3 tank using solar power, from where this water will fall by gravity to the wooded area created within the framework of this project, located at 1.3 km from the treatment plant.

If the results obtained in this pilot action are successful, the whole tree belt surrounding the bike path will be irrigated using this water too.



2.3. Climate change risks addressed

Droughts impact on society can be very high, being one of the natural disasters that causes more economic damage.

The lack of water intensifies erosion, since the air and water drag the superficial particles of the soil, which lead to the lost of fertile and protection layer. Then, the regeneration of the vegetal cover becoming slower and slower.

According to NASA, the greatest increase in temperatures has been recorded during the last 35 years, coinciding with the increase in the emission of greenhouse gases by man. The year 2015 has been the warmest one since 1880 and its December has been the warmest month of the last 136 years.

In this context, measures such as increasing the volume of irrigation water and the area of wooded areas of a territory are essential to mitigate temperature increase and stop the process of desertification,

as urban centers are important heat source and these green areas are able to reduce significantly the local temperature, reduce erosion and naturally increase the water reserve of a territory.

2.4. Sustainability of the project

Once the pilot project has been completed, Águilas Municipality will be in charge of monitoring and maintaining the necessary infrastructure for its continuity, for which it will provide the budget and the necessary human and material resources to ensure it.

3. Main objectives

- Increase the volume of water for urban irrigation by using treating water, thus making use of surplus water from the municipal wastewater treatment plant to allocate a larger quantity of water for human consumption, thus making it possible to face population peaks in summer.
- Increase the wooded areas around the urban area that lowers the temperature and increases humidity levels in the city, thus favouring a cooler climate in the summer season.
- Increase the electrical energy produced by renewable sources through photovoltaic panels, advancing in this way towards more sustainable and renewable energy sources.

4. A timetable with precise actions to be undertaken in the pilot action

Months 1 and 2: September and October 2017.

- Project beginning, follow-up meetings and approval of agreements.

Months 3 and 4:November and December 2017.

- Primary draft of the project with the situation map of each element of the pilot action.
- Discussion of budget for action C3 and necessary authorizations.

Month 5: January 2018.

- Begining the preparation of the technical documentation.
- Starting the research studies:
    - Water engineering for storage and transport of treated water.
    - Construction engineering for water reservoir and pump house building.

Month 6: February 2018.

- Continuation of tasks started on January 2018.
- Search of a relocation site for water reservoir.

Month 7: March 2018.

- Continuation of tasks started on January 2018.
- Relocation of water reservoir.- Reformulation of water and construction engineering projects.
- Starting the obtaining the necessary permissions:
    - Sewage Plant.- Connection to obtain treated water.
    - "Confederación Hidrográfica del Segura" (Hydrographic Confederation of Segura River).- In order to obtain the permissions to pass the pipeline across the "hydraulic public domain" (watercourse protected area).

Month 8: April 2018.

- End of tasks started on January 2018.
- Starting drafting of project and technical specifications (T.A.)

Month 9: May 2018.

- End of tasks started on April 2018.
- First Communication actions.

Month 10: June 2018.

- End of tasks started on March 2018.
- Starting of adjudication procedure.

Month 11: July 2018.

- End of adjudication procedure.
- Second Communication actions.

Month 13: September 2018.

- Works for pumping house.
- Starting works for water reservoir and pipes installations.
- Starting of permanent communication campaign.

Month 14: October 2018.

- End of works for water reservoir and pipes installations.
- Starting works for installation of wooden area.

Month 15: November 2018.

- End of works for installation of wooden area.
- Visit of delegates from others Pilot Actions.

Month 16: December 2018.

- Verification of executed works.
- Starting the measurements (m^3 of treated water used, photovoltaic energy produced and temperature indie and outside of wooden area).

Months 17 to 34: From November 2018 to June 2020.

- Monthly measurements (m^3 of treated water used, photovoltaic energy produced and temperature indie and outside of wooden area).

5. Budget

The budget for the Pilot Action is defined in the project in Action C3 – Development of pilot actions.

It defines the amount per concept established for each one of the actions to be carried out in the pilot action, for infrastructures, external assistance, equipment and other costs.

- Infrastructures:
    - Works for the pumping house: 5600 € (Total) – 1400 € (Municipality).
    - Works for water reservoir: 19600 € (Total) – 4900 € (Municipality).
- Equipment:
    - Motor, pumping ad photovoltaic panels: 12704 €.
- Technical assistances:
    - Installation of wooden areas whit drip irrigation: 30800 €.
    - Contract works for treated water supply connection, installation of pipe from pumping site to water reservoir and from water reservoir to wooden areas (trench, pipe, filling and covering and chest: 21000 €.
    - Designing of report about pilot action developed: 1000 €.
- Other costs:
    - Translator for visits: 1500 €.
    - Printing of material about the pilot action development: 1500 €.

Personnel cost of the personnel assigned to the project will also be required for the performance of the actions: economic development technician, engineer, architect, technical architect, biologist, gardener, electrical technician, local development councilor, administrative.

Visit to pilot actions in Portugal and Latvia will also be required for the development of the programme.

6. List of all permits needed

To ensure the correct implementation of the project a permit from the Segura Hydrographic Confederation is needed in order to be able to pass pipelines through watercourse protected area. To obtain this permit, official channels have been followed through a standard application.

It has also been necessary a permit issued by the management company of the wastewater treatment plant Hidrogea, to make the connection to its outlet pipe. The permit was obtained through conversations with the company.

7. Coordination of project, target audience and stakeholders involved

In order to carry out this project, we will count on the participation of the municipal areas of: environment, local development and training (for employment), urbanism and public participation.

It has also been necessary a coordination with the management company of the wastewater treatment plant Hidrogea, to make the connection to its outlet pipe, and the "Confederación Hidrográfica del Segura" (Hydrographic Confederation of Segura River) in order to obtain the permissions to pass the pipeline across the "hydraulic public domain" (watercourse protected area).

The target audience is the whole population of our town, because all of it will be able to enjoy this wooded area.

8. Risk assessment

Risk area	Description (issue and consequences)	Type of risk	Impact level of risk	Probability that risk will occur	Management strategy
Management risks	Lack of project management experience	internal	3	1	Proper personnel selection system will be implemented.
	Lack of ability to work in a group within the management team	internal	3	1	Work methodologies will be implemented to ensure the smooth functioning of the group
	Conflicts among the project actors that would disturb the members of the Steering Committee creating a disagreement	internal	3	1	Designate a person to act as an intermediary for the resolution of conflicts
	Existence of disagreement among interested parties about possible project problems	internal	3	1	Designate a person to act as an intermediary for the resolution of conflicts
	Decisions made by one of the parties are not adequate for the purpose of the project	internal	3	1	Commitment on the part of the entire team to maintain and ensure compliance with the objectives
Human factor risks	A key member abandons the project, and that disengagement becomes a problem	internal	3	1	Take into account a second person to perform each of the key positions
	When the objectives are misinterpreted by the members of the project, there will be a gap between the expectations and the work as a whole	internal	3	1	Make sure before starting the project that everyone understands the objectives to be met
	Performance problems of the project team	internal	2	1	An appropriate personnel selection system will be implemented, in addition to monitoring the activity

	Lack of authority on the team to complete the work and achieve the objectives	internal	3	1	Make clear to those responsible for the action what their tasks are to be done within the team
Financial risks	Estimates and cost forecasts are inaccurate	internal	3	1	Thorough budget review leaving a margin for unforeseen expenses
Implementation risks	The application plan is not well defined, the risk comes from an error or omission at the time of the scope definition	internal	3	1	Review of the action plan prior to the start of the project
	A large number of change requests increases the complexity of the project and distracts the primary objectives	internal	3	1	Commitment on the part of the whole team to maintain and ensure compliance with the objectives, making only the changes that are essential
	Unspecified or ambiguous change requests	internal	2	1	Do not accept any document bad defined
	The team in charge of the installation of the infrastructure suffers vulnerability of its security	internal	3	1	The security regulations will be complied with in a conservative way
	When the material supplier is not aware of the needs or provides inadequate components	internal	3	1	Previous review the types of materials needed, as well as the quality and adequacy of the same to the infrastructure
Capacity risks	Lack of sufficiently qualified personnel	internal	3	1	An appropriate personnel selection system will be implemented
	Mismanagement of an unforeseen change at the organizational or departmental level would cause problems in the resolution of the project	Internal	3	1	Study the necessary changes ensuring compliance with the objectives
	The workload of interested parties may lead to project interruptions	Internal	3	1	Commitment on the part of the entire team to maintain and ensure compliance with the objectives

	The contributions of the parties are of low quality or irrelevant	Internal	3	1	Designate a person to act as an intermediary for the fulfilment of the objectives
	When the project team needs to acquire new skills there is a risk that productivity will decrease	Internal	2	1	An appropriate personnel selection and training system will be implemented
	Unreliable or poor quality materials, which fail after a short period of time	internal	3	1	Previously, review the types of materials needed, as well as the quality and adequacy of the same to the infrastructure
Environmental risks	Lack of sufficiently qualified personnel	internal	3	1	An appropriate personnel selection system will be implemented
	Mismanagement of an unforeseen change at the organizational or departmental level would cause problems in the resolution of the project	Internal	3	1	Study the necessary changes ensuring compliance with the objectives
	The workload of interested parties may lead to project interruptions	Internal	3	1	Commitment on the part of the entire team to maintain and ensure compliance with the objectives
	The contributions of the parties are of low quality or irrelevant	Internal	3	1	Designate a person to act as an intermediary for the fulfilment of the objectives
	When the project team needs to acquire new skills there is a risk that productivity will decrease	Internal	2	1	An appropriate personnel selection and training system will be implemented
	Unreliable or poor quality materials, which fail after a short period of time	internal	3	1	Previously, review the types of materials needed, as well as the quality and adequacy of the same to the infrastructure

Legal and political risks	Poor quality of the infrastructure because the construction team has not adhered to the established	Internal	3	1	Commitment of the whole team to maintain and ensure compliance with the objectives
	The project stops due to non-compliance with deadlines or lack of reports	Internal	3	1	Designate a person in charge of coordination between the parties
	Difficulties to obtaining work permits	External	3	1	To have previously all the necessary permits before the start of the action

Annex 1

ACTION		2017				2018												2019												2020							
Action number	**Name of the action**	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
0. Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE																																					
0.1.	Documentations to be prepared			X	X																																
0.2.	Research studies to be developed			X	X																																
0.3	Necessary permissions to be obtained			X	X																																
1. Preparation of pilot action (planning, research, permits, etc.) TO DO																																					
1.1.	Preparation of documentations					X	X	X	X																												
1.2.	Development of research studies					X	X	X	X																												
1.3.	Obtaining the necessary permissions							X	X	X	X																										
1.4.	Drafting of project and technical specifications (T.A.)								X	X																											
1.5.	Adjudication procedure										X	X																									
2. Implementation actions (construction works etc.)																																					
2.1.	Works for pumping house													X																							
2.2.	Works for water reservoir													X	X																						
2.3	Works for treated water supply connection, installation of pipe from pumping site to water reservoir and from water reservoir to wooden areas													X	X																						

2.4.	Installation of wooden areas whit drip irrigation														X	X																					
3. Review and necessary approvals after implementation																																					
3.1.	Verification of executed works.																X																				
3.2.	Measurement of m3 of treated water used, photovoltaic energy produced and temperature inside and outside wooden area.																X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3.3.	Reports.																						X						X						X		
4. Awareness raising and communication																																					
4.1.	Communication campaign for inhabitants									X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
4.2.	Setting project info poster													X	X																						
5. Monitoring																																					
5.1.	Monitoring of the pilot action																		X									X									
5.2.	Final assessment																																		X		
6. Transfer and replication																																					
6.1.	Visit of delegates from other Las to see the pilot action															X																					
6.2.	Publication: Local adaptation projects in Spain, Portugal and Latvia																																				X

Annex 2

Outcomes			Outputs			Activities			Inputs	
outcome	indicators/ baseline/target	info source	Inputs	Inputs	info source	activities	indicators/ baseline/target	info source	Inputs	Amount
Reduced drought risk and improved access to water	Squared meters of wooded area in the target area	Direct verification of the construction	Increase of wooded areas in the surroundings of the urban centre.	Increase, in squared meters, of wooded areas in in the target area	Measuring m2 of new tree areas	Works for water reservoir (5x5x2, 50 m3)	Water reservoir built	Direct verification of the infrastructure	€	4900 € (19600 €)
Increased water volume for urban irrigation.	Cubic meters (m^3) of treated water used for urban irrigation Target: 40 m3/day (average day rate)*.	Measurement in water meter	Built water reservoir	Increase in cubic meters (m3) of the volume of irrigation water	Measurement of the water increase in m3	Works for pumping house, photovoltaic panels, motor and pump	Pumping house built, solar panels, motor and pump working on	Direct verification of the infrastructure	€	7752 € (18304 €)
						Infrastructure for pipe conduction and irrigation system.	Infrastructure for pipe conduction and irrigation system built	Direct verification of the infrastructure	€	21000 €
Increased public health, by reducing exposure to direct sun	number of people positively affected	Indirect estimation				Installation of wooden areas.	Installation of wooden areas finished	Direct verification of the infrastructure	€	30800 € **
To be able to carry out a viable procedure that serves as a reference for other municipalities with the same problem	Successful project	Final evaluation of project	Development of a methodology to follow the Pilot Action to be able to transfer the experience to other municipalities	Methodology: objetives and results	Project documentation	Report on the pilot action carried out	External assistance		€	1,000 €

* The annual average rate volume of treated water for irrigation will be 40 m3/day, with a maximum of 50 m3/day on summer months, and a minimum of 30 m3/day on winter months.

** The pilot plan will be carried out on a plot of 22,000 m2. In addition, part of the volume of treated water will be used to irrigate 2 existing wooded areas, 12,000 and 27,000 m2, which are currently irrigated with potable water.

Final design of pilot action

“Conditioning and connection of green areas from the surroundings of the Severo Ochoa Square to the Ensanche Park”

España, Cartagena.

Ayuntamiento Cartagena
www.cartagena.es

LIFE ADAPTATE LIFE16 CCA/ES/000049

Contents

Summary

As a result of being a beneficiary partner, the City Council of Cartagena, according to an agreement signed by the Mayor on April 10, 2017 with the European Commission, describes and develops the proposed actions within the Life Call 2016 program, in the pilot project of " Conditioning and connection of green areas from the surroundings of the Severo Ochoa Square to the Ensanche Park ", for the implementation of adaptation and mitigation policies to climate change in our city.

These actions consist in the creation of a network or urban corridor of interconnected green areas that allow the creation and modification of urban microclimates to alleviate the rise in temperature in the environment.

It is intended a change in the design concept of parks and public squares, through the removal of hard pavements and introducing trees, vegetation, pergolas and pergolas with green roofing, upholstery pavements and increase the number of alcorques that allow the infiltration of water in episodes of rain. In addition, these green areas with be mixed paths of pedestrians and bike lanes.

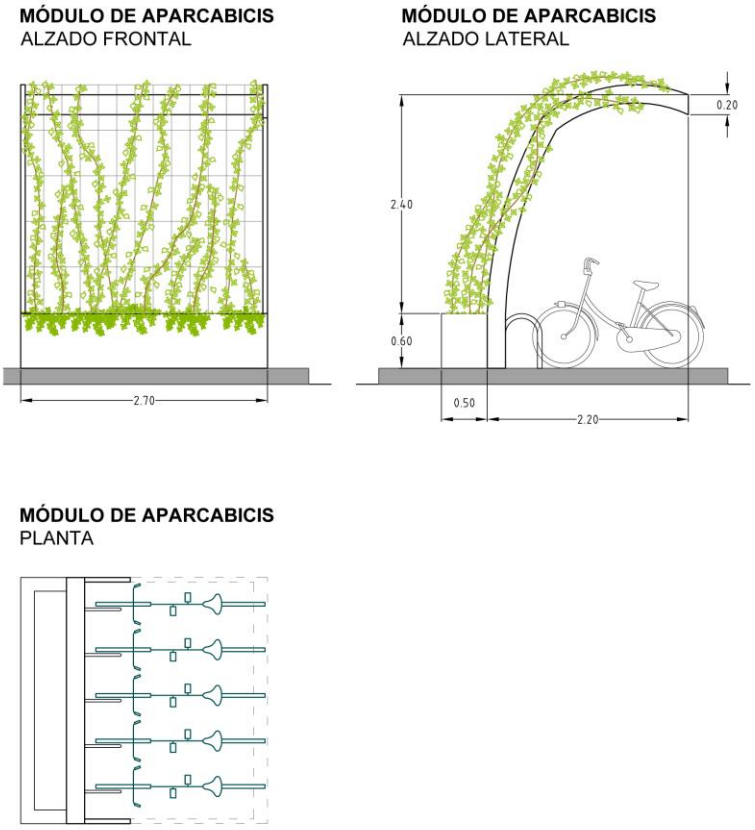


Image 1: Bicycle parking design

Creating shaded spaces with the introduction of well adapted native and allochthonous tree species, expanding tree-beds, introducing pergolas and pergolas with

green roofs into the urban furniture, using the same climbing species, together with the construction of benches to rest the pedestrians.

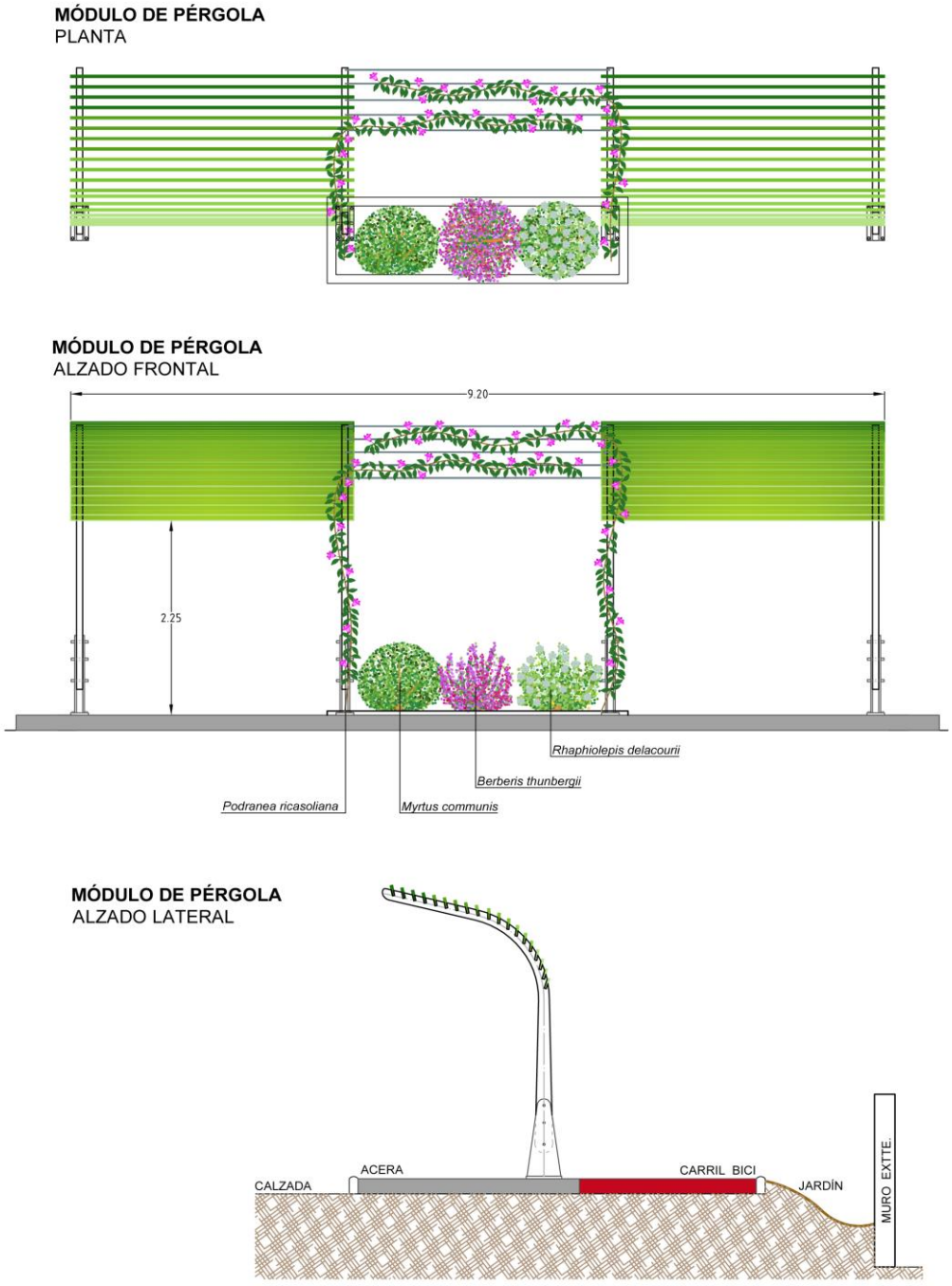


Image 2: Pergola design

The control parameters of the system will be controlled by a meteorological station with a network of specialized sensors that will measure relative humidity and temperature and contrast that ambient temperature with the temperature of the pilot actions. This information will be sent in programmable periods through wireless networks to the switching nodes of the municipal optical fiber network.

1. Core information

1.1. Project title

“ACONDICIONAMIENTO Y CONEXIÓN DE ZONAS VERDES DESDE EL ENTORNO DE LA PLAZA SEVERO OCHOA HASTA PARQUE DEL ENSANCHE”

"CONDITIONING AND CONNECTION OF GREEN AREAS FROM THE SURROUNDINGS OF THE SEVERO OCHOA SQUARE TO THE ENSANCHE PARK"

1.2. Description of location and spatial scale of pilot actions

Plans are attached.

Section 1. Cisterns are expanded to collect rainwater more efficiently, replacing the current sick trees located on the sidewalk affected with the plague macrohomotoma gladiata by shade trees.

Green parking, the asphalted parking will be modified including trees to reduce the thermal gradient produced by the asphalt and increase the shade surface. In addition, a bike lane with metal pergola structure and climbing plant will be installed. They are placed on the sidewalk next to the bike path that borders the existing garden metal pergolas of treated wood, without vegetation.

Section 2. This area ends in narrowing, it is only reduced to sidewalk and bike lane so it is resorted to the solution of pergola with vegetation and awnings, with alcorque in the terrain run with vines and vegetation. Shaded trees are included in the existing garden.

Section 3. At this point there is currently a wall that remains below ground level with debris, covered with a crawler upholstery to improve the infiltration of rain. On the sidewalk, a pergola with a continuous tree with the same plant elements of section 2 is included again.

Section 4. Unused green area and next to the ramp, currently with rubbish and scrub. It includes vegetation with low water needs.

Section 5. It will connect the Ronda de la Unión Street and Dr. Casmiro Bonmatí Square, with a mixed lane for bikes and pedestrians. Within the green zone a path will be created and protected by the shade of trees where a recreational area with calisthenics will be located.

Section 6. Finally, the entrance to Parque del Ensanche will be conected with fast-growing shade trees such as Tipuana tipu, and in front of the Official School of Languages there will be a pergola for rest with bicycle parking.

1.3. Climate change risks addressed

The municipality of Cartagena believes that the increase in green areas adapted to pedestrian use can help to reduce the climate-related risks in the daily life of citizens. This pilot action seeks to reduce one or two degrees in the related areas, and change the way we understand the concept of street by green corridor.

1.4. Sustainability of the project

Once studied and verified which actions are more efficient to reduce the thermal gradient in the hours of greater insolation in the pilot project, the implementation will continue along the Ronda de La Unión Street since it shares the same deficiencies as the area of action of the project, and could be connected achieving 2 km of green areas accessible to pedestrians.

The final objective will be to connect the entire city with green corridors in the future.

2. Main objectives

The pilot action is the result of ingenious initiatives that mitigate the high temperatures in the hours of greater daily insolation to its inhabitants, favouring the infiltration of water in episodes of rain and the fixation of CO2 of the contamination through the vegetation.

These solutions are carried out with the following actions::

1. Including pergolas and shade trees.

2. Creation of tree areas.

3. Increasing the vegetation, with vines, shrubs, shrubs and trees adapted to low water requirements.

To measure the effectiveness of the actions will be controlled by a meteorological station with a network of specialized sensors that measure relative humidity and temperature and contrast that ambient temperature with the temperature of the pilot actions through a data logger. The information will be sent in programmable periods through wireless networks to the switching nodes of the municipal optical fiber network and will be contrasted with that of the data logger.

All of this will be installed in the first six months of the project and will be monitored during the project.

3. A timetable with precise actions to be undertaken in the pilot action

Table Annex 1.

0. ***Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE, 09/17-02/2018, 0.1*** *Preparation of documentations and 0.2 Development of research studies.*

1. ***Preparation of pilot action (planning, research, permits, etc.) TO DO, 03/18-07/18, 1.1.*** *Preparation of documentations subcontract work and process, internal process city council.*

2. ***Implementation actions (construction works etc.), 08/18-02/18, 2.1*** *Manufacture pergolas, 2.2 Construction works and Planting Vegetation and irrigation system (transplant trees in winter).*

3. ***Review and necessary approvals after implementation, 04/19-02/20, 3.1*** *Term of work guarantee.*

4. ***Awareness raising and communication, 04/19-07/19, 4.1*** *Communication campaign for inhabitants, 4.2 Setting project info poster and 4.3 Satisfaction surveys in educational centers of high affluence of the area.*

5. ***Monitoring,*** *03/19-07/20,5.1 Monitoring of pilot action indicators and outputs and 5.2 Final assessment.*

6. ***Transfer and replication,*** *07/20, 6.1 Visit of representatives of other LAs to see the pilot action and 6.2 Publication: Local adaptation projects in Spain, Portugal and Latvi*a.

4. Budget

Budget by Chapters:

SUMMARY	Total amount of items
CHAPTER 1 CAP01– DEMOLITIONS	
Total Chapter CAP01	9,566.55
CHAPTER 2 CAP02 CIVIL WORK	
Total Chapter CAP02	30,201.56
CHAPTER 3 CAP03 INSTALLATIONS	
Total Chapter CAP03	4,844.25
CHAPTER 4 CAP04 FINISHS AND OTHERS	
Total Chapter CAP04	47,798.84
CHAPTER 5 CAP05 GARDENING	
Total Chapter CAP05	33,977.41
CHAPTER 6 CAP06 SECURITY AND HEALTH	
Total Chapter CAP06	1,439.54
CHAPTER 7 CAP07 WASTE MANAGEMENT	
Total Chapter CAP07	804.60
TOTAL WORK	128,632.75
General expenses	18,008.59
Industrial Benefit	7,717.97
Total amount	154,359.31
21% VAT	32,415.46
TOTAL PILOT ACTION	186,774.77

Summary Life Adaptate Budget:

1. TRAVEL AND EXPENSES		
	Total	**12.475,00**
2. SUBCONTRACTING		
	Total	**123.629,20**
3. OTHER EXPENSES		
	Total	**11.000,00**
5. INFRASTRUCTURES		
MUROJOA0117	MURAL PAINTING (Identification LIFE ADAPTATE 2016)	2.500,00
PERGOLA2017	PERGOLA CARTAGENA	39.060,00
PARKINBICI0317	PARKING BIKES INOX AISI 316	760,00
mU16D090	BANK MADRID TYPE MU-16	1.110,33
CALIST0118	CALISTENIA APPLIANCES	900,00
	Total (no VAT)	**44.330,33**
	VAT	**9.309,37**
	Total (VAT included)	**53.639,70**
4. EQUIPMENTS		
CAP03	**CHAPTER 3 INSTALLATIONS**	4.844,25
RIEGO0117	SUPPLY, INSTALLATION AND ADAPTATION OF THE IRRIGATION SYSTEM	6.065,18
ESTACION0217	WEATHER STATION IQ3000	5.645,00
DATALOG	TEMPERATURE DATA LOGGERS	242,00
	Total (no VAT)	**16.796,43**
	VAT	**3.527,25**
	Total (VAT included)	**20.323,68**

5. List of all permits needed

The Pilot Project has been carefully studied so that external permission is not necessary. The actions have been located on municipal properties to avoid affecting foreign properties, the current use of the affected plots is not altered, so it does not alter the current planning. In the design and planning the existing services have studied in order to avoid affecting them, in case of affecting by mistake some affected service will be replaced in the execution of the work avoiding the cutting of services. In the area of action does not change the locations of existing luminaires and there is water service, so it is not dependent on any outsourced company.

6. Coordination of project, target audience and stakeholders involved

Publication of brochures of the Life Adaptate Project, dissemination on the website of the City Council once the execution of the pilot project is completed.

Presentation of the inauguration of the pilot project in institutional act, with visit of municipal representatives.

To be able to assess the acceptance and satisfaction of the inhabitants and citizens that circulate in the area of action of the Pilot Project. It will be communicated by telephone and in writing to the representatives of the Educational Centers the actions carried out and request their voluntary assessment as well as the users of said centers as they transit through this nexus of union of green areas.

The Centers for which an assessment is requested are listed below:

- ***Official School of Languages.***
- ***Professional Music Conservatory of Cartagena.***
- ***The Associations of Parents of Students from Cartagena.***
- ***Concepción Arenal School.***
- ***Center for educational equipment and resources in Cartagena.***

Surveys will be given to these centers so that users could assess the degree of satisfaction obtained in a valuation from 1 to 5, will be collected and an analysis of the data obtained will be made and with the information obtained, the results of the monitoring will be added. You will get a real result of the success of the project's actions. This will help those responsible for the infrastructure area and the municipal government to continue expanding these actions throughout the municipality.

Cartagena, 12 of February 2018.

Eva Hernández Grau

Técnico municipal del Ayuntamiento de Cartagena

7. Risk assessment

Risk area	Description (issue and consequences)	Type of risk	Impact level of risk	Probability that risk will occur	Management strategy
Management risks	*lack of project management experience*	*internal*	*3*	*1*	*Proper personnel selection system will be implemented.*
	changes in the project timetable	*internal*	*1*	*2*	*Monitoring of the administrative and legal process.*
Human factor risk	*lack of knowledge*	*internal*	*1*	*1*	*Consulting support*
Financial risks	project financial instruments and sources	internal	3	1	Approval of the municipal budget for this year and execute the project in parts.
Implementation risks	lack of information security measuring elements are broken	external	2	1	
Capacity risks	lack of knowledge resources	internal	3	1	*Consulting support.*
Environmental risks	Extreme weather event, causing delays of implementation	external	3	1	An emergency action plan will be developed
Legal and political risks	possible changes in regulations or policies	external	2	2	The project will be approved by the government board

Annex 1

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ACTION		**2017**				**2018**												**2019**											**2020**									
Action number	**Name of the action**	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
0. Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE		X	X	X	X	X	X																														
0.1.	Preparation of documentations	X	X	X	X	X	X																														
0.2.	Development of research studies	X	X	X	X	X	X																														
1. Preparation of pilot action (planning, research, permits, etc.) TO DO								X	X	X	X	X																									
1.1.	Preparation of documentations subcontract work and process							X	X	X	X	X																									
2. Implementation actions (construction works etc.)													X	X	X	X	X	X	X																	
2.1.	Manufacture pergolas												X	X	X	X	X																			
2.2.	Construction works												X	X	X	X	X																			
2.3	Planting Vegetation and irrigation system																	X	X																	
3. Review and necessary approvals after implementation																				X	X	X	X	X	X	X	X	X	X	X	X					
3.1.	Term of work guarantee																			X	X	X	X	X	X	X	X	X	X	X	X					
4. Awareness raising and communication																					X	X	X	X												
4.1.	Communication campaign for inhabitants																				X	X	X	X												
4.2.	Setting project info poster																				X	X	X	X												
4.3.	Satisfaction surveys																						X	X												
5. Monitoring																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

5.1.	Monitoring of pilot action indicators and outputs																		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5.2.	Final assessment																																	X	X	
6. Transfer and replication																																					X
6.1.	Visit of representatives of other LAs to see the pilot action																																				X
6.2.	Publication: Local adaptation projects in Spain, Portugal and Latvia																																				X

Annex 2

	Outcomes			Outputs			Activities			Inputs
	outcome	indicators/ baseline/target	info source	outputs	indicators/ baseline/target	info source	activities	indicators/ baseline/target	info source	Inputs
	Increased public health, by reducing exposure to direct sun y bajar la temperatura con las acciones de sombra y vegetación.	With temperature measurements contrasted between the ambient temperature and the temperature in a pilot project with the actions of shade and vegetation. baseline -Tª target - decrease 1-2º C	The reduction of insolation to the citizens in the area of the pilot project and increase the comfort thereof by reducing the thermal gradient	Increase of trees in the surroundings of the urban centre and pergolas.	Increase, in unit, of trees in the municipality and pergolas. Baseline -0 lineal meters of pergolas, increase the number of existing trees. Target – 420 lineal meters of pergolas. Increase in the number of trees in 43 units.	Increase in the number of trees fixing CO2. Increase in the number of pergolas.	Installation of trees, green areas and pergolas	1.- Opening of tree areas. 2- Planting of vegetation and woodland. 3- Installation of pergolas	1.- The opening of tree stands increases the infiltration of rainwater. 2.- The planting of vegetation and trees increases the relative humidity 3.-The installation of the pergolas decreases the Insolation.	Weather station and data logger. Maintenance of vegetation and trees. Maintenance of the pergolas. Personnel of the monitoring of the values contributed by the elements of measurement. Communication and assessment with the target groups. Financial resources.

ACONDICIONAMIENTO Y CONEXIÓN DE ZONAS VERDES
DESDE EL ENTORNO DE LA PLAZA SEVERO OCHOA HASTA EL PARQUE DEL ENSANCHE

AYUNTAMIENTO DE CARTAGENA — INFRAESTRUCTURAS

2.2 PLANTA ACTUAL - TRAMOS 1:1000

JOAQUÍN CABELLO PORTELA
ARQ. TÉCNICO MPAL.

EVA HERNANDEZ GRAU
ING. TÉC. AGRICOLA MPAL.

FEBRERO 2018

TRAMO 1

TRAMO 2

TRAMO 3

TRAMO 4

TRAMO 5

TRAMO 6

Plaza Severo Ochoa

Ronda Ciudad de la Unión

Calle Angel Bruna

Plaza Dr. Casimiro Bonmatí

CEIP Concepción Arenal

E.O.I.

Final design of pilot action

" MEASURES DESTINED TO REDUCE THE EFFECTS OF THE HEAT WAVES (ZONES OF SHELTER FROM THE SUN, CORRIDORS IN SHADE) BY MEANS OF INSTALLATION OF AWNINGS IN CORREDERA AND ADJACENT STREETS OF LORCA CITY"

REGIÓN DE MURCIA
LORCA

LIFE ADAPTATE LIFE16 CCA/ES/000049

Contents

Summary

The aim of Pilot Action of Lorca municipality is to develop a demonstrative action to evaluate the results obtained when installing shadow corridors in the city centre of Lorca and to counteract the urban heat islands, whose microclimates have a negative impact on global warming.

This action involves the installation of awnings in various crowded street or key routes of the city such as the Corredera Street, creating shaded areas and corridors that improves the thermal comfort of pedestrians, reducing the temperature in the building facades and pavements due to solar radiation, as well as reactivating trade: mercantile, financial and leisure, in the months of extreme heat.

Corredera Street

Intersection of Corredera Street and Pío XII Street

Corredera Street

View of the Castle from Alporchones Street

1. Core information

1.1. Project title

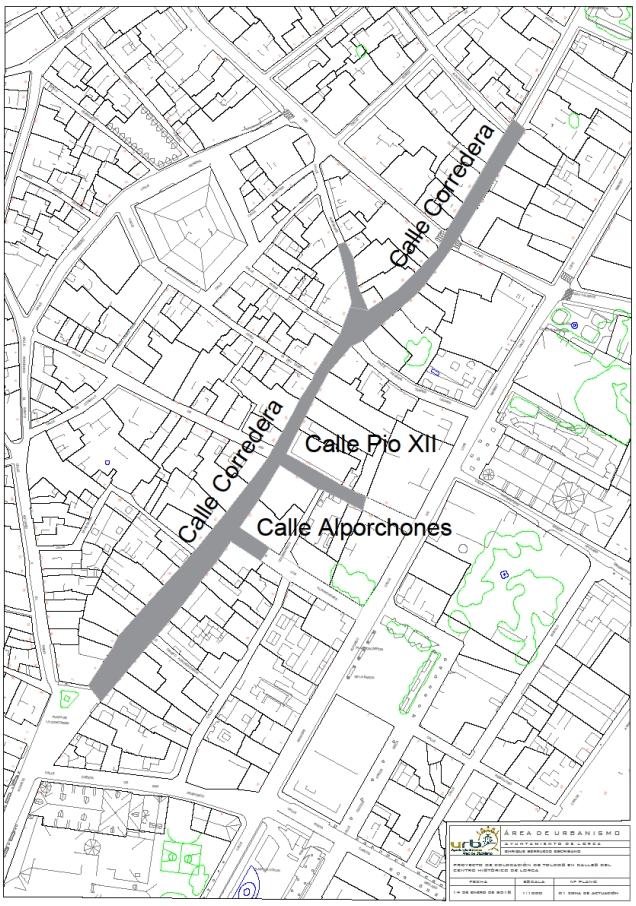
" MEASURES DESTINED TO REDUCE THE EFFECTS OF THE HEAT WAVES (ZONES OF SHELTER FROM THE SUN, CORRIDORS IN SHADE) BY MEANS OF INSTALLATION OF AWNINGS IN CORREDERA AND ADJACENT STREETS OF LORCA CITY"

"MEDIDAS DESTINADAS A REDUCIR LOS EFECTOS DE LAS OLAS DE CALOR (ZONAS DE SOMBRAJE O CORREDORES EN SOMBRA) MEDIANTE LA INSTALACIÓN DE TOLDOS EN CALLE CORREDERA Y ADYACENTES DE LA CIUDAD DE LORCA"

1.2. Description of location and spatial scale of pilot actions

The project is located in Lorca city centre streets such as: Corredera Street (main artery of Lorca), Pío XXII Street, Alporchones Street and Admiral Antonio Aguilar Street.

The awnings will be installed by means of anchors, which will be installed on the building facades located in the mentioned streets, covering from Calle Corredera to Calle Alburquerque and Almirante Aguilar, and removing part of Pío XXII and Alporchones so as the awnings do not cover the Castle of Lorca views.



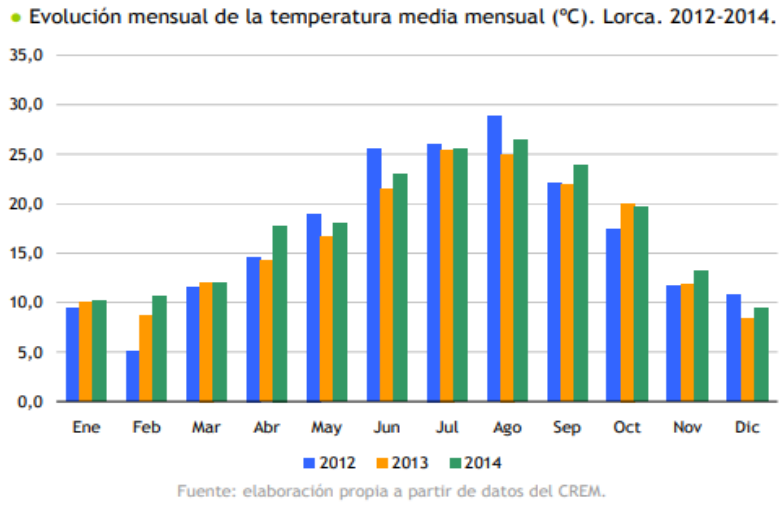
1.3. Climate change risks addressed

The climate change risks that Lorca needs to face are mainly heat waves and urban heat islands.

The average annual temperature in Lorca usually oscillates between 15 and 18ºC. There are some differences between the zones located in the north of the municipality at higher altitudes and the rest of the municipality, registering slightly lower temperatures in the higher areas as a rule.

From June to September is the period of time when the highest average temperatures are recorded, achieving an average temperature of 25º in the warmest months reaching maximum temperatures of 40º in summer. Therefore, the City of Lorca along with Cruz Roja are carrying out campaigns in July for citizens to adopt measures to combat the heat, especially among the most vulnerable population such as children and elderly people, and to prevent fires forestry

Temperatures usually begin to rise in Lorca center from the second week of June, being the hottest months June, July and August. In September, high temperatures are also experienced but they usually fall down at night.



Monthly average temperature evaluation (ºC) Lorca 2012-2014

Last October 2017, high temperatures have also been recorded in the Region of Murcia, being the hottest October since the sixties.

However, as the months with higher temperatures are from June to September, Lorca Pilot Action is focused to mitigate the heat waves and the urban heat islands in these four months.

1.4. Sustainability of the project

The project is intended to be undertaken for the first time in 2018, prior to the actions required for its implementation, and will end in 2021.

The awnings will be installed only during spring and summer months, when solar radiation achieves its maximum value. Only the anchors necessary for the placement of the awnings will be permanently installed.

Analysis and evaluation of results

Final monitoring and evaluation of results: thermometers in facades to check the reduction of temperatures, thermometers in asphalt, surveys to citizens and merchants, and the process of implementing the pilot action (advantages or disadvantages, problems found ...) will determine the sustainability of the project once the Life Adaptate project is finished.

2. Main objectives

The main objectives of pilot action of Lorca municipality are:

- Reduce the temperature of the streets, the buildings facades and the pavement due to solar radiation.
- Adapt the city to climate change
- Reactivate trade and leisure activities in the spring and summer months affected by high temperatures, by improving citizens thermal comfort.
- Be able to evaluate the results obtained and extrapolate them to other municipalities.

3. A timetable with precise actions to be undertaken in the pilot action

MONTH 1 AND 2:

Beginning of the Project, follow up meetings and approval of agreement.

MONTH 3 AND 4: NOVEMBER 2017-DECEMBER 2017

A draft of the project has been carried out with the map of possible affected streets. We have also discussed the budget for action C3, necessary authorizations and distribution of work among the councils affected

MONTH 5: JANUARY 2018

A meeting has been held between the officials assigned to the project and the councillors responsible for urban planning and environment, public participation and trade, to execute the process of public information to the residents of the streets affected by the installation of awnings and merchants.

The procedure to obtain the permits and authorizations of the buildings' owners where the awnings anchors will be installed has also been studied.

Finally, it was decided to make a mail call to all residents of Corredera, Pío XII, Alporchones and Almirante Aguilar Streets to attend on February 8 at 20:30 in the cultural

centre of the city (located just in the area of action on Calle Presbítero Emilio García, very close to Corredera street).

In this meeting both politicians and technicians will inform citizens about the pilot project, what it is, its duration, objectives ... they will also show an image on screen of how the awnings would be installed definitively, and a map of the action area.

The merchants were informed about the environmental and non-environmental objectives of the project: reactivation of the trade, and their collaboration with neighbours and citizens has been requested in order to complete surveys necessary to study the sales obtained after the implementation of the pilot action.

In addition, in this month the aesthetics that is required with respect to the canvases has been studied: colour, shape and model ... and the height and separation with respect to the facades for installation (visibility from the balconies).

MONTH 6: FEBRUARY 2018

During this month the neighbours and merchants have been informed about the pilot action. (Call made to 420 people between neighbours and merchants, on Thursday, February 8, 2018)

The final result of the project with the installation of the awnings is made known through computer graphics, in addition to reporting on benefits and other aspects of the Pilot Action and the Life Adaptate project.

Administrators of buildings were also called to obtain authorizations and permits.

A report to culture is also requested to report on possible conditions to the PEPRI (special protection plan and integral rehabilitation of the historical artistic group of Lorca)

MONTH 7: MARCH 2018

Collect permits and authorizations: culture department and neighbours Writing technical specifications

MONTH 8: APRIL 2018

Administrative procedure for the tender and award of the project for 4 years

MONTH 9: MAY 2018

Implementation: first year 2018

MONTH 10: JUNIO 2018

Final installation of the awnings until September, end of Lorca fiestas

CALENDAR ASSEMBLY AND DISMANTLING OF AWNINGS IN CORREDERA STREET AND ADJACENTS

ASSEMBLY

- JUNE 2018
- JUNE 2019
- JUNE 2020
- JUNE 2021

DISASSEMBLY

- SEPTEMBER 2018
- SEPTEMBER 2019
- SEPTEMBER 2020
- SEPTEMBER 2021.

END OF PROJECT

4. Budget

The budget for the Pilot Action is defined in the project in Action C3 - Development of pilot actions.

It defines the amount per concept established for each one of the actions to be carried out in the pilot action, for external assistance, equipment and other costs.

- Installation and disassembly of parasols – 24,000 euros "EXTERNAL ASSISTANCE"
- Rental of awnings for the pilot action - € 100,382 "EXTERNAL ASSISTANCE"
- Parasol for demonstration activities - 26,190 euros "EQUIPMENT"
- Translator for visits - 1,500 euros "OTHER COSTS"
- Printing of materials on developed pilot actions - 1,500 euros "OTHER COSTS"
- Report on the pilot actions developed - 1,000 euros "EXTERNAL ASSISTANCE"

Personnel costs of the officials assigned to the project will also be required for the performance of the actions: technical architect, public participation responsible, industrial engineer, financial responsible, urban environment responsible.

5. List of all permits needed

1.- APPROVAL OF THE CULTURE COUNCIL OF LORCA.

In this case authorization is not required. The only requirement is the submission of a draft to the project to the Department of Culture so they can check the area of action and give their approval before the final drafting thereof.

The Pío XXII street and Alporchones street have views close to the Castle of Lorca and the awnings can damage or hinder their correct visualization.

After submitting the draft of the project to culture, this department will decide the cutting area, to where the awnings should arrive in the two streets indicated.

2.- AUTORIZACIONES O PERMISOS DE LOS EDIFICIOS AFECTADOS

A meeting will be held in the municipal facilities near the Corredera Street where they will be summoned by mail, merchants and neighbors of the buildings located in the streets that are the object of the pilot action.

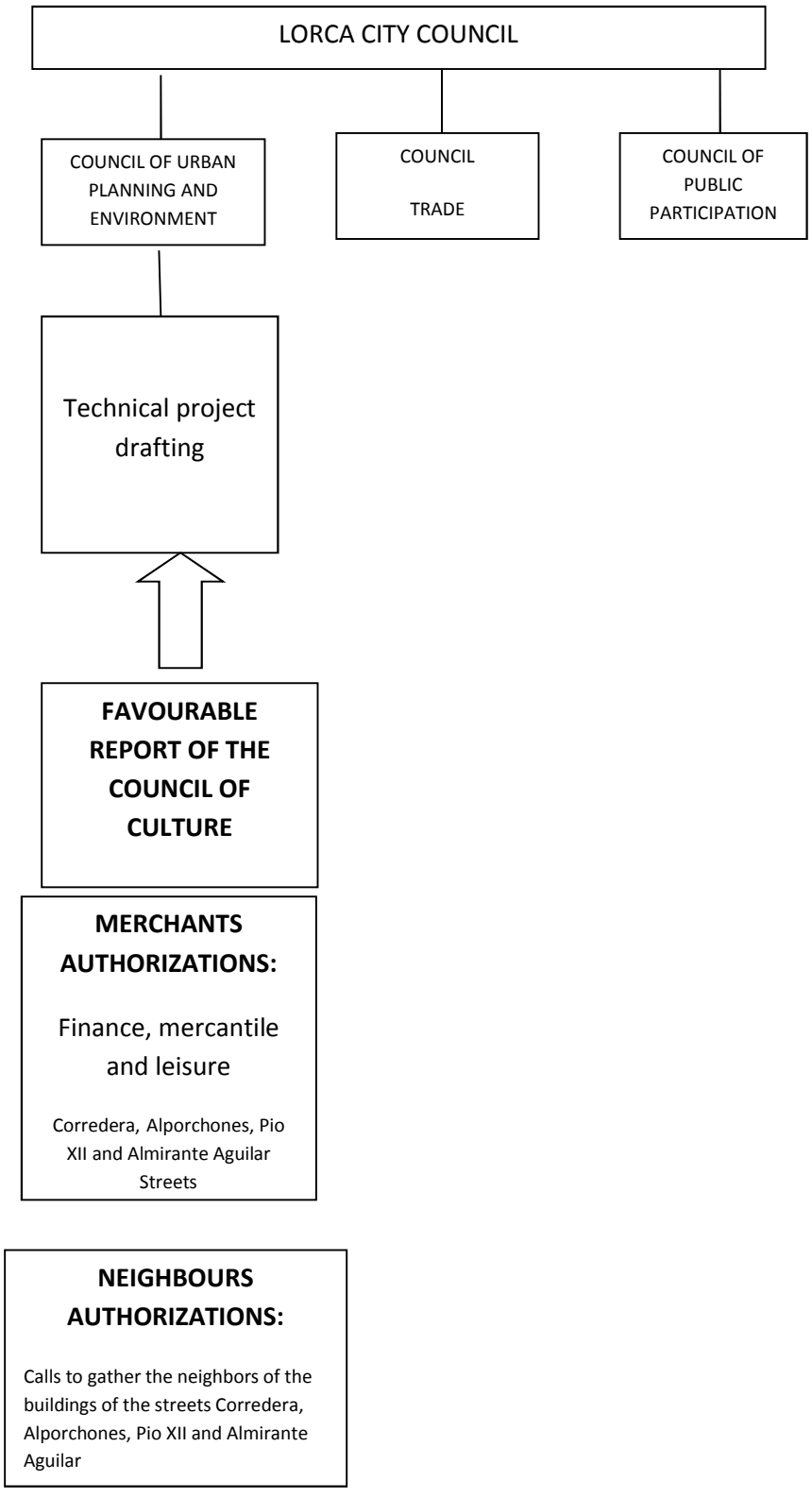
There, they will be informed about the entire process through an on-screen presentation and the collaboration of the merchants will be required to carry out the proposed installation of anchors and awnings necessary for the shaded area.

A Model permit or authorization will also be provided so that the communities of owners can sign it, once they have been approved by virtue of the agreement of the Board of Directors of the corresponding building.

6. Coordination of project, target audience and stakeholders involved

The project will count on the coordination of the municipal areas of: environment, urbanism, public participation, culture, commerce.

The owners of the affected buildings and merchants of the affected streets are also involved in the process, as well as the rest of the citizens of the municipality of Lorca who can be informed of the action taken and give their opinion on it.


LORCA CITY COUNCIL
COUNCIL OF URBAN PLANNING AND ENVIRONMENT
COUNCIL
TRADE
COUNCIL OF PUBLIC PARTICIPATION
Technical project drafting
FAVOURABLE REPORT OF THE COUNCIL OF CULTURE
MERCHANTS AUTHORIZATIONS:
Finance, mercantile and leisure
Corredera, Alporchones, Pio XII and Almirante Aguilar Streets
NEIGHBOURS AUTHORIZATIONS:
Calls to gather the neighbors of the buildings of the streets Corredera, Alporchones, Pio XII and Almirante Aguilar

7. Risk assessment

Risk area	Description (issue and consequences)	Type of risk	Impact level of risk	Probability that risk will occur	Management strategy
Management risks	The only thing that stands out is that it would be a multi-year contract: negotiated contract This contracting file takes several phases until its award. Regarding the technical and administrative staff of the City Council, it is worth mentioning that it is prepared for the management and processing of administrative files as well as for justification of grants such as Life + projects.	Internal	1	1	Begin the administrative file with the authorization of the expense. Basic project writing Collect authorizations or permits: culture and owners of buildings Write the technical project: specifications Collect internal reports that are required Start the recruitment file Request for offers Award Execution 2017-2020 Payments
Human factor risk	The risk of the human factor can be detected in the owners of the Corredera street buildings that do not agree with the adoption of this measure. If you do not have the majority of authorizations, you will study to enable another procedure.	External	1-2	1-2	Neighbors and merchants have been summoned by mail to attend a presentation that will be held on February 8, 2018 at the Cultural Center of the city of Lorca.
Financial risks	The budget for the execution of the project may not be sufficient for all the streets	Internal	2	2	The project will be implemented in the most important streets until the budget is over.
Implementation risks	No risks are observed				
Capacity risks	No risks are observed, since the winners will be companies specialized in this type of structures	External	1	1	
Environmental risks	No risks are observed	External	1	1	
Legal and political risks	No political risks are observed. As for legal, we must collect report from the Department of Culture, given that some streets are affected by the special plan of	Internal	1-2	1-2	The project will run its course regardless of the political party that governs or elected councilors

	protection and comprehensive rehabilitation of the historical artistic Lorca PEPRI			

Annex 1

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ACTION		**2017**				**2018**												**2019**												**2020**							
Action number	**Name of the action**	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
0. Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE																																					
0.1.	Planning: INTERNAL project management meetings about Pilot Action			X	X	X																															
0.2.	Drafting project to send to the Department of culture and plans				X	X																															
0.3.	Drafting authorization model and call for neighbors and merchants				X	X																															
1. Preparation of pilot action (planning, research, permits, etc.) TO DO																																					
1.1.	Preparation of documents						X	X																													
1.2.	Development of research studies						X	X																													
1.3.	Obtaining the necessary permissions						X	X																													
1.4.	Drafting of technical project and technical specifications							X																													
1.5.	Award procedure- EXECUTION								X	X												X															
2. Implementation actions (construction works etc.)																																					
2.1.	JUNE - ASSEMBLY SEPTEMBER- DISASSEMBLY										x	X	X	X									X	X	X	X									X	X	X
2.2.																																					
2.3																																					
2.4																																					

3. Review and necessary approvals after implementation																																								
3.1.	Creation of a part of incidents: meteorological, accidental, other factors and solutions carried out									x	x	x	x	x										x	x	x	x													
3.2.	Measurements of temperature: thermometers and respective reports																																							
3.3	Reports														x	x												x	x											
3.4																																								
4. Awareness raising and communication																																								
4.1.	Communication campaign for inhabitants						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4.2.	Setting project info poster									x	x																													
4.3.	Questionnaires						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
5. Monitoring																																								
5.1.	Monitoring of pilot action indicators and outputs																					x								x										
5.2.	Final assessment																																					x			
6. Transfer and replication																																								
6.1.	Visit of representatives of other LAs to see the pilot action																																							x
6.2.	Publication: Local adaptation projects in Spain, Portugal and Latvia																																							x

Annex

	Outcomes			Outputs			Activities			Inputs	
	outcome	**indicators/ baseline/target**	**info source**	**outputs**	**indicators/ baseline/target**	**info source**	**activities**	**indicators/ baseline/target**	**info source**	**Inputs**	**amount**
1.1	Create a more pleasant environment	Increased public activities on streets during hot summer days.		Reduce the temperature during the heat waves: thermal sensation pedestrians, temperature in facades.	Installation of thermometers before and after the installation of awnings	Measure-ments	Installation of awnings in the historic center of Lorca using tarpaulins of fire-retardant material Assembly and disassembly	Measurements made by the municipal technical architect: TECHNICAL PROJECT			24,000 € Assembly and disassembly 100,382 € Awning rental
1.2	Attract shopping, balance trade in the historic center in months that are not visited by the intense heat			Promote the commercial sector: financial, commercial and leisure	Questionnaires or interviews to citizens and merchants		Surveys and sales indicator: graph				1,500 €
							Printing of materials				
2	To be able to carry out a viable procedure that serves as a reference for other municipalities with the same problem			Development of a methodology to follow the Pilot Action to be able to transfer the experience to other municipalities	Methodology: objectives and results		Report on the pilot action carried out	External assistance			1,000 €

Final design of pilot action

Reconstruction of hydro technical structure of Lake Vidusezera and lake cleaning in Smiltene
Latvia, Smiltene municipality

SMILTENE MUNICIPALITY

LIFE ADAPTATE LIFE16 CCA/ES/000049

Contents

Summary

The climate is changing in Latvia and it will continue to change. Adaptation measures are needed to minimise negative effects on society, environment and economy, and it is the most coherent measure to prevent the negative effects of climate change. Smiltene municipality is planning to clean lake and reconstruction of hydro technical structure to prevent flood risks and eutrophication process. The Lake Vidusezers is an artificial water reservoir (2.9 ha), located in the middle of cascade of lakes, 200 meters from Smiltene centre. It is eutrophic lake with nutrients and plant growth. The algae blooms are the most visible sign of eutrophication, they occur in Lake Vidusezers in the summer. The hydro technical structure of Lake Vidusezers is broken and sluices need to be equipped with an automatic lifting mechanism for controlling the water level in Lake Vidusezers.

The project aim is to promote arrangement of infrastructure objects, which improve adaptation to climate change. This final design of pilot action is infrastructure project which has divided into two parts: 1st part - Reconstruction of hydro technical structure; 2nd part - Deepening and cleaning of Lake Vidusezers, the shores strengthening. Both parts will be implemented at the same time from November 2018 till September 2019. The main objectives are reconstruction of existing sluice structures, to equip with an automatic lifting mechanism for controlling the water level in Lake Vidusezers and also deepening and cleaning of Lake Vidusezers- sowing, sludge digging, average depth of excavation 1.10m. It is intended to lower the water level, clean the water course and deepen it till average of 1,10m. The total cleaning area is 2.40 ha. The shores of lakes (1,400 m2) will be glided and leveled after the completion of work. So far a number of activities are carried out in preparation of the project: Environmental Solutions Institute in 2015 prepared a "Report on the socio-economic impact of lakes of Smiltene, on the survey results and on the results of future management"; on the 2015th the Research Institute of food safety, animal health and environment "BIOR" prepared "Rules of fishery exploitation in Vidusezers".

The total budget of project is 291 461 EUR. Smiltenes municipality will contribute 106 227,00 EUR and 185 234,00 EUR will receive as share of the EU Commission’s financial support contribution.

Arrangement of Vidusezers will also increase the recreation of city's Old park area for city inhabitants. Cleaning of leak Vidusezers and reconstruction of hydro technical structure of Lake Vidusezers will allow to better collect rain and flood waters, reduce the risk of floods and prevent environmental pollution, as well as help to absorb heat waves and improve microclimate in city, which everything together will provide a place for biodiversity. The ecosystem of the lake will also improve and it will be possible to do fishing in it. After cleaning the lake and installation of a floating fountain

is planned, this will increase the amount of oxygen in the water and prevent the contamination of water by algae. It is also planned to restore the utilities and to create a boat dock. A cleaned lake will enable the possibility for residents and tourists to spend the hot summer days at the lake and enjoy the scenery from a different vantage point.

Picture 1 The Lake Vidusezers is overgrown in period of summer, in 2016

Picture 2 Hydro technical structure with damaged sluice in the Lake Vidusezers, in 2016

Picture 3 The Lake Vidusezers , in 1930

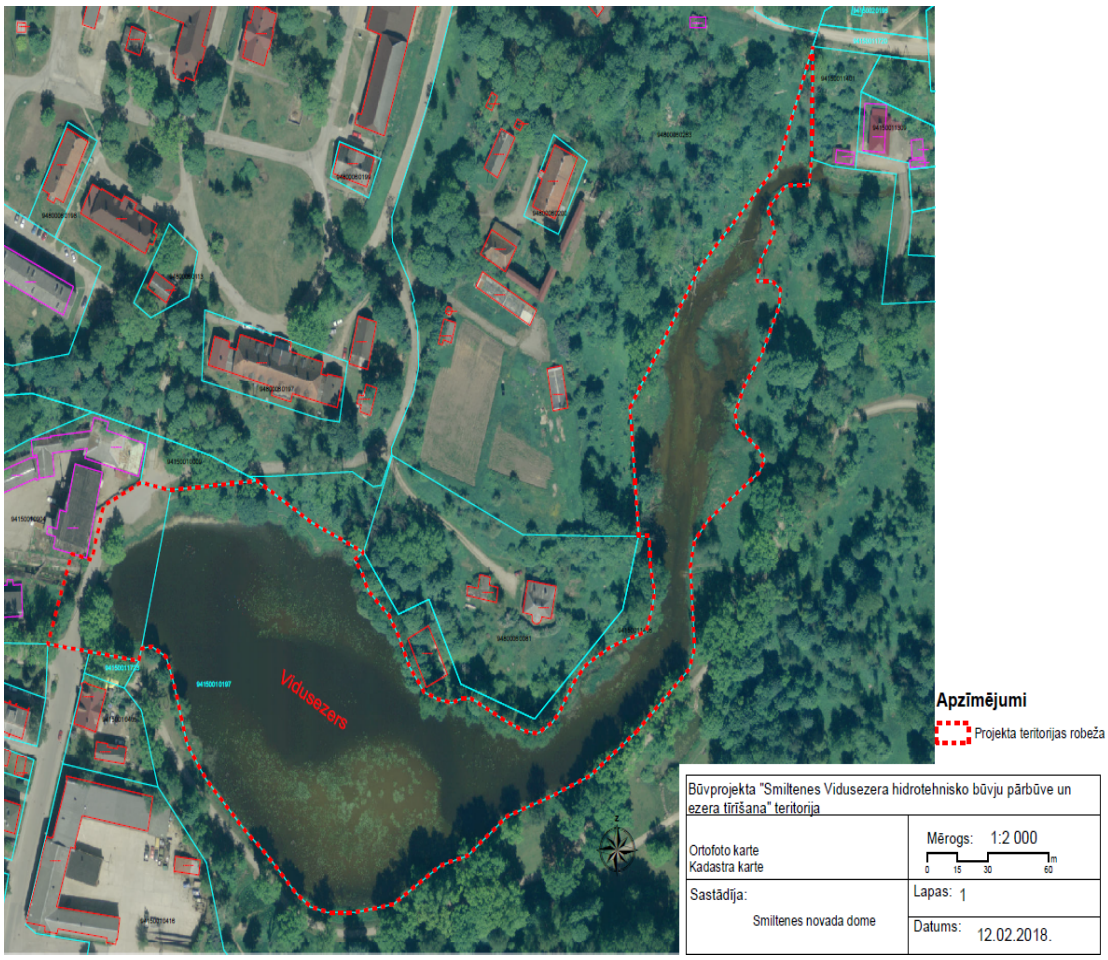
Picture 4 The Lake Vidusezers is used for many purpose, for examples, The Town Smiltene festival, in 2016

1. Core information

1.1. Project title

Smiltenes Vidusezera hidrotehnisko būvju pārbūve un ezera tīrīšana. (Reconstruction of hydrotechnic structure of Vidusezers and lake cleaning in Smiltene)

1.2. Description of location and spatial scale of pilot actions



Project is planned to implement on two local government plots of lands with a total area of 3.14 hectares, which are parts of Protection Zone of cultural monument of State significance “Parks” (The Park) No. 6879 and “Smiltenes muižas apbūve” (The Smiltene Manor building) No. 6873.

The Lake Vidusezers is an artificial water reservoir (2.9 ha), located in the middle of cascade of lakes, 200 meters from the city centre. It is surrounded by a variety of cultural and historical objects, and there are projects planned and implemented in adjacent areas (restoration of historic pavement on Kalnamuiža estate, Old Park reconstruction, arrangement of Castle ruin territory).

The old park, full with different trees and bushes, is a well-maintained area on the bank of Lake Vidusezers where there are recreational sites with benches, water elements with fountains and asphalted pathways. The area is appreciated by wild

ducks, swans, beavers, squirrels. This park is beloved by locals and visitors not only for peaceful strolls and magnificent nature, but also for active recreation, like Nordic walking and cycling.

Picture 5 The Town Smiltene

1.3. Climate change risks addressed

Climate change increases different natural risk possibility- eutrophication and floods in local municipalities in Latvia are becoming increasingly more important. This pilot action is aimed to mitigate and adaptive these climate change risks.

The municipality of Smiltene is in risk by more and more frequent heavy rainfalls and an increasing flood risk in the area. Risk of floods is one of the main concerns for Latvia, because it is rich in waters: the mean density of the river network is 600m/km2, water bodies occupy 1.7% from territory. Latvia has flat surface (98% of the country lies under 200 m above sea level). Causes of floods:

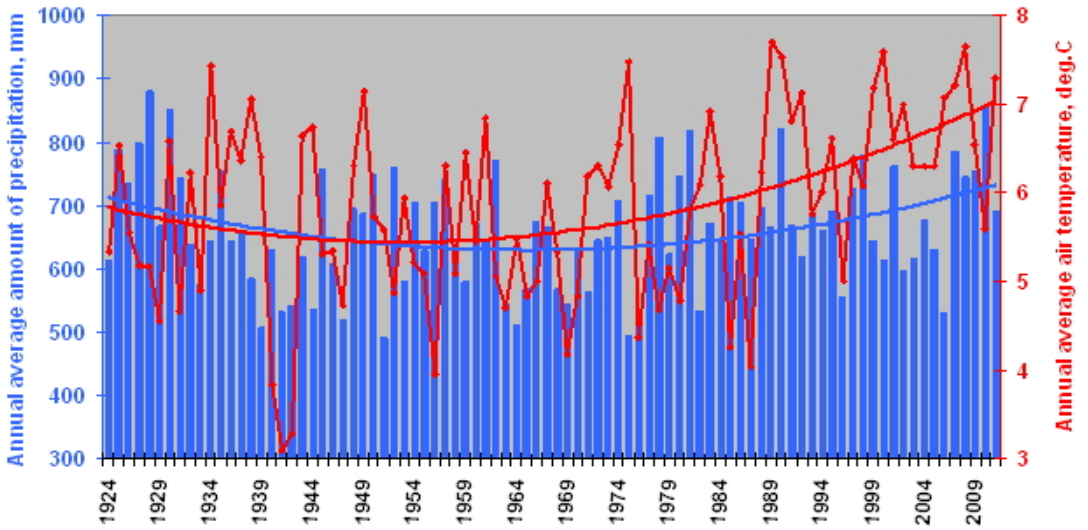
- high water and thawing snow in spring - when the air temperature and volume of snow are the factors determining the size of floods;

- Summer - autumn rain when there are 1000mm and more precipitation. Such floods are usually local and the damage is relatively geographically limited;
- prolonged rainy periods when the land gradually becomes saturated with water until it is no longer able to absorb it;
- hydro technical structure accident and the over-flooding caused by internal erosion of a dam or a sluice accident;
- human activity which reduce the natural capacity to store excessive amount of water during a flood event.

Flooding can cause huge emotional and material damage, force communities to be displaced from their homes, while taking weeks to clean up and repair the damage. Most common problems are damage to property, destruction of sowings, loss of livestock, and risk of contamination of drinking water by waterborne diseases.

The lake Vidusezers have never been cleaned and waste water had been discharged directly into water. The result of this is the release of a high quantity of nutrients which stimulates the disproportionate growth of algae. The smell of lake and landscape is unpleasant. The algae blooms are the most visible sign of eutrophication. They disrupt natural ecological processes in freshwater and can be harmful to animals and humans. New research indicates that the symptoms of eutrophication in lakes will be made worse by climate change, adding to the challenge of restoring water quality and biological health.

The observation data show that climate changes are happening in Latvia. During the 20th century the average air temperature in Latvia has risen by 1 degree. This increase is even more apparent in the years of the 21st century, which have already passed. During the past 100 years, there have been fluctuations in annual rainfall, which tended to rise from the beginning of the second half of the 20th century, for example, there were critical situation with heavy rains in period of August-September, in 2017.



The annual average air temperature and amount of precipitation in Latvia

1.4. Sustainability of the project

This pilot action is infrastructure project, with lasting outcomes for adaptation and mitigation to climate change. Project has social, economic and environmental objectives to achieve sustainable development. As a result of project inhabitants of Smiltenes municipality (13 058 in 2017) and all tourists will be able to enjoy beautiful nature, landscape in healthy, clean and safe environment. The Old Park and Lake Vidusezers is popular place where locals and visitors go for slow walks, for active recreation- Nordic walking and cycling and also celebrate The Town Smiltene festival in the few last years (picture No.4). The landscape area on coast of the Lake Vidusezers will be nicer and more beautiful after implementation of project. Project implementation will help to mitigate climate change risks and to adaptate to climate change, because it will allow better:

- collect rain and flood water;
- reduce the risk of floods;
- prevent environmental pollution;
- absorb heat waves;
- improve microclimate in city;

From a flood management perspective a low and stable water level is beneficial. From an ecosystem and landscape development perspective larger water level amplitudes are optimal. One out of a few reasons for this is the need to prevent a massive increase in vegetation in coastal areas, improving water quality.

2. Main objectives

The project “Life Adaptate” aim is to promote arrangement of infrastructure objects, which improve adaptation to climate change. The construction project is planned to divide into

two parts: 1st part - Reconstruction of hydro technical structure; 2nd part - Deepening and cleaning of Lake Vidusezers, the shores strengthening.

The main objectives for final design of pilot action:

- Reconstruction of existing sluice structures and road surface;
- The sluices need to equipped with an automatic lifting mechanism for controlling the water level in Lake Vidusezers;
- Restore the water supply channel in the river Abuls, strengthening the slopes;
- Consider and evaluate the possibilities to establish innovative solutions for sluice restoration;
- Calculate acceptable transport load over the sluice, in addition to evaluate the possibilities for light vehicle traffic over sluice after accepting structures for service;
- Establish secure access to sluice and channel maintenance;
- Deepening and cleaning of Lake Vidusezers- sowing, sludge digging, average depth of excavation 1.10m.
- Restore the slopes in the area and strengthen them to avoid further landslides.

The main criteria of the construction project are economic solutions, quality of building structures, functionality, longevity, safety, technological provision of functions, architecture. Cleaning of Lake Vidusezers will allow better: collect rain and flood waters, reduce the risk of floods, prevent environmental pollution, absorb heat waves, improve microclimate in city.

3. A timetable with precise actions to be undertaken in the pilot action

Preparations of The final design of pilot action have already started in February 2018. The regulations and terms were established for the development of the building design and the author supervision for “Reconstruction of hydro technical structure of Lake Vidusezera and lake cleaning in Smiltene”. The Public procurement for building design and the author supervision will be announced in April 2018, in accordance with the design and supervision tasks. In April we will enter into contract on development of the building design with a developer of the building design. When developing documents a building design, a developer of the building design has a duty to comply with the laws and regulations and technical regulations governing the construction - Construction Law, General Construction Regulations, Construction rules for hydro technical and drainage structures and have to obtain the necessary permissions to carry out the project. The total time for drawing up and development a building design is not more than 170 calendar days. The building design is scheduled from May 2018 until the end of September 2018. In this time is necessary to get Authorization and technical regulations from Valmiera Regional Environmental Board of the State Environmental Service.

The Public Procurement for constructor work and supervision of the construction permit for project is planned to announce in September, 2018. This project has two parts: 1st part - Reconstruction of hydro technical structure; 2nd part - Deepening and cleaning of Lake Vidusezers, the shores strengthening. Both parts will be implemented at the same time from November, 2018 till September, 2019.

Monitoring of pilot action indicators and outputs will be in March, 2019 and December, 2019.

4. Budget

The total budget of project is 291 461 EUR. Smiltenes municipality will contribute 106 227,00 EUR and 185 234,00 EUR will receive from the coordinating beneficiary as share of the EU Commission's financial support contribution.

Execution costs:

- Personnel- 97 720,00 EUR (includes environmental technician, energy technician, also public participation responsible, financial responsible, pilot action responsible, project responsible personnel costs)
- Explanations of assumptions - 20 691,00 EUR (attendance to workshops of other Latvian municipality; visit to pilot actions in other counties: Spain, Portugal; workshop "Adaptation and Mitigation Plans in European Cities,- implications for EU policy; attendance to the European Climate Change Adaption conference; participation in SCM and KOM in Spain and Portugal)
- Preparation of technical documentation - 7 500 EUR (development of the building design "Reconstruction of hydro technical structure of Lake Vidusezera and lake cleaning in Smiltene")
- Works for lake cleaning (2.4 ha)- 112 500 EUR (constructor work)
- Design of report about pilot actions developed- 1 000,00 EUR
- Arrangement of hydro technical structures- 10 000,00 EUR (constructor work)
- Infrastructure for hydro technical structures- 10 000, 00 EUR (constructor work)
- Other costs- 13 500,00 EUR (organization of two public consultation meetings, organization of workshops, printing of materials about pilot actions developed, translator for visits, conference fees, organization of 1 SC meeting)
- Overhead amount- 18 550,00 EUR

5. List of all permits needed

The regulations and tasks were established for the development of the building design for “Reconstruction of hydro technical structure of Lake Vidusezera and lake cleaning in Smiltene”. The developer of the building design has a duty to comply with the laws and regulations and technical regulations governing the construction and get a construction permit from Construction Board, which will be issued with conditions. Conditions will include necessary agreements with the owners of surrounding property, engineering companies as well as requirements from institutions to get technical regulations and obtain approvals, for example, Authorization and technical regulations from Valmiera Regional Environmental Board of the State Environmental Service in Smiltene are needed for implementation of project. The area of project is in parts of Protection Zone of cultural monument of State significance “Parks” (The Park) No. 6879 and “Smiltenes muižas apbūve” (The Smiltene Manor building) No. 6873, therefore is necessary permission of Cultural monument of State significance

6. Coordination of project, target audience and stakeholders involved

Project manager will responsible for project management, as well as co-ordination of tasks, decision making, sharing responsibility among project staff and following the project implementation process. Project Coordinator will monitor the quality of works, organize meetings at least once a month with developers of the building design about development of the building design and meetings with performer of construction work about development of the construction works. Project Accountant will be responsible for financial implementation of the project: authorize the transfer of expenses in and out of project account, responsible for providing financial analysis on a project through its life cycle, and proactively work with Project Manager to monitor and analyse project performance against budget.

Local authorities, inhabitants of Smiltenes Municipality (13 058 persons in 2017), are the main target audiences of the project as they are the most vulnerable in fornt of climate change. Big target group is also tourists, who will benefit from better microclimate in town. All municipalities in Flood - prone area in Latvia are considered as direct target group of the project.

The project also proposes a considerable cluster of target groups: Planning Regions of Kurzeme, Riga, Vidzeme, Zemgale and Latgale in Latvia, are considered target group because of their responsibility to ensure regional planning and coordination, as well as cooperation between municipalities and different governmental institutions, in local level. Therefor planning regions can learn from Smiltene municipality experience, and use this knowledge in other municipalities

7. Risk assessment

Risk area	Description (issue and consequences)	Type of risk	Impact level of risk	Probability that risk will occur	Management strategy
Management risks	Lack of project management experience	Internal	3	1	Proper personnel selection system will be implemented
	Planning risk, an accident or any other unforeseen, uncontrollable circumstances, can alter the initial plan	Internal	2	2	Proper planning should cover all possible scenarios
	Project management team lacks ability to work as a team	Internal	3	1	Proper personnel selection system will be implemented
Human factor risk	The human failures that could be made in the task which might lead to problems of project implementation	Internal	3	2	Identify appropriate control measures which prevent or mitigate the human failures
Financial risks	Problems in financial flow	Internal/ External	3	1	Review a similar project if available and use any monitoring and verification of their projects to inform your own calculations
Implementation risks	Delays can occur when obtaining the permits and authorizations necessary for the implementation of the project	External	3	1	The project coordinator has already evaluated and planned the legal requirement in time so the procedures to obtain them do not constitute a delay in its global development

Capacity risks	Lack of employees	Internal	3	1	Create the necessary capacities in the form of suitable employees
Environmental risks	Extreme weather event, causing delays of implementation	External	3	1	Will develop emergency action plan
Legal and political risks	change of labour laws, changes to procurement law	External	2	2	Will adopt to new legislation
Procurement risk	Interrupted procedures, procurement appeals	External	2	1	Will develop plan for procurements, developing specifications, selecting the appropriate procurement methods, preparing solicitation documents

Annex 1

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ACTION		**2017**				**2018**												**2019**												**2020**							
Action number	**Name of the action**	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
0. Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE																																					
0.1.	Preparation of regulations and terms for the development of the building design and the author supervision						X																														
1. Preparation of pilot action (planning, research, permits, etc.) TO DO																																					
1.1.	Preparation of documentations							X	X	X	X	X	X	X	X																						
1.3.	Obtaining the necessary permissions							X	X	X	X	X	X	X	X																						
2. Implementation actions (construction works etc.)																																					
2.1.	Reconstruction of hydro technical structure															X	X	X	X	X	X	X	X	X	X	X	X										
2.2.	Deepening and cleaning of Lake Vidusezers, the shores strengthening															X	X	X	X	X	X	X	X	X	X	X	X										
3. Review and necessary approvals after implementation																																					
3.1.	**Constructions are put into operation**																										X										
3.2.	**Opening**																										X										
4. Awareness raising and communication																																					
4.1.	Communication campaign for inhabitants											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
4.2.	Setting project info poster														X																						
4.3.																																					

5. Monitoring																																					
5.1.	Monitoring of pilot action indicators and outputs																			X								X									
5.2.	Final assessment																																	X			
6. Transfer and replication																																					
6.1.	Visit of representatives of other LAs to see the pilot action																																				X
6.2.	Publication: Local adaptation projects in Spain, Portugal and Latvia																																				X

	Outcomes			Outputs			Activities			Inputs
	outcome	**indicators/ baseline/target**	**info source**	**outputs**	**indicators/ baseline/target**	**info source**	**activities**	**indicators/ baseline/target**	**info source**	**Inputs**
1.1	Reduced floods risk	implemented an automatic lifting mechanism for controlling the water level in Lake Vidusezers; baseline - 0 target - 1	Project documentation	reconstruction of hydro technical constructions	Functioning hydro technical constructions Baseline - currently existing partly operating hydro technical constructions Target - operating construction	Project documentation	Arrangements of property rights	record in land register - all hydro technical constructions of lake "Vidusezers" owned by municipality	Land register	Financial resources Human resources
							Preparation of the work assignment for the technical project	Prepared work assignment	Public procurement documentation	Financial resources Human resources
							Public procurement to find developer of technical project	contract with technical project developer	municipality documentation	Financial resources Human resources
1.2	Prevented environmental pollution	Decreased eutrophication less algae blooms Water quality	Quality measures	Cleaned water course and deepened lake "vidusezers	Lake is deepened Baseline - 50cm Target - 1.1m	Project documentation	Development of technical project	developed and agreed technical project	municipality documentation	Financial resources Human resources

							Construction works	Object has put in to operation according to legislation	municipality documentation	Financial resources Human resources
2	Improved microclimate in city	Number of people positively affected	Calculations, based on publicly available statistics	Improved lake surrounding landscape	local residents satisfied with recreational territory Baseline - current satisfaction Target - increased satisfaction by 20%	Public survey	Judgement from The State Environmental Service (SES) about damage caused to fish resources by construction works, payments of compensations.	received statement from SES	The State Environmental Service (SES)	Financial resources Human resources

Final design of pilot action

Implementation of a natural lake
Alfândega da Fé

LIFE ADAPTATE LIFE16 CCA/ES/000049

Contents

Summary

Alfândega da Fé is located in Alto Trás-os-Montes Subregion occupying a total area of 321.99 km^2 and with 5104 inhabitants.

Alfândega da Fé is located in 41º20'N latitude and 6º58'W longitude. The municipality registers high annual and diurnal temperature variations and seasonal variations, with harsh winter and summer and spring and autumn with no significant variations registration.

The average annual temperature varies between 12.5 and 16.0 ° C. In what regards the precipitation, its annual value is around 600 mm, increasing in the direction of the mountain range, on top of which it reaches up to 1200 mm. The air humidity is low, between 65 and 70%.
From a geomorphologic point of view, the municipality is in a mountainous area mostly composed of rocks with an eruptive origin, namely schists and granite and quartz that arise occasionally because of its strong resistance to erosion. The dominant soils are thin, which makes its exploitation for agricultural purposes difficult, requiring constant fertilization. All watercourses that cross the municipality belong to Douro river watershed, being the Sabor river the biggest watercourse.

The municipality registers high temperatures and low rainfall during the summer months. As a large part of the municipal area consists of forest and agricultural farmland, it is particularly vulnerable to forest fires. In addition, other climate impacts are identified as the extreme temperatures, water scarcity and increased ice and snow

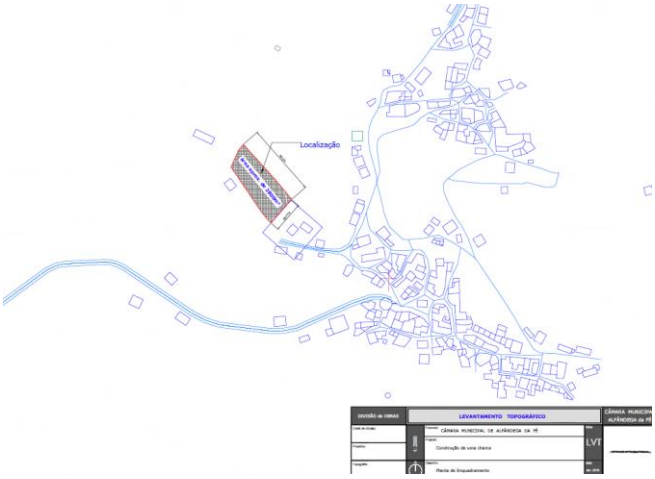
A large portion of the municipal area consists of forests (with fastgrowing hardwoods) and agricultural land. So, it is particularly vulnerable to an increasing number of forest fires. Due to that, some important plans have been developed, related to forest fire prevention and to the occurrence of extreme temperature events. Alfândega da Fé has been improving the city's urban environment ensuring its attractiveness and sustainability by creating urban areas in which people can comfortably live, work and relax. Examples are the creation of more green areas in the city centre, planting trees, flood protection measures along the streams, protecting fresh air paths and cold air production areas. In addition, the municipality has defined flood, green, and ventilation areas in its land use plan. The municipality has already adopted a number of adaptation measures, which are part of a series of integrated projects related to the renovation of the city and forest fire plans. All urban planning is developed in cooperation with the health department to prevent heat-related health risks for the youngest and the elderly and teaming up with relevant actors.

It should be noted that the forest areas has been increasing in the last decades for various reasons, such as depopulation and the inherent abandonment of agriculture processes and the afforestation of agricultural land, encouraged by the common agricultural policy, sometimes undermining the much-needed compartmentalisation of the territory in the field of forest fire protection.

On the other hand, the reduction of the active population in the primary sector has implications in the rural areas management.

For the reasons above mentioned Alfândega da Fé will implement a natural lake in order to respond to the great vulnerability of the municipality to the droughts phenomena and consequent risk of fire occurring through the implementation of a natural lake that promote environmental cooling, promote irrigation of agricultural areas and support the fight against forest fires.

To respond to that objective the lake to be implemented will storage water for irrigation, in a total area of approximately 2937 m^2 retaining the water from the rains, the runoff of the soil and the water lines of the mountain range of Bornes.



1. Core information

1.1. Project title

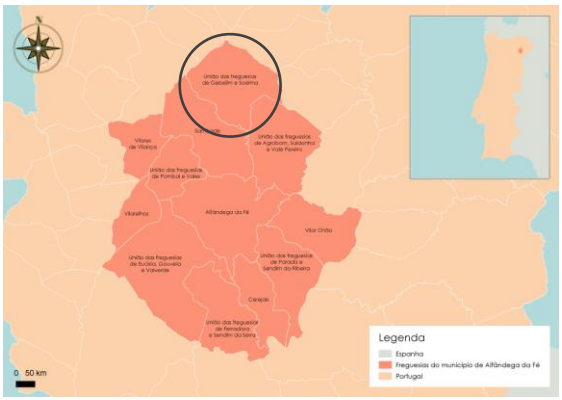
Implementation of a natural lake in the municipally of Alfândega da Fé as a climate change adaptation measure.

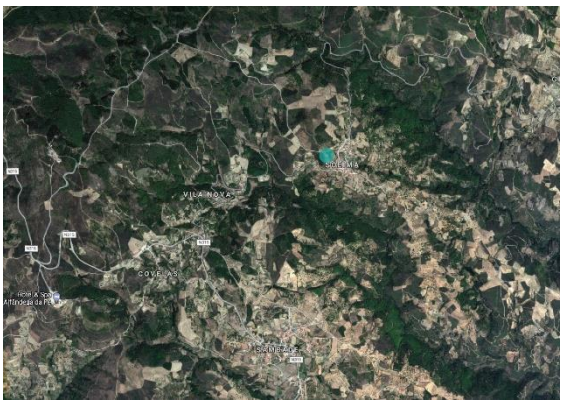
Construção de uma charca no município de Alfândega da Fé como medida de adaptação às alterações climáticas

1.2. Description of location and spatial scale of pilot actions

The pilot action will be developed in the municipality of Alfândega da Fé, more specifically in the village of Soeima that belong to the Gebelim e Soeima parish.

The village is located on the southern side of Bornes mountain and has the particularity of being in a altitude of 1000m. It is important to mention that in Alfandega da Fé the forest areas cover approximately 68% of the total area (21 908 ha) and that Gebelim e Soeima parish is the one that presents more forest area (1 521 ha) in the municipality.





The project will take part of Sabor sub-basin that is part of the Douro Hydrographic Basin.

1.3. Climate change risks addressed

The municipality registers high temperatures and low rainfall during the summer months. As a large part of the municipal area consists of forest and agricultural farmland, it is particularly vulnerable to forest fires. In addition, other climate impacts are identified as extreme temperatures, water scarcity and increased ice and snow

A large portion of the municipal area consists of forests (with fastgrowing hardwoods) and agricultural land. So, it is particularly vulnerable to an increasing number of forest fires. Due to that some important plans have been developed, related to forest fire prevention and to the occurrence of extreme temperature events. The municipality has already adopted a number of adaptation measures, which are part of a series of integrated projects related to the renovation of the city and forest fire plans. All urban planning is developed in cooperation with the health department to prevent heat-related health risks for the youngest and the elderly and teaming up with relevant actors.

In order to answer the effects of high temperatures and consequently heat waves, the pilot actions in Alfândega da Fé will include the implementation of a natural lake in order to face high temperatures, promoting cooling and irrigation of agricultural areas and support the fight against forest fires.

1.4. Sustainability of the project

The implementation of the natural lake intends to ensure the existence of a constant water resource for agriculture use but also to be used in case of forest fires. The lake will obtain the water in two natural ways: capturing the water that comes from the rains taking advantage of the water from the terrain declivation. In this way the man only needs to intervene in filling it with water once in a long period of time, otherwise it maintains its volume almost constant.

It is also expected that the lagoon will attract living beings that not only promote pollination but can also prevent the appearance of pests and diseases that can destroy plantations, thus reducing possible damages. Additionally all the Security, accessibility and management issues are also included in the project.

2. Main objectives

The main objective of this pilot action is to find a solution that responds to the great vulnerability of the municipality to the phenomena of droughts and consequent risk of fire occurring through the implementation of a natural lake that promote environmental cooling, irrigation of agricultural areas and support the fight against forest fires.

To respond to that objective the lake to be implemented will storage water for irrigation, in a total area of approximately 2937 m^2 retaining the water from the rains, the runoff of the soil and the water lines of the mountain range of Bornes.

3. A timetable with precise actions to be undertaken in the pilot action

The work to be carry out presents the following tasks: excavation works, landfill with the excavation of the reservoir area materials, geomembrane and geotextile for waterproofing placement, and placement of security devices around the perimeter of the lake.

The lake discharge will be affected by a flood discharge which will function as a safety device, to guarantee the exhaustion of the water in extreme conditions.

The lake will have a bottom waterproofing in order that the filling is made through the surface water coming from the higher areas around and by precipitation.

4. Budget

Implementation of a natural lake in the municipally of Alfândega da Fé will represent an investment between 35 000,00€ and 40 000,00€. This value is provisional and under verification.

5. List of all permits needed

The project presented will use, for this purpose, Public Space with Public Use and in an area considered in the Municipal Master Plan as a Rural Area with a low density. The project does not interfere with any existing urban infrastructures such as public lighting and building infrastructures, with the exception of the reformulation of the drainage system.

6. Coordination of project, target audience and stakeholders involved

The municipality of Alfândega da Fé will be the coordinator of the project. For that, a team of 3 people will be allocated to monitor all the work and to the financial management of the project.

The team will be responsible for the project coordination, communication, monitoring and evaluation.

The target audience is all the municipality population with a special focus on farmers. Also, the institutions related to fire prevention are being consulted.

7. Risk assessment

Risk area	Description (issue and consequences)	Type of risk	Impact level of risk	Probability that risk will occur	Management strategy
Management risks	Lack of project management experience	Internal	3	1	Proper personnel selection system will be implemented.
	Delay due to public procurement processes	External	3	2	
	Failure to meet deadlines by the project implementation company	External	3	1	Issue to be considered in the contract
Financial risks	Financial constraints	Internal	1	1	Will develop a financial plan
Implementation risks	Extreme weather event, causing delays of implementation	External	2	1	Will develop emergency action plan
Environmental risks	Extreme weather event, causing delays of implementation	External	2	1	Will develop emergency action plan
Other	Constraints verified in the site at the beginning of the works, namely in excavation	External	3	1	Will develop emergency action plan

Annex 1

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
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0. Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE																																					
1. Preparation of pilot action (planning, research, permits, etc.) TO DO																																					
1.1.	Preparation of documentations																																				
1.2.	Development of research studies																																				
1.3.	Obtaining the necessary permissions																																				
1.4.	Other																																				
2. Implementation actions (construction works etc.)																																					
2.1.	Excavation works																																				
2.2.	Landfill																																				
2.3	Waterproofing																																				
2.4	Security systems																																				
3. Review and necessary approvals after implementation																																					
4. Awareness raising and communication																																					
4.1.	Communication campaign for inhabitants																																				
4.2.	Setting project info poster																																				
5. Monitoring																																					
5.1.	Monitoring of pilot action indicators and outputs																			X									X								

5.2.	Final assessment																																				X			
6. Transfer and replication																																								
6.1.	Visit of representatives of other LAs to see the pilot action																																							X
6.2.	Publication: Local adaptation projects in Spain, Portugal and Latvia																																							X

Annex 2

	Outcomes			Outputs			Activities			Inputs	
	outcome	**indicators/ baseline/target**	**info source**	**outputs**	**indicators/ baseline/target**	**info source**	**activities**	**indicators/ baseline/target**	**info source**	**Inputs**	**amount**
1.1	Reduced drought risk and improved access to water	baseline - 0% target - 20%	Project	Built natural lake	Baseline – 0 m3 Target - 2.300,00 m3	Project	Excavation works	1	Project		
							Landfill with the excavation of the reservoir area materials house	1	Project		
1.2	Increased water volume for irrigation of agricultural areas and support the fight against forest fires	Cubic meters (m^3) water available baseline – 0 % target - 25%	Project				Waterproofing	1	Project		

Final design of pilot action

Shaded areas using renewable energies

Mértola

LIFE ADAPTATE LIFE16 CCA/ES/000049

Contents

Summary

Mértola is located in the Southeast region of Portugal and occupies an area of 1292 km^2 and with 7500 inhabitants.
The municipality of Mértola is located in the Southeast region of Portugal and is part of Baixo Alentejo region.

The climate of this region is predominantly Mediterranean, with hot, dry summers as a result of its interiority. Winters are mild and with little rainfall.
From a geomorphological point of view three major geomorphic structures are present in Mértola: the plains, with slight wave, and that dominate the quartzite elevations of the Sierras of Alcaria Ruiva and São Barão and enclosed valleys of the Guadiana River and its effluents.

In these structures numerous biotopes - watercourses, Mediterranean undergrowth, rocky outcroppings, woods, forests, steppes are present. So this middle section of the Guadiana area has unique biodiversity characteristics.

To prove this environmental balance, in 2014, the territory of the Guadiana Valley Natural Park began the reintroduction of the Iberian lynx program in Portugal, with the continuous and progressive release of several couples of the species.

Regarding climate change Mértola's projections indicate a decrease in the average annual rainfall, with a potential increase in rainfall in the winter - More precipitation in winter months (up to 7%) and a decrease in the rest of the year, especially in the spring (up to -54%) and more frequent and intense droughts with a significant decrease in the number of days with precipitation, up to 12 days per year, increasing the frequency and intensity of droughts.

There will also be an increase in the annual average temperature, especially the maximum - Increase in the number of days with very high temperatures (> 35 ° C), and tropical nights, with minimum temperatures> 20 ° C, and heat waves more frequent and intense and also higher occurrence of fires. Regarding extreme events increase, it's highlighted heavy rainfall in short periods of time and more intense winter storms. Decrease in the average annual rainfall with a significant decrease in the spring: -54%

A large portion of the municipal area consists of forest land with fast growing species and agricultural land, meaning that it is particularly vulnerable to water scarcity and to an increasing number of forest fires. In order to mitigate these events some important plans have been developed, related to forest fire prevention and the occurrence of extreme temperature events. Mértola intends to improve the city's urban environment ensuring its attractiveness and sustainability by creating urban areas in which people can comfortably live, work and relax.

In order to respond to the effects of high temperatures and consequently heat waves the pilot actions in Mértola will include the creation of covered recreation areas - "shadow areas" – in urban areas with integration of various types of renewable generation in order to provide a solution to high temperatures when it's not possible to have a natural coverage with trees.

Pictures 1 to 3 represents the locations of the infrastructures and the last one represents a implemented infrastructure.

1. Core information

1.1. Project title

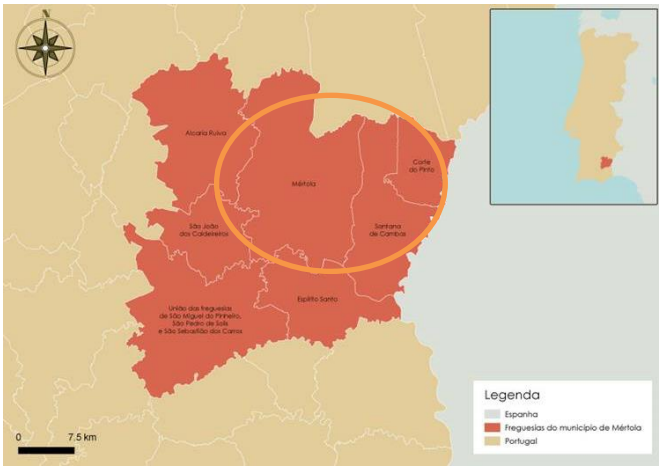
Implementation of shaded areas using renewable energies

Criação de áreas de sombreamento com recurso a energias renováveis

1.2. Description of location and spatial scale of pilot actions

The pilot action will be developed in the municipality of Mértola, more specifically in 2 educational centers and in the beach of Albufeira da Tapada Grande located in Mina de São Domingos.

In what regards the beach of Albufeira da Tapada Grande this is located on an interior zone and away from the sea, namely in Corte do Pinto parish (1). This natural beach presents a range of facilities and services, namely a picnic area that need some structure for shadow.



The two educational centers are also located in Mértola, more specifically in Corte do Pinto parish (2) and in the city center (3).

1.3. Climate change risks addressed

Regarding climate change Mértola's projections indicate a decrease in the average annual rainfall, with a potential increase in rainfall in the winter - More precipitation in winter months (up to 7%) and a decrease in the rest of the year, especially in the spring (up to -54%) and more frequent and intense droughts with a significant decrease in the number of days with precipitation, up to 12 days per year, increasing the frequency and intensity of droughts.

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In order to respond to the effects of high temperatures and consequently heat waves, the pilot actions in Mértola will include the creation of covered recreation areas - "shadow areas" – in urban areas with integration of renewable energy in order to provide a solution to high temperatures.

1.4. Sustainability of the project

The implementation of the covered recreation areas in a beach and in two education centres intends to ensure the existence of shadow areas that provide a solution to hig temperatures. The solution presents a source of fresh water for people and a small source of water for animals, night-time LED lighting and an LCD screen that indicates the energy generated by that tree.

The trees will captures solar energy and provides green electricity that can be used for charging gadgets or to feed the suport infrastrucutue of the beach and scholls and by that way save some energ . The tree will also offers Wi-Fi, lighting (at night) and useful information and it it will provide a distinctive visual environment in the slected places and offer the population energy at a public space, rest, security and comfort.

2. Main objectives

The main objective of this pilot action is to find a solution that responds to the great vulnerability of the municipality to the phenomena of droughts and consequent heat waves.

To respond to that objective the structures to be implemented will present the following characteristics:

Model Features

- LCD panel that shows urban information.
- USB Charging Stations
- Free Wi-Fi
- Water source-for humans and animals.
- LED night lighting
- These models are programmed for areas with favorable climatic conditions and use a STRUC (Structural Analysis Program) program, certified according to European standards I.S.1225 and I: S.414.

Technical specifications

- Height-4.5 meters
- Width - 435 x 410 m
- Weight-1250kg
- Weight with all structure and solar panels-2500 kg
- 6 USB charging stations
- Wi-Fi access
- Water sources
- Led lightning

Characteristics of the panels

- 7 panels BIPV -Building Integrated PhotoVoltaics, each with 46 monocrystalline cells, of the type double tempered glass. Each with $2m^2$ of area and 80kg of weight.
- Power 1400 Watts
- Average energy 7KW per day
- Voltage-12V DC
- Operates 365 days a year
- 7000 watts of storage
- Resists to winds up to 140-150 km h
- Structure of Galvanized Metal-Tree
- LCD device- 7-inch touchscreen and camera
- Water device-Drinking water and filtered, with carbon filters.
- 3-generation Wi-Fi-GSM Router with 30-meter range
- Illumination-3 9W LEDs on each panel, temporarily controlled

3. A timetable with precise actions to be undertaken in the pilot action

The work to be carry out presents the following tasks:

- site preparation considering that is necessary an area of 500x500 cm, zone without relief and favorable to insolation (open to the sunlight). Preparation of the drain system (access to fresh and potable water, and flow),
- Implementation of infrastructures.

4. Budget

The implementation of the covered recreation areas in a beach and in two education centres represents an investmente around 88 500,00€ - provisional and under evaluation.

Price include delivery, on-site technician and installation.Taxes not included

5. List of all permits needed

The project presented will use, for this purpose, Public Space with Public Use and in an area considerer in the Municipal Master Plan. The project does not interfere with any existing urban infrastructures such as public lighting and building infrastructures.

6. Coordination of project, target audience and stakeholders involved

The municipality of Mértola will be the coordinator of the project. For that a team of 2 people will be allocated to monitor all the work and the financial management of the project.

The team will be responsible for the project coordination, communication, monitoring and evaluation.

The target audience is all the municipality population.

7. Risk assessment

Risk area	Description (issue and consequences)	Type of risk	Impact level of risk	Probability that risk will occur	Management strategy
Management risks	Lack of project management experience	internal	3	1	Proper personnel selection system will be implemented.
	Delay due to public procurement processes	External	3	2	
	Failure to meet deadlines by the project implementation company	External	3	1	Issue to be considered in the contract
Financial risks	Financial constraints	Internal	1	1	Will develop a financial plan
Implementation risks	Extreme weather event, causing delays of implementation	External	2	1	Will develop emergency action plan
Environmental risks	Extreme weather event, causing delays of implementation	External	2	1	Will develop emergency action plan
Other	Constraints verified in the site at the beginning of the works	External	3	1	Will develop emergency action plan

Annex 1

ACTION		2017				2018												2019												2020							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Action number	**Name of the action**	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
0. Preparation of pilot action (planning, research, permits, etc.) ALREADY DONE																																					
1. Preparation of pilot action (planning, research, permits, etc.) TO DO																																					
1.1.	Preparation of documentations																																				
1.2.	Development of research studies																																				
1.3.	Obtaining the necessary permissions																																				
1.4.	Other																																				
2. Implementation actions (construction works etc.)																																					
2.1.	Site preparation																																				
2.2.	Implementation of infrastructures																																				
3. Review and necessary approvals after implementation																																					
4. Awareness raising and communication																																					
4.1.	Communication campaign for inhabitants																																				
4.2.	Setting project info poster																																				
5. Monitoring																																					
5.1.	Monitoring of pilot action indicators and outputs																			X									X								
5.2.	Final assessment																																		X		
6. Transfer and replication																																					

6.1.	Visit of representatives of other LAs to see the pilot action																																							X
6.2.	Publication: Local adaptation projects in Spain, Portugal and Latvia																																							X

Annex 2

	Outcomes			Outputs			Activities			Inputs	
	outcome	**indicators/ baseline/target**	**info source**	**outputs**	**indicators/ baseline/target**	**info source**	**activities**	**indicators/ baseline/target**	**info source**	**Inputs**	**amount**
1.1	Reduced high temperatures risk by reducing exposure to direct sun and supply fresh water	Population affected by this action baseline - 0% target - 15%	Project	Covered recreation areas	Baseline – 0 units Target – 3 units	Project	Site preparation	3	Project		
1.2	Increased use of renewable energy	baseline - 0% target - 10%	Project				Implementation of infrastructures	3	Project		
1.3	Climate change awareness increasement	Population Informed about climate change and risks baseline - 0% target - 30%	Project								

life adaptate

This document has been done with the financial support of the European Union within the framework of the LIFE programme. The contents are the sole responsibility of the project LIFE ADAPTATE and in no case it should be noted that reflects the position of EASME and that this agency is responsible for the use that can be made of the information contained.