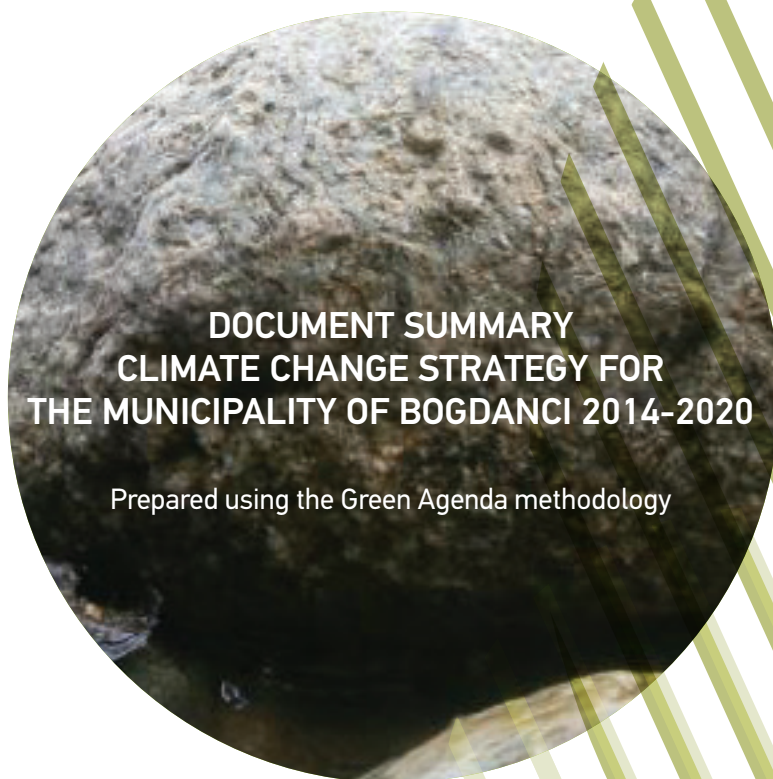




# CLIMATE CHANGE STRATEGY

MUNICIPALITY  
OF BOGDANCI  
(2014-2020)



**DOCUMENT SUMMARY  
CLIMATE CHANGE STRATEGY FOR  
THE MUNICIPALITY OF BOGDANCI 2014-2020**

Prepared using the Green Agenda methodology

**THE DOCUMENT WAS PREPARED BY:**

Rural Development Network of the Republic of Macedonia

**RESPONSIBLE PERSON FOR PROCESS IMPLEMENTATION IN THE COMMUNITY:**

Nadica Madzirova – Local Coordinator

**LOCAL TEAM FOR PROCESS IMPLEMENTATION**

**AND DOCUMENT DRAFTING:**

Jovanka Ampova - Coordinator of the working group

Local agricultural products

Dejan Madzirov - Coordinator of the working group

Water resources

Marjan Peev - Coordinator of the working group

Energy potentials

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USAID Municipal Climate Change Strategies Project

**RESPONSIBLE PERSON:**

Igor Slavkoski – Executive Director

**PREPARATION AND EDITING:**

Stole Georgiev – GA Process Coordinator

Maja Markovska – GA Process Assistant

**ASSOCIATES:**

MSc Metodija Dimovski – Climate Change Expert

MSc Emilija Poposka – Climate Change Expert

**DESIGN AND TECHNICAL EDITING:**

Jana Acevska

**PROOFREADING, CORRECTION AND TRANSLATION:**

CES Training Center

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Polyesterday

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# PREFACE

**Climate change is a problem  
which should not be ignored**



The Municipality of Bogdanci is located in a region where climate change is felt in all segments of everyday life. Climate change is a real and serious problem and should not be ignored. The price we pay for neglecting climate change is greater than resolving the problem quickly and firmly. The Municipality is affected by increased water demand, change in the quantity and the period of precipitation, floods, droughts, heat waves and wildfires. The consequences will negatively affect public health, economic development, and the environment.

USAID's Municipal Climate Change Strategies Project, which includes the Municipality of Bogdanci, provides a good opportunity to raise awareness of the impacts of climate change as well as initiatives to introduce clean energy, reduce greenhouse gas emissions, and address issues related to water in a way that both influences environmental protection and creation of new jobs. The Green Agenda method - which includes a variety of stakeholders - presents an opportunity for all people to take part in the decision making process and express their opinion on the given topic. In addition the implementation of an immediate action with already visible results, the ongoing pilot project and certainly, strengthening the capacity of local civic associations and the municipal citizens themselves in order to present the needs of the community.

To my pleasant surprise, the strategy development process took place with great involvement of the citizens of Municipality of Bogdanci, meaning that citizens from all settlements were actively present during all trainings which were supported by trainers and experts from Milieukontakt Macedonia, as well as at the meetings held for developing the strategy. As demonstrated in the Municipality of Bogdanci, the Green Agenda is a good tool for encouraging public participation in the decision making processes.

I am very pleased with the course of the entire process since the Municipality of Bogdanci is among the first Macedonian municipalities to have acquired the Climate Change Strategy document that we can use to act locally or to reduce or mitigate the impacts of climate change.

The majority of the municipality's population is engaged in agriculture as a primary or supplementary activity. In this region, climate change impacts have reduced the yield and quality of agricultural products. The Strategy identifies adaptation measures that may facilitate productivity for farmers in the areas of viticulture, orcharding and gardening.

Regarding energy resources and opportunities arising from the geographical positioning of the Municipality of Bogdanci, the measures envisaged in the Strategy include the application of energy efficiency in the institutions as an example for the local population to apply the same in their own homes.

Lately we are aware of the increasing temperatures and the need of drinking water and irrigation water in the summer, while on the other hand precipitation is present during the periods of increased risk of flooding. Providing sufficient quantities of drinking water and saving water for irrigation, along with flood protection are the priority measures foreseen in the Strategy.

The Climate Change Strategy 2020 of Municipality of Bogdanci is a good foundation of the opportunities for including citizens in the area of decision making on public processes and highlighting the importance of the citizens in the decision making process. The Municipality of Bogdanci will take concrete actions to implement the measures envisaged in the Strategy and will contribute to the reduction and mitigation of climate change.

Sincerely,  
Anastasija Olumcheva  
Mayor, Municipality of Bogdanci



Dear associates in USAID's Municipal Climate Change Strategies Project,  
  
citizens of Bogdanci,

As a team leader and director of this project, I would like first to thank you for your hard work, dedication, and motivation which have guided us in the past two years through the process of preparing this strategy.

The fact that USAID's Municipal Climate Change Strategies Project, implemented by the Association for Sustainable Development – Milieu-kontakt Macedonia, is the first of its kind in the region, was an additional challenge. This project produced the first four local climate change strategies in our country. This makes us, as an implementing organization, together with the citizens of the four municipalities that were included in this process, sort of pioneers in terms of addressing climate change, which has recently been referred to by the United Nations as an increased threat for humanity, greater than epidemics and terrorism together.

Implementation of USAID's Municipal Climate Change Strategies Project began on September 25, 2012 in four municipalities in the Republic of Macedonia and enabled the development of a consensual strategy and action plan for addressing the effects of climate change on the municipalities of Tearce, Bogdanci, Pehchevo, and Krivogashtani.

The documents are of very high quality, covering all aspects related to climate change that are specific to Macedonia.

The innovativeness of the Green Agenda Method, which has guided the project and which led to the signing of the first strategic documents – specifically regarding the challenges related to climate change at local and national level – is reflected in the participatory dimension of the process of creating and developing the strategic and action plan.

By including civic organizations, citizens, the private sector, and municipal authorities, the project increased the municipality's adaptive capacity to confront climate change.

At the same time, the process helped to improve local democratic processes and cooperation between civic organizations, citizens, and the local government.

In addition to the development of the strategies, USAID's Municipal Climate Change Strategies Project helped municipalities invest in their sustainable development and increase the quality of life of their citizens through the identification of urgent actions and the implementation of pilot projects.

The citizens of the Municipality of Bogdanci and the surrounding settlements improved the quality of drinking water by installing a new filter in the water treatment plant; the citizens of the Municipality of Tearce, together with 13 settlements in this municipality, now have energy-efficient street lighting, which helps reduce greenhouse gas emissions; and the municipalities of Bogdanci and Krivogashtani now have more energy-efficient buildings.

Igor Slavkoski  
  
Executive Director,  
Milieukontakt Macedonia

# INTRODUCTION TO THE STRATEGY



Climate change is caused by global warming, for which people are aware of and feel it in all aspects of their lives, especially in the last two decades. Climate change is a challenge to people as the only inhabitants on planet Earth who are the major contributors for the increase of greenhouse gas emissions through industrial, livestock, and agricultural production, as well as deforestation.

The impact of climate change affects agriculture by reducing the yield of the most sensitive crops such as winter wheat, vines and alfalfa, causing large economic damage. In forestry it is felt through the extinction of certain parts of the tree-crown and whole tree-trunks by insects and diseases, then forest fires and smouldered areas, as well as migration of certain tree species to higher altitudes. The negative effects of climate change on water resources will result in reduction of available waters and reduce the quality of water. The impacts on human health are conditions with possible fatal outcome, caused by extreme weather conditions (floods, droughts, storms).

Municipality of Bogdanci got the opportunity to take part in USAID's Municipal Climate Change Strategies Project, the first of its kind in the world, and to take concrete measures to adapt to climate change and reduce its impact. The purpose of the Strategy is to contribute to greater resilience to climate change by improving the readiness and ability to respond to climate change impacts locally.

The Green Agenda methodology is being used for the implementation of this process, which is a participatory method of creating and implementing local development strategies and plans. In Municipality of Bogdanci the start of the process is specific because the non-governmental organization implementing the process, Rural Development Network of the Republic of Macedonia, is not originally from Bogdanci, and therefore, to facilitate the operation, a local coordinator has been appointed, who is familiar with the relationships and processes in Bogdanci.

The process begins by identifying the local values that locals are proud of. A survey has been conducted, which is delivered to the citizens of the municipality, whereby values have been identified and organized into four groups, thereby forming four working groups.

The working groups were assembled of the local stakeholders – local authorities, local businessmen, non-governmental organizations and active citizens. The Rural Development Network of the Republic of Macedonia is coordinating these working groups and trainers and experts from Milieukontakt Macedonia, as well as the municipal administration intensively support the same as well.

In order to build local capacities and an incentive for local people to actively participate in the process and the implementation of activities, a series of trainings and lectures were held, delivered by the trainer in charge for Municipality of Bogdanci, Mrs. Julijana Daskalov.

The operation of the working groups consists of several phases, in which members of the working groups carry out analysis of the environment and the environmental problems/issues, according to their priorities, needs and wishes.

An important component of the Green Agenda process is the implementation of a pilot project in order to achieve rapid and visible solutions, which are generally beneficial for the entire community. Proposed ideas were obtained from each working group, and the emergency action – Insulation of the roof of the Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” was selected and realized.

As part of the project, a Greenhouse Gas Inventory has been made, a document of located sources of causes of greenhouse gases in Municipality of Bogdanci. The local coordinator and the members of the working groups, including available data to Municipality of Bogdanci with expert assistance from Milieukontakt Macedonia, have collected the data used for the completion of this document.

This process is conducted by the citizens themselves, deciding on their priorities, whereby a strategic document has been prepared, including an action plan for protection and promotion of the main values of the environment, with an emphasis on climate change, consistent with the needs of the community. This is very important because the process and the results derive from and are owned by the local population.

# PROFILE

## OF MUNICIPALITY OF BOGDANCI

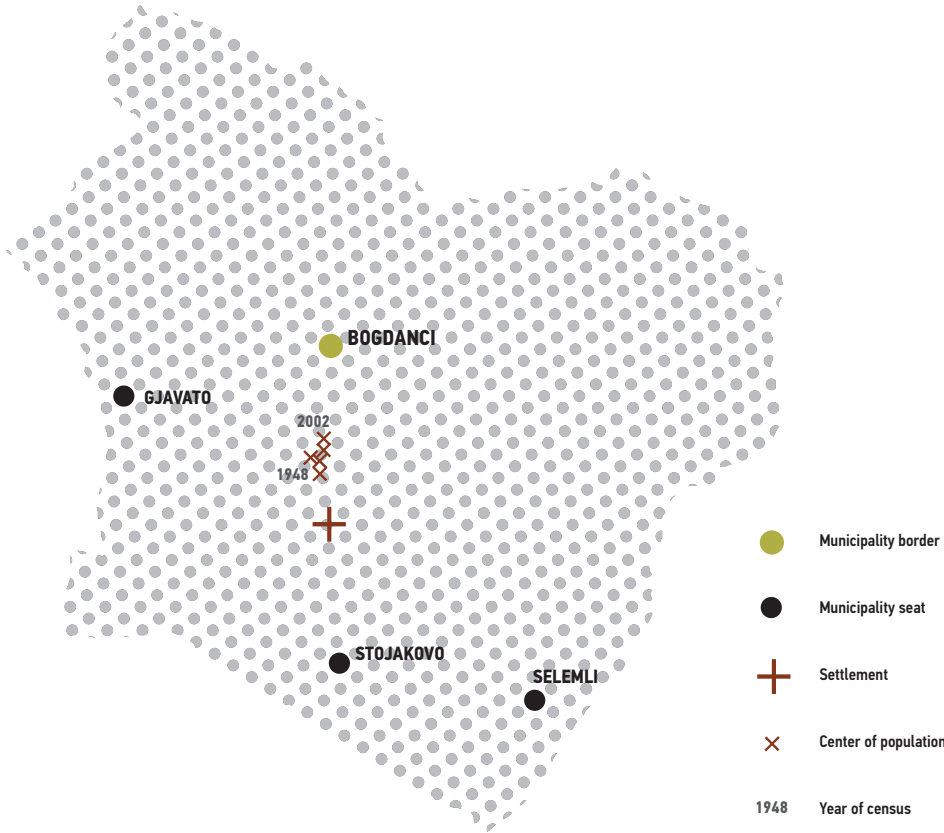


UNIT OF LOCAL SELF-GOVERNMENT	MUNICIPALITY OF BOGDANCI
YEAR OF ESTABLISHMENT	1996
AREA	114.54 KM²
TOTAL POPULATION	8.707
GENDER RATIO	4.330 WOMEN // 4.377 MAN
POPULATION DENSITY	76,02 CITIZENS/KM²
ANNUAL GROWTH	-5.8 ‰
NUMBER OF HOUSEHOLDS	2.597
NUMBER OF DWELLINGS	3.006
NUMBER OF SETTLEMENT	4
SETTLEMENTS	BOGDANCI 6,011 CITIZENS, STOJAKOVO 1,931 CITIZENS, GJAVATO 438 CITIZENS, SELEMLI 327 CITIZENS
MAIN ECONOMIC ACTIVITIES	TEXTILE INDUSTRY. STOCKBREEDING. AGRICULTURE
NATURAL RESOURCES	FARMLAND, MINERAL RESOURCES, RENEWABLE ENERGY SOURCES (SOLAR AND WIND POWER)
TOTAL CARBON DIOXIDE EMISSION RATE (CO <sub>2</sub> -EQ.)	12.806,88

TABLE 1 Basic information about the Municipality of Bogdanci

## GEOGRAPHIC LOCATION

The Municipality of Bogdanci extends to the most eastern part of Macedonia, between 41°07' and 41°15' Latitude and 22°30' and 22°40' Longitude and covers an area of 114.54 km². To the north it shares a border with the Municipality of Valandovo, to the northeast and east a border with the Municipality of Dojran, and south to southeast with Greece, and to the west a border with the Municipality of Gevgelija.





# TERRAIN

Geologically, the territory of Municipality of Bogdanci is part of the Vardar Zone, where there are rocks of different ages and different compositions, including quaternary sediments in the valley of the river Vardar.

Due to its plane-like nature, the terrain of the territory of Municipality of Bogdanci is not very developed. It is dominated by low mountainous forms, while only in the northern part of its territory higher hills rise, including Mamino (426 m alt.), Kuchelot (436 m alt.), and Puntot (453 m. alt). The highest part of the municipality is actually the border area to the southeast towards Municipality of Dojran where there are the slightly higher hills Bandera (532 m. alt.) and Karabalija (697 m. alt.)

# HYDROGRAPHY

The largest river in Macedonia, Vardar, borders the western edge of the municipality. Although it does not flow through the municipal territory, the role of the Vardar river is huge since it significantly influences the climatic and hydrological regime. Especially important in terms of climate change are the frequent water overflows of the Vardar River, which flood the surrounding area.

The largest water flow in the Municipality of Bogdanci is the Luda Mara River, which after the construction of the reservoir Lake Paljurci often has the characteristics of an overflowing stream, which during major rainfall causes floods, causing major problems especially due to the large deposits of fluvial material. The volume capacity of the reservoir Paljurci is 2.8 x 106 m³.

The same holds true for the Luda Mara River; its tributaries are overflowing. Its right tributaries include: Gabrovska River, Medurska River, and Kamilska River, while a significant left tributary is the Polandere. Some torrential streams as are the Suva Reka, Matorska, and Taljusnica rivers, which flow directly into the reservoir.

Besides Paljurci, another municipal reservoir was built on the Selemliška River, near the village Selemli. The reservoir lake “Selemli” is significantly smaller and has a useful volume of 0.84 x 106m³. Both reservoirs are intended for irrigation of the arable land, and for this purpose the municipality built another seven micro reservoir lakes.

# CLIMATE CHARACTERISTICS

Due to its geographical position, (un)developed relief, i.e. the small average altitude below 500 m.a.s.l.; the Municipality of Bogdanci completely belongs to the sub-Mediterranean type climate zone. The climate characteristics are very hot summers and relatively cold winters.

The coldest month in the year is January with an average temperature of 3.8°C, while the absolute minimum of -13.0°C is measured in January and December. The warmest month on record is July with an average temperature of 25.4°C while the absolute maximum temperature is 44.6°C measured in July. The average air temperature for several years is 14.2°C.

MONTHS	TEMPERATURE °C		PRECIPITATION	
	Average monthly	Average monthly maximum	Average monthly minimum	Mm
January	3,8	8,8	-0,3	53,0
February	5,6	10,7	1,0	61,2
March	8,8	14,6	3,4	59,8
April	13,4	19,6	7,3	54,3
May	18,5	25,1	12,0	59,4
June	22,4	30,0	16,0	42,3
July	25,4	32,6	17,9	31,6
August	24,7	31,9	17,3	33,8
September	20,2	27,9	13,8	33,1
October	14,4	21,4	8,9	72,5
November	8,8	14,1	4,4	86,7
December	4,9	9,9	1,0	73,1
Annual	14,2	20,6	8,6	660,8

TABLE 2. Climate inputs for Municipality of Bogdanci, period 1971 -2000¹

¹Source: National Hydro-meteorological Service, MS Gevgelija

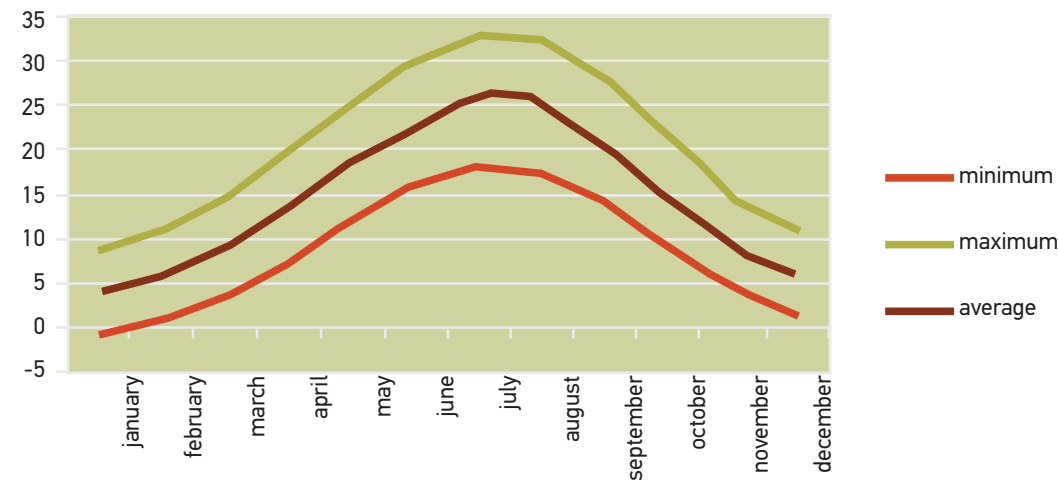


FIGURE 1 Monthly temperatures in Municipality of Bogdanci

The Municipality of Bogdanci does not receive large amounts of precipitation, with an average annual quantity of 660.8 mm. The most precipitation falls in November, when the average is 86.7 mm. The summer period is very dry and gets less than 15% of the total annual precipitation.

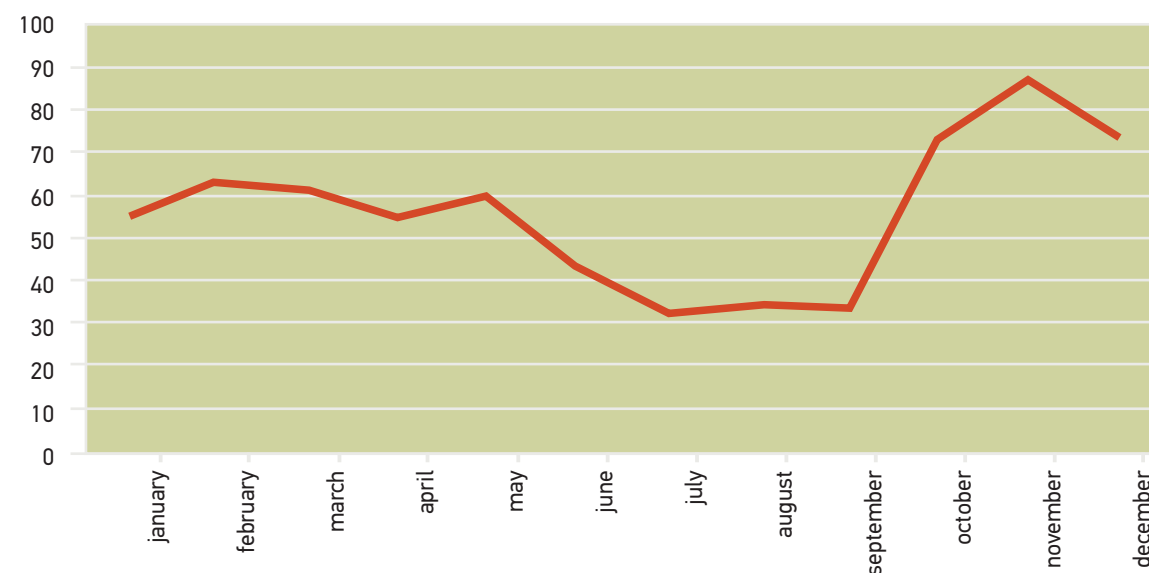


FIGURE 2 Average monthly precipitation in Municipality of Bogdanci

In terms of winds, the highest frequency is from the northern and southern routes, i.e. the Vardarec and Jugo winds. Vardarec blows throughout the year, with highest intensity in winter months and it lowers the temperature in the Municipality, and during summer it increases the evaporation. Jugo is a warm wind and blows mostly in spring and autumn.

## DEMOGRAPHIC CHARACTERISTICS

According to the last official census of population and households in the Republic of Macedonia, 8,707 residents live in the territory of the Municipality of Bogdanci, i.e. 76 residents per km<sup>2</sup>, slightly below the population density in Macedonia, which in 2002 counted 78.6 r/km<sup>2</sup>. Of this figure 4,243 (50.25%) were men, and 4,200 (49.75%) were women.

The majority of the population in 2002 lived in the municipal center Bogdanci – 6,011 residents or 69% – while in the remaining three village settlements the population was smaller: Stojakovo – 1,931 resident or 22%, Gjavato – 438 residents or 5%, and Selemli – 327 residents or 4%.

The ethnic structure of the population is 92.9% Macedonian or 8,093 residents. In addition, in the Municipality there are 525 Serbs (6.0%), 54 Turks (0.6%) and 35 members of other ethnic groups.

Regarding the age structure, as shown in the table below, the population of the Municipality of Bogdanci is aging faster than the Macedonian average level; namely, the age group of young population from 0-14 years participates with 13.38% in the Municipality of Bogdanci, which is around 8% less than this group in the total population in Macedonia. On the other hand, the share of the working population is 72.15% and is on the same level as the national percentage, and finally, the population of 65 years and over (i.e. retirees) comes in at 14.46% of the total population in the municipality and is 4% higher than the Macedonian level.

	total	0-14 years		15-64 years		over 65 years	
total	8.443	1.130	13,38%	6.092	72,15%	1.221	14,46%
man	4.243	580	13,67%	3.134	73,86%	529	12,47%
woman	4.200	550	13,10%	2.958	70,43%	692	16,48%

TABLE 3 Age structure

These negative demographic trends are concerning for the future development of the municipality, because in the next 15-20 years the number of working-age and young people will decline, while the number of aging population will increase. The reasons for the seriously large trend of population decrease are multifaceted, including the strongly expressed economic migration. As a result, the natural growth, more precisely reduction of the population in 2011 was -5.8% which places this municipality in the first 10 on the list of municipalities with largest reduction of population in the Republic of Macedonia.

According to the 2002 Census, the Municipality of Bogdanci registered 2,597 households, showing the average household size of 3.4 people, slightly below the Macedonian average of 3.6 residents per household. On the other hand, the number of apartments (dwellings) in the municipality is 3,006, i.e. 1.15 residents per household, which is also below the national average which is 1.2 flats per household.



## ROAD INFRASTRUCTURE

The Municipality of Bogdanci with its position at the southeast end of the country has a great location since along its western border runs along the highway E-75 and the municipal center is at a distance of only 7.5 km from the highway, through which the municipality is both ways directly connected to the north with the capital Skopje, and also to the south with Greece.

The Municipality of Bogdanci has excellent connections with all neighboring municipalities, except the roads are not in a good condition and require urgent reconstruction and repair. Namely, it is connected with Gevgelija through the regional road R-111, which extends to the east and connects with the regional road P-604 and links the municipality to south, and also with the Municipality of Dojran, as well as with the municipality Valandovo to the north to which it is also connected via the regional road P-123, which is also the main internal transversal road connecting the three municipal villages, Gjavato, Stojakovo and Selemli.

In the future it is expected to connect the road P-123 with the regional road P-111 through the dirt road that runs from Selemli towards the reservoir Paljurci, which will complete the internal transport infrastructure.

## LAND USE

The Municipality of Bogdanci has 1,698 ha total area of available farm land, of which 1,254 ha (73.9%) are in use<sup>2</sup>, and one-third of that area, i.e. 561.6 ha, is being irrigated. Given that early-gardening is the main activity of the population in the municipality, 58.66% of used farmland falls into the category of arable land, gardens, and home gardens, while another 34.09% are vineyards.

Cereals occupy 346.28 ha, i.e. 47.5% of arable land and gardens, followed by vegetable crops with 322.9 ha, that is 44.3%. Dominant crops are wheat, covering an area of 180.75 ha (52.2%) and barley with 127.47 ha (36.8%). Of forage crops, alfalfa dominates with 61.4% of the total area and clover with similar dominance of 31.5%. Dominant vegetable crops are cabbage with 113.17 ha, tomatoes with 82.31 ha, and onions with 79.94 ha, which altogether cover 85.5% of the area under these crops.

The individual owners in Bogdanci dispose of a small area of forests, only 33.22 ha, of which 97.7% are deciduous forests, while only a small part are coniferous forests

## ECONOMIC CHARACTERISTICS

According to the State Statistical Office, on December 31, 2011, the Municipality of Bogdanci only had 331 active business entities registered. Most of these active business entities were found in the following sectors:

- Wholesale and retail; repair of motor vehicles and motorcycles, 143 entities;
- Transport and storage, 46 entities, and
- Manufacturing, 37 entities.

Of the other sectors of business activities, in the Municipality of Bogdanci active business entities have been recorded in the following sectors: agriculture, forestry and fishing, mining and quarrying, water supply; waste management; environmental remediation, construction, hospitality and catering, information and communication, professional, scientific and technical activities, education, health care and social care, art, entertainment and leisure, other service activities.

Most of these active business entities, according to their size, fall into the category of micro-entities, while only five entities belong to the category of medium enterprises, and there are no large business entities. On the other hand, the total number of active business entities changes from one year to another, with an increasing trend of the total number; however, mainly through an increase in the number of micro-entities and reduction in the number of small entities.

<sup>2</sup>State Statistical Office, Agricultural Census 2007, Statistical Database, <http://makstat.stat.gov.mk/pxweb2007/Database/popisnazemjodelstvoto/PopisNaZemjodelstvoto.asp>





# GREENHOUSE GASES (GHG) INVENTORY

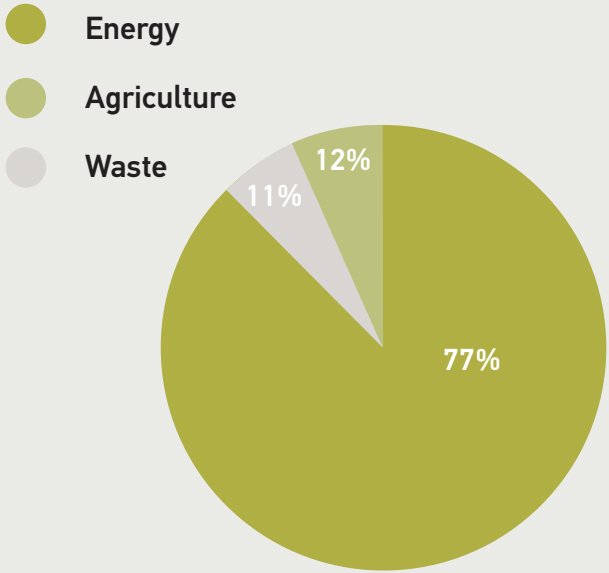


A phase of education of the municipal representatives was introduced within the USAID Municipal Climate Change Strategies Project, implemented by Milieukontakt Macedonia, for preparation of a greenhouse gas inventory. Hence, together with the participants in the process of strategy preparation, a local greenhouse gas inventory of the Municipality of Bogdanci was also prepared.

Data was collected through a questionnaire, which represented a guide for the working groups and contained directions/guidelines on the type of data to be collected. Also, official requests with questionnaires were submitted to the municipality and the private sector and conducted surveys with the municipal residents and the private sector, and also data from the national institutions were used. During the making the inventory (counting/measuring the quantities of greenhouse gases) the emissions of direct (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) and indirect greenhouse gases (CO, NO<sub>x</sub>, SO<sub>2</sub>) are being calculated. This kind of inventory preparation at the local level has been performed for the first time in the Republic of Macedonia.

Such inventory preparation of the greenhouse gases made the “footprint” of greenhouse gases on the territory of Municipality of Bogdanci. Considering the collected and processed data according to the national methodology for greenhouse gas inventory preparation, the following results were obtained:

## SOURCE OF GREENHOUSE GRASS EMISSIONS BY SECTOR



The greenhouse gas emission on the territory of the Municipality of Bogdanci is:

**28.280,21**  
tons/year CO<sub>2</sub>-eq

or

**3,35**  
tons/year CO<sub>2</sub>-eq/per capita

Absorption capacity of forests

**15.473,33**  
tons/year CO<sub>2</sub>-eq

Balance of greenhouse gas emissions:

**12.806,88**  
tons/year CO<sub>2</sub>-eq



# THE GREEN AGENDA PROCESS

## The Green Agenda Methodology



For the preparation of the climate change strategy for municipality of Bogdanci, a Green Agenda methodology was applied, which was adjusted for resolution of issues related to climate change, organized in five phases and 18 steps.

### Green Agenda – A tool for preservation of community values

The Green Agenda is a participatory and democratic method for development and implementation of local strategies and plans for sustainable development with active inclusion of different sectors of the local community where the process is being implemented. The process is exceptional and special compared to the other processes which have similar goals from three aspects:

- The process begins with the identification of local values
- The participation in the process is not limited to experts and specific stakeholders only, rather it is comprehensive and open for everyone; and
- The very process which is a result, as well as the results which arise from the process, are beneficial for the local population.

### The relevance of the Green Agenda is twofold:

On one hand, the participatory process, by means of which a common agreement is achieved, strengthens communication and cooperation, that is, the participation of the public in the decision making and good management at local level;

On the other hand, the results of the process – local climate strategy with an action plan, which may contribute for the local sustainable development and improvement of the quality of life.

### The long-term goals of the Green Agenda include the following:

Integration of the issues related to the environment, sustainable development and climate change, in all relevant processes of planning and creation of politics;

Raising the level of familiarity of the local population, with the issues in the field of environment, sustainable development and climate change;

Raising the awareness of the climate change impact on local development and vice versa;

Increase of the participation of the civil society in the decision-making processes in the community and the good management;

### Short-term goals of the Green Agenda include the following:

Analysis of the community development, in the context of environmental protection and adaptation to climate change;

Analysis of climate change vulnerability, in terms of local sustainable development,

Creation of a vision of the community and strategic approach in the adaptation to climate change and its mitigation;

Support of initiatives and interactive processes with the relevant stakeholders and holders of the community development;

SECTOR	TONS CO <sub>2</sub> -eq / year	%
<b>Energy</b>	21.641,94	76,53%
Electricity supply in private housing	13.905,56	49,17%
Electricity supply in public facilities/buildings	246,46	0,87%
Electricity supply for street lighting	194,23	0,69%
Industry and catering	1.304,80	4,61%
Transportation	5.990,88	21,18%
Agriculture	3.245,20	11,48%
Methane emissions from enteric fermentation	2987,88	10,57%
Methane emissions from manure management	237,72	0,84%
Greenhouse gas emissions from burning crop residues	19,60	0,07%
<b>Forests and forestry</b>	-15.473,33	-120,82%
Waste	3.393,07	12,00%
Methane emissions from solid waste landfills	2.995,44	10,59%
Methane emissions from residential/commercial organic wastewater and sediments	208,53	0,74%
Emissions of nitrogen oxides from the sewers	189,1	0,67%
<b>Total (exl. forestry)</b>	<b>28.280,21</b>	
<b>Total (incl. forestry)</b>	<b>12.806,88</b>	

TABLE 3 Review of greenhouse gas emissions by sector

## PRINCIPLE1 LOCAL VALUES

At the very beginning of the process in the community, the local stakeholders identify the community values. The main idea is the focus on matters that the local population is proud of, instead of focusing on problems. In terms of value, the stakeholders may identify natural resources or objects in the environment or the nature (such as natural monuments, protected areas, specific flora or fauna, and entire ecosystems as well). For example, specific local agricultural products may be a value, together with the entire agriculture or some other economic activity. Value can also be cultural facilities, however infrastructural facilities as well, environmental media and entire ecosystems etc.

**VALUES** are all resources (natural, social, economic) available to the community, which are aimed at sustainable development of the community and are relevant for the community and the citizens are especially proud of them.

## PRINCIPLE2 ACTIVE COMMUNITY PARTICIPATION

The Green Agenda process is open for everyone interested, regardless of the level of previous knowledge of climate change and environmental protection. Everyone who is dedicated to his community may contribute for the success of the process and its results. This indicates the special attention paid to construction of local capacities, so that the local population can acquire tools for active participation in the process and in the implementation of the activities.

## PRINCIPLE3 JOINT OWNERSHIP

Upon the selection of values, local working groups are formed, which process at least one value. The working groups analyze the status of each value, whereby they define the community vision, and also contribute with ideas and drafting of project activities within the agreed strategy. All these steps are undertaken from the local population, and they are based on their priorities, needs and wishes. For this reason, the citizens are truly motivated in the inclusion of their plans in the final document of the Green Agenda.

## PRINCIPLE4 COMMUNITY STRATEGY

Since, in the specific case, the Green Agenda is a process that analyses the issues related to climate change and the environment, in the context of the human society, the environmental activists are not the only ones who should be invited to participate in the process, but also other interested groups of the society, such as women and youth, farmers, land owners, people with disabilities, religious organizations etc. Such approach is of exceptional importance, because climate change may have different impact on different categories of citizens, who can have different senses of the consequences of climate change.

As a result of this process, the community acquires a document i.e. a strategy, based on consensus and addresses the needs of the civil society, with an action plan of identified measures for adaptation and mitigation of the climate change effects. In addition, the public awareness of the local population is raised, as well as its preparedness for global climate change, the activism is strengthened, and parallel processes for future actions are developed, which will help the participants to perceive the short-term and middle-term project results.

Basically, the Green Agenda is a process directed towards development of a strategy for bridging the determined gap (difference) between the current situation, the trends (tendencies) and the desired future (vision). After the termination of the process, monitoring is implemented (monitoring of the situation), in order to analyze the results and to give conclusions and recommendations, whereby a new cycle can start.

## PRINCIPLE5 STRENGTHENED CAPACITY

The capacity building at the local level, as a component of the Green Agenda process, is essential for the provision of local ownership, as well as for encouragement of the local population to undertake responsibility of their own sustainable development, thereby to improve the quality of life of the current and future generations.

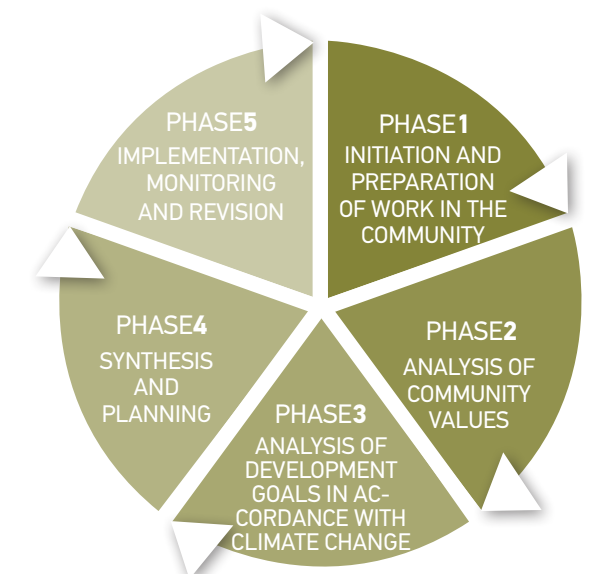


Figure 3 Steps in the Green Agenda process



**PHASE 1**  
INITIATION AND PREPARATION  
OF WORK IN THE COMMUNITY



**STEP 1: Creation of community profile**  
Preparation of climate profile  
Greenhouse gas inventory  
Mapping stakeholders in the community  
Analysis of existing documents and local policies  
Identification of possible community VALUES



**STEP 2: First meeting with the community stakeholders**  
Preparatory activities for organizing a meeting  
Realization of the meeting  
Determination of community values  
Formation of thematic working groups

**PHASE 2**  
ANALYSIS OF  
COMMUNITY VALUES



**STEP 3: Determination of FUNCTIONS of values**



**STEP 4: Determination of TRENDS of functions**



**STEP 5: Analysis of EFFECTS of the trends**



**STEP 6: Defining a community VISION**



**STEP 7: Defining the main PROBLEMS**



**STEP 8: Analysis of the CAUSES of problems**



**STEP 9: Setting community development GOALS**

**PHASE 3**  
ANALYSIS OF DEVELOPMENT GOALS IN  
ACCORDANCE WITH CLIMATE CHANGE

**PHASE 4**  
SYNTHESIS AND PLANNING

**PHASE 5**  
IMPLEMENTATION,  
MONITORING AND REVISION



**STEP 10: Assessment of VULNERABILITY to climate change**



**STEP 11: Assessment of possibilities for MITIGATION of climate change**



**STEP 12: Selection of PRIORITY MEASURES for climate change**



**STEP 13: Development of an ACTION PLAN for climate change**



**STEP 14: Development of MONITORING plan**



**STEP 15: Writing of the strategy and a public debate**



**STEP 16: Adoption of the strategy by the Municipal Council as an official strategic document**



**STEP 17: Implementation of priority measures through pilot projects**



**STEP 18: Monitoring and revision of the strategy**





# VISION AND STRATEGIC DEVELOPMENT GOALS

Vision of the citizens  
of Municipality of Bogdanci



The Municipality of Bogdanci is an energy efficient municipality; it uses every drop of water and produces high quality vegetables and fruits.

## DEVELOPMENT GOALS FOR VISION REALIZATION

1. MAIN DEVELOPMENT GOAL OF THE WORKING GROUP LOCAL AGRICULTURAL PRODUCTS:

Protection and promotion of local agricultural products

*Specific goal 1.1:* Application of new technologies for growing vegetables

*Specific goal 1.2:* Application of new technologies for cultivation of fruit/orchards and vineyards.

2. MAIN DEVELOPMENT GOAL OF THE WORKING GROUP WATER RESOURCES:

Sustainable management of local water resources

*Specific goal 2.1:* Sustainable management of the water supply system

*Specific goal 2.2:* Proper course and mode of irrigation as a water saving measure

*Specific goal 2.3:* Collection and conservation of rainwater – quality water for people and nature, reduced risk of natural disasters, climate stabilization, strengthened biodiversity

3. MAIN DEVELOPMENT GOAL OF THE WORKING GROUP ENERGY POTENTIALS:

Utilizing renewable energy sources and applying energy efficient measures in public buildings

*Specific goal 3.1:* Utilizing the potentials of RES in the public sector

*Specific goal 3.2:* Education, promotion and campaigns to cope with climate change and utilization of RES and EE

*Specific goal 3.3:* Reducing greenhouse gas emissions from public buildings



# COMMUNITY SITUATIONAL ANALYSIS

## COMMUNITY STAKEHOLDERS

Mapping and identifying of stakeholders begins with promoting the project for drafting a climate change Strategy for the Municipality of Bogdanci, in early April 2013. Initially, all members, who are directly or indirectly involved in the organizational activities, are informed through informal meetings, attended by the following stakeholders from the community:

**Public institutions** – Mayor of the Municipality of Bogdanci, municipal administration, Primary Municipal School “Petar Musev”, Secondary Municipal School “Bogdanci”, Primary Municipal School “St . Cyril and Methodius” in Stojakovo, PE “Communal Hygiene”.

**Local communities** – The presidents of the local communities of the settlements in Municipality of Bogdanci have been informed about the idea of the project at the initial meetings.

**Civic associations** – the leaders of several non-governmental organizations, including associations concerned with ecology, nature, waters, beekeeping, and hunters have been informed through various networks and activities.

**Business sector** – In order to introduce the project to the businessmen, a series of preparatory meetings have been held whereby the local coordinator visited local firms.

**Individual activities** - the local coordinator by means of direct contacts with the citizens and sharing information material, introduced the local population to the project.

## EXISTING LEGISLATION AND LOCAL POLICIES (STRATEGIES, PLANS, PROGRAMS ETC.)

### NATIONAL LAWS AND REGULATIONS:

- Environmental Law (Official Gazette of RM, no. 53/2005);
- Regulation of operations and activities for mandatory prepared elaborate on environmental protection, and the Mayor is the competent authority for its approval (Official Gazette of RM no. 80/2009);
- Law on supply of drinking water and discharge of urban wastewater (Official Gazette of RM, no. 68/2004);
- Energy Law (Official Gazette of RM, no. 16/2011);
- Law on Ambient Air Quality (Official Gazette of RM, no. 67/2004);
- Law on Waste Management (Official Gazette of RM, no. 68/2004);
- Law on Nature Protection (Official Gazette of RM, no. 67/2004);
- Law on Waters (Official Gazette of RM, no. 87/2008);
- Decree on the categorization of watercourses, lakes, reservoirs and groundwater (Official Gazette of RM no. 18/1999);
- Law on Quality of Agricultural Products (Official Gazette of RM no. 140/2010);

- Law on Local Self-Government (Official Gazette of RM no. 5/2002);
- Utilities Act (Official Gazette of RM no. 95/2012);
- Law on Public Hygiene (Official Gazette of RM no. 111/2008);
- Law on Cemeteries and Funeral Services (Official Gazette of RM no. 86/2008);
- Law on Determination of names of streets, squares, bridges and other infrastructure facilities (Official Gazette of RM, no. 66/2004);
- Law on General Administrative Procedure (Official Gazette of RM, no. 38/2005);
- Offences Act (Official Gazette of RM, no. 62/2006);
- Law on Inspection Control (Official Gazette of RM, no. 50/2010);
- Law on Mineral Resources (Official Gazette of RM, no. 24/2007);
- Decision on communal order on the territory of the Municipality of Bogdanci;
- Decision on public hygiene;
- Decision on the fee for public hygiene maintenance;
- Decision on adoption a protection and rescue plan against natural disasters and other accidents of the Municipality of Bogdanci;
- Decision on establishing universal units for Protection and Rescue in the Municipality of Bogdanci;
- Decision on establishing headquarters for the Protection and Rescue unit in the Municipality of Bogdanci;

### LOCAL DOCUMENTS, STRATEGIES, PROGRAMS AND PLANS:

- Rural Development Strategy;
- Local Economic Development Strategy;
- Local Environmental Action Plan;
- Draft Report on the Strategic Environmental Assessment for the General Urban Plan for the town of Bogdanci, Municipality of Bogdanci;
- Report on the Strategic Environmental Assessment for the urban planning documentation of the commercial zones places called “Gramadi”, “Ljushev Brest”, “Crkvica”, “Sipka” and “Barta”, made by Urban Rural Consulting, Skopje, April 2010, approved by the Municipality of Bogdanci;
- Study for assessment of the environmental impact of the project: Wind Park – Bogdanci, Decision no. 11-119/3 of 05.01.2011, Ministry of Environment and Physical Planning;
- Report on the Strategic Environmental Assessment for Urban Plan outside a settlement for repurchase-distributive centers for fresh fruit and vegetables, manufacturing, distribution and services in places called “Gorni Chair”, Cadastral Municipality Bogdanci – Municipality of Bogdanci, Urban Rural Consulting, Skopje, November 2010, approved by the Municipality of Bogdanci;
- Strategic assessment of the environmental impact for the Urban Plan outside a settlement for the construction of a religious facility including a hotel-catering complex on CP 2810, part of CP 2812, place called Bolovan, part of CP 2797, place called Pobreshko and part of CP 4209 place called Paljurci, CM Bogdanci outside the town, KD ENVIRO RESURSI DOO Skopje, no.105-04/12 from 04.04.2012;



- Program for arrangement of construction land in the Municipality of Bogdanci 2013;
- Work Program in the field of using state owned construction land on the territory of the Municipality of Bogdanci 2013;
- Annual Program for construction, reconstruction, maintenance and protection of local roads and streets in the Municipality of Bogdanci 2013;
- Urban Equipment Program in the Municipality of Bogdanci 2013;
- Program for preparation of urban plans in the Municipality of Bogdanci 2013;
- Program for public hygiene maintenance;

ONGOING LOCAL PROJECTS:

- Strategic environmental impact assessment for an Urban plan outside a settlement for the commercial complex Winery Divino, Municipality of Bogdanci, DTLIPU TEHNOLAB DOO Skopje, no.0702-233/1 of 09.04.2012, approved by the Municipality of Bogdanci;
- Strategic environmental impact assessment for an Urban plan outside a settlement for the recreational and sports complex on CP 2923/1, 2923/2, 2923/3 on part of CP 2920, 2921, 2922 place called Korodere, on part of CP 2797/1 place called and on part of CP 8148 place called Kardere, CM Bogdanci outside the township, KD ENVIRO RESURSU DOO Skopje, 2011;
- Strategic environmental impact assessment for local urban plan documentation for a manufacturing facility on CP 11753/1, 11754/2 and parts of CP 11753/2 and 11754/1, place called Crkvica, CM Bogdanci, KD ENVIRO RESURSU DOO Skopje, 2011;
- Strategic environmental impact assessment for local urban plan documentation for the construction of a commercial complex on CP 11763, 11760/1, 11760/2, 11751/1, 11751/2 and part of CP 11754/1, CM Bogdanci, DEK DEKONS EMA DOO, Skopje, 2012;
- The Decision of utilities operations is in progress in accordance with the new Utilities Act;
- Drafting of the Program for protection of the population against infectious diseases is in progress in accordance with the Law on protection of the population against infectious diseases;
- Energy Efficiency Program

Note: All documents are available on the website of Municipality of Bogdanci ([www.bogdanci.gov.mk](http://www.bogdanci.gov.mk)) and the archives of the Municipality of Bogdanci.

IDENTIFIED COMMUNITY VALUES

Identification of the values of the community has been carried out during the preparatory phase for the Green Agenda implementation process. In this step the following values of Municipality of Bogdanci were identified:

WATER RESOURCES AND BIODIVERSITY

- Luda Mara River
- Ljokova River
- Gegova River
- Dukovec River
- Medurci River
- Paljurci Reservoir
- High level of groundwater
- Wells for water supply
- Wells for the hydro-system to save Dojran Lake
- Animal species: wild rabbit, wild boar, rock partridge
- Endemic species of the walnut and plane tree community [juglando-platanum trees](Cheste Javor)
- Natural rarities: Astragalus - kidney bean variety (Astragalus physocalyx Fischer), Land quillwort [Phrygian isoetes] (Isoetes Phrygia Hausskin)
- Fungi: Amanita curtipes, Scleroderma polyrhizum, Myriostoma coliforme
- Types of plants: St. John’s wort, chamomile, dill, mint, nettle

ENERGY POTENTIALS

- Wind power
- More than 300 sunny days a year

AGRICULTURE AND FOOD

- Cereal crops: wheat, corn, barley
- Vegetables: tomatoes, cabbage, onions, potatoes, parsley, chayote
- Fruits: red and white grapes, Japanese apples, prunes, figs, wild figs, watermelons, apples, Japanese medlar
- Beekeeping
- Milk, yogurt, cheese, cottage cheese, hard cheese, yellow cheese
- Fodder beet, alfalfa

CULTURE AND TOURISM

- Churchulum
- Archaeological sites
- International Grand Prix Flying Targets (clay pigeons) Tournament
- Horse and donkey races

MANUFACTURING AND TRANSPORTATION

- Cow farming
- Poultry farming
- Textile industry
- Production of PVC carpentry and other products made of polypropylene
- Wood industry – production of pellets and briquettes
- Production of metal doors and windows
- Wine production
- Passenger land transportation

WORKING GROUPS

At the first meeting with the stakeholders the priority community values were selected and the working groups were formed that went through the process of drafting the climate strategy for Municipality of Bogdanci.

WORKING GROUP 1 Local agricultural products

- Vegetables and fruits

WORKING GROUP 2 Water resources

- Reservoir Paljurci, wells for water supply and wells for the hydro system for salvation of Dojran Lake

WORKING GROUP 3 Energy potentials

- Wind energy and over 300 sunny days a year

ANALYSIS OF  
LOCAL VALUES

LOCAL AGRICULTURAL PRODUCTS

Growing fruit and vegetables is a tradition in the Municipality of Bogdanci. Several types of vegetables are grown of the early spring crops, of which the most common are: tomatoes on 82.31 ha, 79.94 ha with onions, cabbage is grown on 113.17 ha, potatoes on 21.05 ha (Census of Agriculture 2007). Vegetable production is performed in the open field and in greenhouses, with or without heating. Until the nineties of the last century, agriculture was considered a core business and a pillar of the economy in the Municipality of Bogdanci.

The dam “Paljurci” was built for better organized and accelerated development of agriculture, which provides water for irrigation of the area. In such conditions a significant development of the total agricultural production is being achieved. Consequently, positive trends were achieved in the development of the manufacturing industry, increase of the areas with cereals and vegetable crops, development of livestock breeding, as well as expansion of vineyard areas.

However, in recent years, significant changes occur in the agrarian structure. Year after year the production of vegetable crops decreases, and the areas planted with these crops are reducing, as well as the average yields, which makes the production economically unviable. Unfavorable hydrological conditions have considerable impact, such as the reduced rainfall and snow, the occurrence of drought, which leads to reduction of the amount of water, and also the gradual adoption of measures for limiting the use of water from the dam “Paljurci”. Completely dry periods are getting more frequent in the months of June, July and August, just when the agricultural crops require more watering. Additionally, more frequently diseases emerge and the exploitation of farmland is declining. All this contributes to a decreased interest in farming and its transformation into a secondary activity, and reduction or diminishing of certain agricultural crops.

On the other hand, in the past years, new areas with new crops have been observed, which have shorter time of vegetation adapted to changing climate conditions, such as broccoli, cauliflower, lettuce, eggplant. Also the introduction of new crops is remarkable, which do not belong to the category of so-called “traditional crops” such as asparagus, Chinese cabbage and red lettuce.

In 2004, Bogdanci suffered a catastrophic flood which left traces on the quality of the soil, both from pedagogical and biological standpoint. It takes continuous laboratory monitoring, research and analysis to accurately determine the effects of this catastrophe, but unfortunately those are lacking.

In such conditions, in order to increase production, it is important to use controlled, quality planting material, and to use seeds with satisfactory percentage of germination.

One major cost for growing early spring vegetables is the heating of greenhouses, for which timber, liquid fuels, car tires and plastic are being used. Despite the high costs, this practice causes further excessive use of the forests, and increased environmental pollution caused by greenhouse gas emissions.

While growing early vegetables displays a negative trend, orcharding shows the exact opposite, i.e. a positive trend has been observed with increased areas planted with vineyards, apples, Japanese apples etc. At the same time new crops were introduced that are adapted to changing climatic conditions, such as: chokeberries (aronia), kiwi, pomegranates, hazelnuts, raspberries and a new type of plums.

Processing of soil is the basis for its fertility and quality. Unfortunately, this function acquires an increasingly negative trend. People stay away from the soil due to their fear to face climate change which is more visible and more prevalent.

Agricultural activities have direct impact on the environment with the use of pesticides and herbicides, and also from burning or disposal of agricultural waste. From the recent observations it can be concluded that there is a possibility for a future use of agricultural waste.

DEVELOPMENT GOALS FOR THE VALUE  
Local agricultural products

- 1.1. Application of new technologies for growing vegetables
- 1.2. Application of new technologies in the cultivation of fruit and vineyards

# WATER RESOURCES

Precipitation is an extremely important climatic element, despite the air temperature and winds, the water regime, which directly affect the body of water. The following factors influence on the distribution of precipitation: movement of cyclones in winter and anti-cyclone conditions in summer, that cause long, dry periods lasting three or more months (July to September). On the other hand, the emergence of short intense rainfall, causing erosion and flooding, this in turn, inflicts significant damage on the buildings and the crops. The last example of the devastating effect of these rains is the flood from June 2004. The average amount of annual precipitation is 649.9 mm, measured in the nearest weather station in Gevgelija. The maximum precipitation is reached in the months October, November and December.

Groundwater is widely prevalent in the Municipality of Bogdanci. Waterbeds are of compact type of aquifer at free level in the alluvial cascade deposits of the river Vardar, with thickness up to 100 m in Gavochko Pole, and with very good filtration properties. In this waterbed of ground-water there are several exploitation fields for irrigation of agricultural areas, water supply for the population and the industry: Bogdanci 40 l/sec, the Well System Gjavato-1 (for salvation of Dojran Lake) 1000 l/sec, the Well System Gjavato-2 (Paljurci) 700 l/sec. Along with the Skopje region, this is the greatest bearing of groundwater within non-aligned alluvial sediments. In the mountainous part there is also a high level of groundwater and during the precipitation period of the year several sources are activated which complement the temporary water streams with water.

There are numerous temporary water streams in the territory of Municipality of Bogdanci. During medium dry years, there is water in most of the temporary watercourses of the upper basin, from November to May. However, in favorable hydrological years, water is flowing throughout the entire watercourse in the period from October to June. Their devastating erosive effect is most evident during longer intensive rainfall, which has been a frequent occurrence lately. The reasons for this phenomenon are the deforestation along the watercourse and their catchment areas and uncontrolled urbanization.

The water from the reservoir “Paljurci” is used for irrigation of farmland in the Municipality of Bogdanci. The dam “Paljurci” was built in 1977 and it is located 4 km northeast of Bogdanci, on the river Luda Mara that is part of the water shed of the river Vardar. The dam is constructed as an embankment, made of local materials, with a central clay core leaning on both sides on the graveled slopes. The height of the construction (from the foundation) is 22.5 m, according to the criteria of the International Commission on Large Dams, and it represents a large dam. The volume of the reservoir lake at normal level is  $2.9 \times 10^6 \text{ m}^3$ , and the useful volume of the reservoir is  $2.6 \times 10^6 \text{ m}^3$ . The reservoir space is quite favorable in terms of stability and there is no danger of occurrence of any landslides and rockslides. The large body of water of the river Luda Mara, at the profile site of the dam, reaches  $180 \text{ m}^3/\text{s}$ , which is a 1,000-year great water basin of  $63.2 \text{ km}^2$ . Through the spillway  $160 \text{ m}^3/\text{s}$  of water is evacuated, while  $20 \text{ m}^3/\text{s}$  is retained in the reservoir. During the flood in 2004 this maximum was reached and the dam spillway suffered significant damages.

In dry years, when the reservoir lake “Paljurci” has no capacity to meet the needs of water, water for irrigation is used from the Hydro-system for salvation of Dojran Lake (HSSDE). Electricity is used for abstraction of groundwater, which makes the water more expensive, unlike the reservoir lake “Paljurci” where water runs gravitationally.

There are several small reservoir lakes located on the territory of Municipality of Bogdanci. Some are connected to the reservoir “Paljurci” (Taljushnica, Motorna, the Tyrolean grip on the river Gabrovci), and some of them are used as water tank for livestock watering (Brdanka, Kamilska). After the flood in 2004 and the unscrupulous behavior of some citizens all these remain out of operation.

The reservoir lake Selemlija is located on the same river, with a volume of  $0.9 \times 10^6 \text{ m}^3$ , but without any organized irrigation system on it.

The working group Water resources, according to the Green Agenda methodology, identified three functions of the value, two of which are primary – drinking water (wells for water supply – Gjavato), irrigation water (reservoir Paljurci) and one tertiary/regulatory function – temporary watercourses.

## DEVELOPMENT GOALS FOR THE VALUE Water resources

2.1. Sustainable management of the water supply system

2.2. Proper manner and mode of irrigation as a water saving measure

2.3. Collection and conservation of rainwater – quality drinking water for people and nature, reduced risk of natural disasters, stabilized climate, strengthened biodiversity

# ENERGY POTENTIAL

The limited resources of commercial energy reserves and the dependence on imported energy, stress the increased need, even at local level, for the application of both permanent orientations, and today often mentioned solutions to cover the energy needs and losses, and that is the use of measures for individual energy production from renewable sources and the application of appropriate energy efficient measures. Hence, the goal that the working group was working on the defined value – energy potential, within the municipal climate change strategies project, is actually promotion and initiation of exchange of initiatives and practices for dealing with hazards and disruptions caused by climate change with the use of available mechanisms and the potential of renewable energy sources and energy efficiency on the territory of Municipality of Bogdanci, and offering an opportunity for mutual learning and strengthening of the capacities of members within the working group on the specific topic.

Renewable energy sources (the wind and the Sun) that are already easily available in the municipality, are largely unexploited in terms of potential available as a natural resource, since the municipality has not yet produced a tangible quantity of electricity from which the expected and projected benefits can be directly calculated, as well as the reduced greenhouse gas emissions. Nevertheless, lately there is a more visible positive trend of movement in this area, in particular the start or the realization of the project wind park Bogdanci, wherewith the Municipality of Bogdanci becomes part of the world map as a serious participant in the fight for reduction and mitigation of climate change impacts, not only locally, but also on the regional and global level. Certainly, here we may also mention the massive installation of solar systems for generating hot water in households and leading people’s awareness in the direction of individual production which may become real within this planning period.

Energy efficiency, however, a local problem that must be solved exclusively at the local level. According to the records and the results obtained from the software for monitoring energy consumption in public buildings ExCite, in the Municipality of Bogdanci there is also a considerable potential in this field, to achieve energy savings in all active public buildings or facilities for which there is a real expectation for a quick return of investment, in addition to the indirect effect on climate change through reduction of harmful greenhouse gas emissions. Starting with the application of EE measures in public institutions and households and the installation of energy-saving street lighting, present only a part of the positive trend indicators in this area, and its accompanying effects are healthy population, energy and financial savings as a sort of global effect of the reduction of greenhouse gas emissions.

The first two functions directly result from this point, the production function as primary and exploiting of possibilities directed to energy efficiency as a tertiary (regulatory) function of the value energy potentials.

The main goal of the value energy potentials is conversion of all possibilities in the field of renewable energy sources and energy efficiency into strengths in the forthcoming planned seven-year period. It correlates with the overall goal of this strategy, and also with other related and consistent strategic documents in the municipality, which are aimed at increasing awareness among citizens about climate change, environmental protection, and inevitably, it is one of the key issues when it comes to climate change, and that is energy efficiency.

Thereby the third environmental function is derived, as a secondary function of the value, which in these conditions of global warming and pollution, gains particular importance in terms of environment and climate change, which have to be aimed towards elimination of the skepticism (the expectation) that climate change will not have major negative impacts and the lack of knowledge on the impact of climate change, and climate change in general, all this is made through active measures to address the causes of these phenomena in the form of education, promotions, campaigns, where the final effect will be a clean and healthy environment, improved quality of life and favorable conditions for the entry of investors dealing with organic farming.

## DEVELOPMENT GOALS OF THE VALUE Energy potentials

3.1. Exploiting the potential of RES in the public sector

3.2. Education, promotion and campaigns for coping with CC (climate change) and exploiting RES and EE

3.3. Reducing greenhouse gas emissions from public buildings



# ASSESSMENT OF VULNERABILITY TO CLIMATE CHANGE



## METHODOLOGY OF ASSESSMENT OF VULNERABILITY

In order to determine the vulnerability to climate change, the already developed methodology by USAID Climate-Resilient Development (CRD) Framework. This methodology provides analysis of the already set community development goals, how exposed to climate change they are, how open to climate change they are and what is the current adaptive capacity for response to climate change.

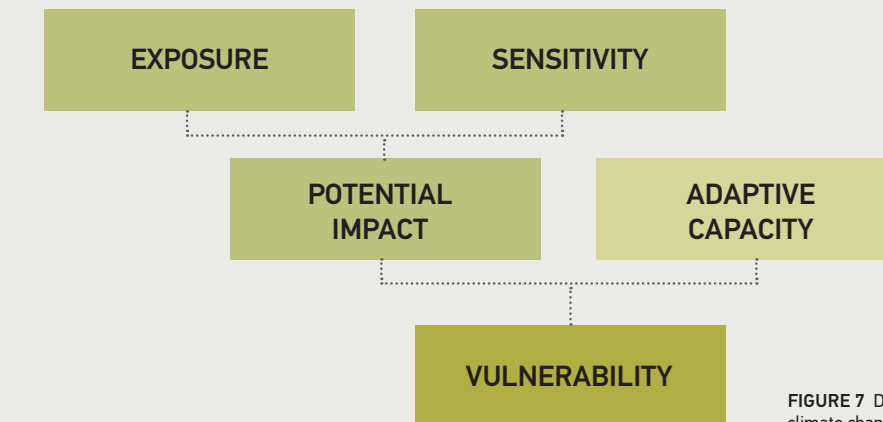


FIGURE 7 Diagram of assessment of vulnerability of climate change

Why is it necessary to make an assessment of vulnerability? There are several different reasons, but the most important ones include:

- Raising the awareness of threats from climate changes;
- Determination how climate changes can affect the existing, or in the specific case, planned strategies/projects;
- Identification of the areas where vulnerability is particularly certain and where the measures for adaptation are most required;
- Informing of the planning of the measures for adaptation for reduction of vulnerability;

DEFINITIONS

**VULNERABILITY** is the degree to which something can be harmed by or cope with stressors such as those caused by climate change. It is generally described as a function of exposure, sensitivity and adaptive capacity (USAID CRD Framework)

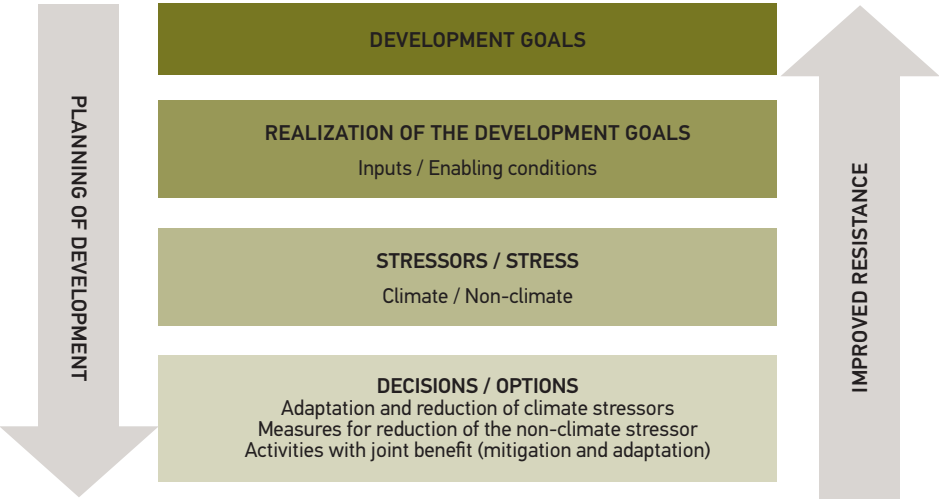
**EXPOSURE** is the extent to which something is subject to some stressor. For example, a flood is a climate stressor which may impact on the infrastructure. An infrastructure built near a river is exposed to flooding, while an infrastructure built in a place with higher elevation and greater distance from the river is not exposed to flooding.

**SENSITIVITY (RESISTANCE)** is the extent to which things will be affected or changed (damaged) from the exposure to some stressor. For example, in general, agricultural crops are sensitive to increased night temperatures. However, there are plants which would not grow at lower temperatures and are more sensitive to temperature stressor unlike others. The selection of crops may reduce the vulnerability of farmers at increased temperatures. If we review the previous example with the flood, for example, two facilities built near a river are equally exposed to floods; however, if one of the facilities is built on pillars or there is a possibility for the flood wave to penetrate, it is less sensitive compared to the other one.

**ADAPTIVE CAPACITY** is a combination of ability or the potential of things to predict, to prepare and to undertake actions in order to respond to the effect of climate change. For example, well networked and rich communities most commonly have more adaptive capacity unlike the ones which are insulated and poor.

THE VULNERABILITY TO CLIMATE CHANGE IS DETERMINED THROUGH THE FOLLOWING PROCEDURES:

- 1. Determination and analysis of inputs and enabling conditions/ drivers of the development goals
- 2. Determination of impact of climate and non-climate stressors of the inputs and the enabling conditions of the development goals
- 3. Analysis of vulnerability to climate change



In order to fulfill the defined specific goal, required inputs (resources/claims) should be inserted and specific conditions should be fulfilled, which will lead towards fulfillment of the determined development goal. Climate changes impact on a specific input and not on the entire sector (industrial, economic, civil, business and public sector).

**THE INPUTS** that need to be invested in the direction of fulfillment of development goals can be physical, social, economic, cultural, inputs of the environment, goods and services that encourage development etc.

**ENABLING CONDITIONS** are the ones which have the control and move things, that is, they serve for efficient use of the inputs. The enabling conditions cover a wider aspect of elements of socio-political conditions which form and define the use of the inputs.

THE INPUTS may be:	ENABLING CONDITIONS MAY BE:
<ul style="list-style-type: none"><li>• PHYSICAL INPUTS: infrastructure (all types of public facilities, buildings, structures, communication, roads, homes), materials, raw materials, food, machines, equipment, services, energy etc.</li><li>• ENVIRONMENTAL INPUTS: land/soil, water, flora and fauna (natural resources) ecosystems etc.;</li><li>• ECONOMIC INPUTS: capital, funds, employments, savings, credits, loans, deposits, investments, trade, enterprises, service activities, consulting activities etc.</li><li>• SOCIAL INPUTS: workforce, education, trainings, health care etc.</li><li>• POLITICAL INPUTS: institutions, agencies, associations, governmental bodies, non-governmental organizations, donors etc.</li><li>• CULTURAL INPUTS: cultural goods, cultural heritage, cultural manifestations etc.</li></ul>	<ul style="list-style-type: none"><li>• Political establishments – political will and understanding</li><li>• International, national and local policies)</li><li>• Access to information, education, knowledge and technologies</li><li>• Access to justice, fair system, civil rights etc.</li><li>• Market demands, trade, stock exchange;</li><li>• Political and safety stability and security</li><li>• Traditional habits and behaviors, religious beliefs etc.</li></ul>
CLIMATE STRESSORS	NON-CLIMATE STRESSORS
<ul style="list-style-type: none"><li>• Change of quantity and period of rains</li><li>• Temperature increases</li><li>• Extreme weather events</li><li>• Floods</li><li>• Droughts</li><li>• Storms</li><li>• Wind</li><li>• Heat waves</li><li>• Cold waves</li></ul>	<ul style="list-style-type: none"><li>• Economic: inflation, devaluation, increase of prices</li><li>• Social-demographic: increase of the number of residents, migration, urbanization, crime, violence, low awareness</li><li>• Physical: dilapidation of infrastructure, inappropriate construction</li><li>• Political: bad governance, corruption, non-implementation of regulations</li><li>• Environmental: excessive use of resources, pollutions</li></ul>

ANALYSIS OF VULNERABILITY OF THE STRATEGIC DEVELOPMENT GOALS TO CLIMATE CHANGE

VALUE 1:	LOCAL AGRICULTURAL PRODUCTS	
Function 1.1:	Food for the people – Vegetables	
Specific goal 1.1:	Application of new technologies for growing vegetables	
Inputs and conditions	INPUTS: Plastic greenhouses Workforce Professional staff	ENABLING CONDITIONS: National legislation Ministry of Agriculture
Stressors Exposure	CLIMATE: Frost Strong winds Temperature differences High temperatures Low temperatures UV radiation Drought Flood Snow	NON-CLIMATE: Migration of the population to the cities Obsolete construction of greenhouses
Impacts of climate stressor	Complete devastation of the plant Decreased yield Reduced funds in the budget of farmers	
Current adaptive capacity	Using tap water Use of pesticides Application of fertilizers	
Protection and strengthening measures against climate change	<b>Measure 1.1.1:</b> Application of agril in greenhouses and outside for frost protection <b>Measure 1.1.2:</b> Pellet heating system for greenhouses/plastic tunnels <b>Measure 1.1.3:</b> Training on application of trichoderma harzianum in growing tomatoes and peppers <b>Measure 1.1.4:</b> Debate on the application of calcium carbonate for the protection of peppers from UV radiation <b>Measure 1.1.5:</b> Special tariff for collection of water payments for users of a drip irrigation system <b>Measure 1.1.6:</b> Debates on application of mulching in growing vegetables <b>Measure 1.1.7:</b> Test laboratory for seeds and seedlings	

VALUE 1 :	LOCAL AGRICULTURAL PRODUCTS						
Function 1.1:	Food for the people – Vegetables						
Specific goal 1.1:	Application of new technologies for growing vegetables						
Measures/	Technical feasibility 15%	Urgency 25%	Efficiency 30%	Cost-efficiency 20%	Can we afford 10%	TOTAL	Rating
<b>Measure 1.1.7</b> Test laboratory for seeds and seedlings	9	15	18	12	6	<b>60</b>	<b>1</b>
<b>Measure 1.1.2</b> Pellet heating system in greenhouses/plastic tunnels	9	7,5	18	12	6	<b>52,5</b>	<b>2</b>
<b>Measure 1.1.4</b> Debate on the application of calcium carbonate for the protection of peppers from UV radiation	9	7,5	18	6	6	<b>46,5</b>	<b>3</b>
<b>Measure 1.1.1</b> Application of agril in greenhouses and outside for frost protection	9	7,5	9	12	3	<b>40,5</b>	<b>4</b>
<b>Measure 1.1.6</b> Debates on application of mulching in growing vegetables	9	2,5	9	2	3	<b>25,5</b>	5
<b>Measure 1.1.5</b> Special charge on the water bill for users of a drip irrigation system	4,5	2,5	9	2	3	<b>19</b>	<b>6</b>
<b>Measure 1.1.3</b> Training on TRICHODERMA HARZIANUM in growing tomatoes and peppers	4.5	2,5	9	2	1	<b>19</b>	<b>7</b>

DEVELOPMENT GOAL:						
Adjustment measures	Criteria A 15%	Criteria B 25%	Criteria C 30%	Criteria D 20%	Criteria E 10%	TOTAL 100%
Measure 1	B = 9	C = 7,5	H = 3	B = 12	B = 6	37.5

H = High = 60 // M = Medium= 30 // L = Low= 10

X = 
$$\frac{((B) (C) (H) * Criteria )}{100}$$



VALUE 1:	LOCAL AGRICULTURAL PRODUCTS	
Function 1.2:	Food for the people – Fruit	
Specific goal 1.2:	Application of new technologies in cultivation of fruit and vineyards	
Inputs and conditions	INPUTS: Orchards Vineyards Irrigation system Workforce Professional staff Road infrastructure	ENABLING CONDITIONS: Ministry of Agriculture
Stressors Exposure	CLIMATE: Frost Hail Drought Floods Wind UV radiation Heat waves Temperature differences Changing intensity and periods of precipitation	NON-CLIMATE: Aging infrastructure Migration Obsolete irrigation methods; Outdated methods in growing fruit and vineyards
Impacts of climate stressors	Decreased crop yields Damage to crops in blooming stage Damage to foliage Reduced photosynthesis process Increased water consumption Reduction of employability Damage to road infrastructure Damage to irrigation network	
Current adaptive capacity	Using water from the water supply network Using water from hydro-system for salvation of Dojran Lake Restoration of the network Rehabilitation of road infrastructure	
Protection and strengthening measures against climate change	Measure <b>1.2.1:</b> Campaign to apply the drip irrigation system to save water Measure <b>1.2.2:</b> Special tariff for collection of water payments for users of a drip irrigation system Measure <b>1.2.3:</b> Debates on using UV nets against UV radiation and hail Measure <b>1.2.4:</b> Application of new methods for pruning vineyards and orchards Measure <b>1.2.5:</b> Debates on informing farmers to use the IPARD funds Measure <b>1.2.6:</b> Laboratory for testing the soil Measure <b>1.2.7:</b> Test laboratory for graft substrates Measure <b>1.2.8:</b> System for utilizing waste from orchards and vineyards for pellet production	

ВРЕДНОСТ 1 :	LOCAL AGRICULTURAL PRODUCTS						
Function 1.2:	Food for the people – Fruit						
Specific goal 1.2:	Application of new technologies in cultivation of fruit and vineyards						
Measures/	Technical feasibility 15%	Urgency 25%	Efficiency 30%	Cost-efficiency 20%	Can we afford 10%	TOTAL	Rating
Measure 1.2.6 Laboratory for testing the soil	9	15	18	12	6	60	1
Measure 1.2.4 Application of new methods for pruning vineyards and orchards	9	7,5	18	12	6	52,5	2
Measure 1.2.8 System for utilizing waste from orchards and vineyards for pellet production	9	7,5	9	6	3	34,5	3
Measure 1.2.3 Debates on using UV nets against UV radiation and hail	4,5	7,5	9	6	3	30	4
Measure 1.2.5 Debates on informing farmers to use the IPARD funds	4,5	7,5	9	6	3	30	5
Measure 1.2.1 Campaign to apply the drip irrigation system to save water	4,5	2,5	9	6	6	28	6
Measure 1.2.7 Test laboratory for graft substrates	4,5	2,5	9	6	1	23	7
Measure 1.2.2 Special tariff for collection of water payments for users of a drip irrigation system	4,5	2,5	9	6	1	23	8

VALUE 2:		WATER RESOURCES					
Функција 2.1:		Drinking water					
Specific goal 2.1:		Sustainable management of the water supply system					
Inputs and conditions	Inputs	Ground water	Water supply wells; pump station; return pressure pipeline; tank; water supply network	Sewerage network	Road infrastructure	Workforce Professional staff	PE Communal Hygiene; Municipality of Bogdanci; Ministries (MEPP, MA, ME)
	Enabling conditions	Law on Waters	Work Program of PE Communal Hygiene; Law on water supply and disposal of urban wastewater	Law on waters supply and disposal of urban wastewater			Political will and understanding; International cooperation; Work Program of PE Communal Hygiene; Spatial Plan of RM; Law on waters; Water supply and disposal of urban wastewater
Stressors Exposure	Climate	Drought Increasing temperatures Heat waves Changing intensity and periods of precipitation	Aging infrastructure Urbanization Non-regulation Corruption Political crisis Oil pipeline	Floods	Increasing temperatures	Increasing temperatures Heat waves	Increasing temperatures Heat waves
	Non-climate	Pollution Non-regulation Pipeline	Aging infrastructure Urbanization Non-regulation Corruption Political crisis Oil	Aging infrastructure Urbanization	Aging infrastructure Urbanization	Migration	Corruption Non-regulation

VALUE 2:		WATER RESOURCES					
Функција 2.1:		Drinking water					
Specific goal 2.1:		Sustainable management of the water supply system					
Impacts of climate stressors		Reducing the level of groundwater	Increased water consumption Increased consumption of EE Increased system exploitation Damage to the infrastructure	Increased exploitation Damage to the infrastructure	Damage to the infrastructure	Reduction of employability	Reduction of employability
Current adaptive capacity			Using water from the HSSDL Restoration of the water supply network	Construction of a new reservoir	Restoration of the water supply network	Solar energy and/or wind power pumps	Campaign and education measures for saving water
Protection and strengthening measures against climate change		Measure 2.1.1: Construction of a new reservoir Measure 2.1.2: Restoration of the water supply network Measure 2.1.3: Solar energy and/or wind power pumps Measure 2.1.4: Campaign and education measures for saving water Measure 2.1.5: Installation of sectorial valves, control and measuring instruments in the water supply network Measure 2.1.6: Study on the quality and use of groundwater in the field Gjavochko Pole					

VALUE 2 :	WATER RESOURCES						
Function <b>2.1:</b>	Drinking water						
Specific goal <b>2.1:</b>	Sustainable management of the water supply system						
Measures/	Technical feasibility 15%	Urgency 25%	Efficiency 30%	Cost-efficiency 20%	Can we afford 10%	TOTAL	Rating
Measure <b>2.1.1</b> Construction of a new reservoir	9	15	18	12	1	55	<b>1</b>
Measure <b>2.1.5</b> Installation of sectorial valves, control and measuring instruments in the water supply network	9	15	9	12	1	46	<b>2</b>
Measure <b>2.1.3</b> Solar energy and/or wind power pumps	4.5	7.5	18	12	1	43	<b>3</b>
Measure <b>2.1.2</b> Restoration of the water supply network	1.5	15	18	6	1	41.5	<b>4</b>
Measure <b>2.1.4</b> Campaign and education measures for saving water	9	7.5	3	12	6	37.5	<b>5</b>
Measure <b>2.1.6</b> Study on the quality and use of groundwater in the field Gjavochko Pole	4.5	7.5	9	2	1	24	<b>6</b>

VALUE 2:		WATER RESOURCES				
Function 2.2:		Irrigation water				
Specific goal 2.2:		Proper manner and mode of irrigation as a water saving measure				
Inputs and conditions	Inputs	Luda Mara River Reservoir Paljurci Selemlija River Reservoir lake Selemlija Minor reservoirs HS Salvation of Dojran Lake	Irrigation network	Road infrastructure	Workforce Professional staff	PE for water management “Juzen Vardar” Water communities Southern Vardar valley Hydro-system for salvation of Dojran Lake Municipality of Bogdanci MAFWE MEPP
	Enabling conditions	Law on waters Spatial plan of the Republic of Macedonia	Law on water economy Law on water communities Annual plan for irrigation and maintenance Spatial plan of the Republic of Macedonia			Inter-institutional cooperation Annual program for irrigation and maintenance Action plan for cleaning the canals, torrents, rivers Spatial plan of the Republic of Macedonia Law on Waters Water economies Water communities
Stressors Exposure	Climate	Droughts Increasing temperatures Heat waves Changing intensity and periods of precipitation	Floods	Increasing temperatures Floods	Increasing temperatures Heat waves	Increasing temperatures Heat waves
	Non-climate	Overuse of resources Pollution	Aging infrastructure	Aging infrastructure	Migration	Non-regulation Corruption
Impacts of climate stressors		Increased water consumption Damage to embankments	Damage to the irrigation network	Damage to the road infrastructure	Reduction of employability	Reduction of employability



VALUE 2:	WATER RESOURCES				
Function 2.2:	Irrigation water				
Specific goal 2.2:	Proper manner and mode of irrigation as a water saving measure				
Impacts of climate stressors	Increased water consumption Damage to embankments	Damage to the irrigation network	Damage to the road infrastructure	Reduction of employability	Reduction of employability
Current adaptive capacity	Using water from the HS for salvation of Dojran Lake	Rehabilitation of the damaged irrigation network	Rehabilitation of the road infrastructure	Reduced working hours	Reduced working hours
Protection and strengthening measures against climate change	Measure <b>2.2.1</b> : Education methods for correct determination of the timing and quantity of water for irrigation Measure <b>2.2.2</b> : Setting gauging instruments on the tertiary network Measure <b>2.2.3</b> : Technology for correct determination of the time and quantity of water for watering purposes Measure <b>2.2.4</b> : Recovery of minor reservoirs Measure <b>2.2.5</b> : Special system for charging the users of the drip irrigation system Measure <b>2.2.6</b> : Education on irrigation methods				

VALUE 2:	WATER RESOURCES						
Function 2.2:	Irrigation water						
Specific goal 2.2:	Proper manner and mode of irrigation as a water saving measure						
Measures/	Technical feasibility 15%	Urgency 25%	Efficiency 30%	Cost-efficiency 20%	Can we afford 10%	TOTAL	Rating
Measure <b>2.2.3</b> Technology for correct determination of the time and quantity of water for watering purposes	9	15	18	12	1	55	1
Measure <b>2.2.4</b> Recovery of minor reservoirs	9	15	18	6	1	49	2
Measure <b>2.2.2</b> Setting gauging instruments on the tertiary network	9	15	18	6	1	49	3
Measure <b>2.2.5</b> Special system for charging the users of the drip irrigation system	9	15	9	6	6	45	4
Measure <b>2.2.1</b> Education methods for correct determination of the timing and quantity of water for irrigation	9	7,5	9	12	6	43,5	5
Measure <b>2.2.6</b> Education on irrigation methods	9	2,5	9	6	6	32,5	6

VALUE 2:		WATER RESOURCES			
Function 2.3:		Temporary watercourses			
Specific goal 2.3:		Collection and conservation of rainwater – quality water for the people and nature, reduced risk of natural disasters, stabilized climate, strengthened biodiversity			
Inputs and conditions	Inputs	Precipitation 649,4mm Maminska River Brdanka r. Kamilska r. Gegova r. Dukovec r. Ljokova r. Medurska r. Dubravska r.	Gabroshka r. Polander r. Suva r. Motorna r. Taljushnica r. Paljurska r. Govedarska r. Pobreshka r. Stojachka r.	Workforce Professional staff	Municipality of Bogdanci PE Communal Hygiene Ministries: AFWE MEPP Protection and Rescue Directorate
	Enabling conditions	Law on Waters			Inter-institutional cooperation Political will and understanding
Stressors Exposure	Climate	Flood Changing quantities and periods of precipitation Drought		Increasing temperatures Heat waves	Increasing temperatures Heat waves
	Non-Climate	Urbanization Pollution Deforestation		Migration	Non-regulation Corruption
Impact of climate stressors		Irreversible water leakage Disruption of the minor water cycle Damage to agricultural crops Damage of individual buildings Damage to the road infrastructure		Reduction of employability	Reduction of employability
Current adaptive capacity		20% coverage with sewerage			

Value 2:	WATER RESOURCES						
Function 2.3:	Temporary watercourses						
Specific goal 2.3:	Collection and conservation of rainwater – quality water for the people and nature, reduced risk of natural disasters, stabilized climate, strengthened biodiversity						
Measures/	Technical feasibility 15%	Urgency 25%	Efficiency 30%	Cost-efficiency 20%	Can we afford 10%	TOTAL	Rating
Measure <b>3.3</b> Reforestation and arrangement of catchment areas of the temporary streams as a measure for retention of rainwater	9	15	18	12	1	55	1
Measure <b>3.1</b> Arrangement of riverbeds on the temporary watercourses	9	7,5	18	12	1	47,5	2
Measure <b>3.5</b> Expanding green areas in urban environments by building sustainable systems for rainwater retention and flood protection	9	7,5	18	6	1	41,5	3
Measure <b>3.2</b> Collection of rainwater from roof coverings of public buildings and paved areas	9	7,5	18	6	1	41,5	4
Measure <b>3.4</b> Education methods for collecting rainwater and its use	9	7,5	3	12	6	37,5	5
Measure <b>3.6</b> Construction of rain gardens in schoolyards and educating students about them	9	7,5	9	2	1	28,5	6





# ASSESSMENT OF OPPORTUNITIES FOR REDUCTION OF GREENHOUSE GAS EMISSIONS



## IN THE MUNICIPALITY OF BOGDANCI

The Inventory of GHG developed for the municipality of Bogdanci shows that the majority of greenhouse gas emissions derive from the energy sector i.e. consumption of electricity and fossil fuels.

Climate change mitigation refers to efforts to reduce or prevent greenhouse gas emissions. In this respect as a measure that can contribute for the reduction of greenhouse gas emissions is energy efficiency, using less energy for continuous service. By installing thermal insulation and replacing the carpentry in public buildings less energy is used for heating and cooling. Thus consumption of electricity and fossil fuels, as primary energy sources, is reduced. Installing energy- efficient bulbs reduces the amount of energy required to meet the same level of illumination using standard (mercury) bulbs.

The Municipality of Bogdanci disposes of a great potential of renewable energy sources such as solar energy and wind power. A measure to reduce greenhouse gas emissions is substituting the source of energy from a conventional (non-renewable) into an alternative (renewable) one, such as the photovoltaic and wind power plants for public enterprises and educational institutions. It should be noted that the installation of solar systems for generating hot water in individual buildings has positive trend.

It is inevitable that raising the awareness of the local population about energy efficiency, conservation of energy, the role of water and vegetation on the climate, utilization of bio-mass, is of great importance for the prevention of the impact of climate change.

### Measures for direct/active coping with the causes of climate change (substitution of energy resources from conventional/non-renewable into alternative/renewable)

- Installation of solar systems for hot water in the Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Bogdanci
- Installation of solar systems for hot water in the Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Stojakovo
- Photovoltaic pumps or wind turbines (for the needs of PE Communal hygiene)
- Road signals running on solar energy
- Windmills for pumping water for irrigation of public green areas (parks, playgrounds)
- Street lighting running on solar collectors
- Installation of a photovoltaic system for generating electricity for the Public Primary School and Kindergarten “Brand Petrushev”

### Identifying the measures and activities/projects for utilization of bio-mass

- Pellet heating system in plastic tunnels by pelleting waste of vineyards and orchards



Measures for indirect/passive coping with causes of climate change (methods and techniques for energy efficiency and performance)

- Replacement of windows with PVC multi-chambered windows with insulated glazing on part of the municipal building
- Replacement of standard (mercury) bulbs with new energy-efficient bulbs in both municipal buildings
- Updating the car fleet of the Municipality of Bogdanci
- Roof reconstruction of the Primary School“Petar Musev”
- Installation of floor insulation of the Primary School “Petar Musev”
- Installation of insulation on the external walls of the Primary School “Petar Musev” in Bogdanci
- Purchase and installation of PVC multi-chambered windows with insulated glazing for 20% of the school building of the Primary School “Petar Musev”
- Purchase and installation of new doors in the Primary School “Petar Musev”
- Replacement of standard (mercury) bulbs with new energy- efficient bulbs in the Primary School “Petar Musev”
- Installation of insulation on the external walls of the Secondary Municipal School in Bogdanci
- Replacement of standard (mercury) bulbs with new energy-saving bulbs in Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Bogdanci
- Roof reconstruction of Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Stojakovo
- Replacement of the windows on 50% of the building of Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Stojakovo
- Installation of floor insulation on 50% of the building of Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Stojakovo
- Replacement of standard (mercury) bulbs with new energy- efficient bulbs in Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Stojakovo
- Replacement of standard (mercury) bulbs with new energy- efficient bulbs in the Secondary Municipal School in Bogdanci
- Installation of insulation on the external walls of the Primary School “St. Cyril and Methodius”
- Replacement of standard (mercury) bulbs with new energy-efficient bulbs in the Primary School “St. Cyril and Methodius” in Stojakovo
- Installation of insulation on the external walls of Public Primary School and Kindergarten “Kosta Pop Ristov Delchev” in Bogdanci
- Replacement of standard (mercury) bulbs with new energy-efficient bulbs in the Primary School “St. Cyril and Methodius” in Selemli
- Replacement of windows with PVC multi-chambered windows with insulated glazing on the building of the Public Primary School and Kindergarten “Brand Petrushev”
- Installation of floor insulation of the Public Primary School and Kindergarten “Brand Petrushev”
- Installation of insulation on the external walls of the Public Primary School and Kindergarten “Brand Petrushev”

Measures and activities/projects for raising public awareness on the changing lifestyle:

- Energy Efficiency Campaign
- Renewable Energy Sources Campaign
- Climate Change Campaign

SECTOR	ENERGY						
Measures	Technical feasibility 20%	Urgency 20%	Efficiency 30%	Cost-efficiency 15%	Can we afford it 15%	TOTAL	RATING
Installation of a combined heating and cooling system by using alternative energy sources for the Public Primary School and Kindergarten Brand Petrushev	12	15	18	9	1	55	1
Roof reconstruction of the Primary School Petar Musev	12	15	18	9	1	55	2
Replacement of the floor, windows and doors with new ones in the building of the Public Primary School and Kindergarten Brand Petrushev	12	15	18	4,5	1	50,5	3
	12	7,5	18	9	1	47,5	4
Purchase and installation of PVC multi-chambered windows and doors with Thermo pane glass on 20% of the school building of the Primary School Petar Musev	12	7,5	18	4,5	1	43	5
Installation of insulation of the external walls of public buildings	6	2,5	18	9	1	41,5	6
Installation of photovoltaic systems for generating electricity in public buildings	12	15	9	4,5	1	41,5	7
Roof reconstruction of the school building of the Public Primary School and KindergartenKosta Pop Ristov Delchev in Stojakovo	12	7,5	18	1,5	1	40	8
	6	2,5	18	4,5	1	32	9
Installation of floor insulation of the Primary School Petar Musev	12	2,5	9	4,5	1	29	10
Installation of geo-thermal pumps in the Primary School Petar Musev	12	2,5	9	4,5	1	29	11
Updating the car fleet of the Municipality of Bogdanci	6	7,5	9	4,5	1	28	12
Installation of solar systems for hot water in public buildings	12	2,5	3	1,5	6	25	13

ANNEX 1

LIST OF

PARTICIPANTS IN

THE PROCESS

WORKING GROUP 1		LOCAL AGRICULTURAL PRODUCTS
No.	Name and Surname	Institution / Individual
1	Milena Peneva	Taurus Farmas
2	Darinka Bojkova	
3	Elena Olumcheva	
4	Vesna Ristovska	
5	Roska Rogleva	
6	Tome Endzekchev	
7	Katerina Chrcheva	
8	Zvonko Radev	
9	Tome Gjurov	
10	Venera Stamnova	
11	Dejan Arnaudov	Student
12	Marjan Karastojanov	DK Brand Petrusev
13	Viktor Karastojanov	Vivi Prom
14	Gjorgje Kocев	
15	Dragan Kostadinov	
16	Risto Zivkovik	
17	Mitko Vlahov	
18	Anila Gjorgi	
19	Stanka Karajanova	

Coordinator of the working group: Jovanka Ampova

WORKING GROUP 2		WATER RESOURCES
No.	Name and Surname	Institution / Individual
1	Katerina Bejkov	Water management „Јужен Вардар“
2	Borche Lazarov	Dojran Stil
3	Tomica Tasev	Student
4	Biljana Chuchanova	Taurus Farm
5	Kristijan Todorov	Elita
6	Valentina Koshelni	Unemployed
7	Nikola Stratrov	Royal Medika
8	Borche Trajkov	Retired
9	Dragi Risteovski	High School Bogdanci
10	Emilija Mineva	
11	Mile Stratrov	
12	Slavcho Uzunov	
13	Jovanka Prosheva	
14	Ivan Luledziev	
15	Zoran Chavdarov	

Coordinator of the working group: Dejan Madzirov

WORKING GROUP 3		ENERGY POTENTIALS
No.	Name and Surname	Institution / Individual
1	Violeta Kostadinova	High School Bogdanci
2	Sonja Srbova	High School Bogdanci
3	Atanas Prchev	Municipality Bogdanci
4	Lidija Hadzieva	Municipality Bogdanci
5	Vangelica Vancheva	Municipality Bogdanci
6	Blagoj Karakolev	High School Bogdanci
7	Katerina Banceliska	Municipality Bogdanci
8	Suzana Petrusheva	
9	Hana Popova Petrusheva	
10	Anastasija Olumcheva	

Coordinator of the working group: Marjan Peev

