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Climate Change Health Adaptation Strategy

Report

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Expert Pool.

Expert Pool Bulgaria

CLIMATE CHANGE HEALTH ADAPTATION STRATEGY

I. Foreword

The present document is developed within the framework of the project “Climate friendly healthcare institutions”, ref. No. CBC006.2.12.027, funded under Contract №RD-02-29-154/12.07.2019 between the Territorial Cooperation Management Directorate at the Ministry of Regional Development and Public Works in Bulgaria and Gotse Delchev Municipality. The project is implemented under the Interreg-IPA Cross-border Cooperation Programme Bulgaria – Macedonia 2014-2020.

The Interreg-IPA CBC Programme itself focuses on measures aiming at mitigating the effects of climate change and at addressing issues related to the conservation of nature and biodiversity, the sustainable use of natural resources, environmental protection and risk management at cross-border level.

Therefore, this document aims to outline the situation with the climate change on national and cross-border region level, to describe the challenges it poses to human health and the strategic approach to mitigating them or adapting thereto.

The strategy was developed by the team of Expert Pool Bulgaria pursuant to Service Contract No. CB006.2.12.027/24.02.2020 and shall be subjected to a discussion with stakeholders from Gotse Delchev Municipality in order to incorporate the suggestions of the concerned individuals and institutions and to better reflect the local context.

II. Purpose of the strategy

The Strategy has the purpose of bringing together data from available scientific and research sources and placing it in the local perspective of the cross-border region and the specific sector of health services. It is intended that the information contribute towards the development of policies and planning by the Municipality for climate change community adaptation, in compliance with the relevant legal acts and strategic documents of higher ranks.

The present Climate Change Health Adaptation Strategy also has the purpose of laying out the directions guidelines for incorporating climate change into existing health programs and scaling-up of disaster risk reduction, emergency preparedness and response capacities in order to meet the increased risk of emergencies. These manifestations of the climate change tend to be more severe and strongly felt by the entire community – and with more serious implications to the human health and safety.

The present Strategy aims to contribute to the strategic objective “Improvement of management for adaptation” as laid out in the NSCCAAP for the Healthcare sector, in terms of serving as a foundation for future development of policies in the area of climate change adaptation, thus essentially improving the governance of the sector, as well as the capacity at local level.

It will also contribute to the Operational objectives:

- **Strengthening the political, legal and institutional framework, and**
- **Building administrative, infrastructural, financial, communication and technical capacity**

Both of the above Operational objectives are related to the strategic objective laid out above.

III. Background

III.1. Historical review

Historically, a number of discoveries have prompted towards the possibility and the trends toward global warming, causing climate changes.

Svante Arrhenius published in 1896 the first climate model calculating a rise in temperatures to amount to 5-6 degrees if CO₂ in the atmosphere was doubled.

Later, in 1938 Guy Stewart Callendar published evidence that carbon dioxide was increasing and the atmosphere was warming.



Fig. 1 Guy Stewart Callendar, *Wikimedia*

More concrete, and alarming discoveries were made in the 1950s when Gilbert Plass used digital computers to model the different layers of the atmosphere (until then believed to be a single layer), and found that adding carbon dioxide would cause global warming.

Hans Suess found evidence that CO₂ in the air was rising. Roger Revelle proved that the oceans would not absorb the increase.



Fig. 4 Charles David Keeling in 2001, *Wikimedia*

Together they helped Charles Keeling to begin a record of a continued increase, the Keeling Curve:

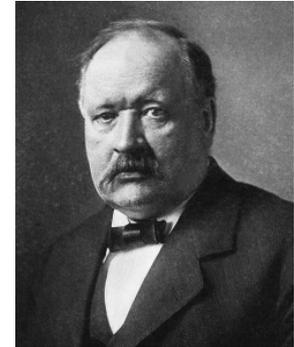


Fig. 2 Svante Arrhenius, *Wikimedia*



Fig. 3 Gilbert Plass, *Gilbert Plass blog*

Monthly mean CO₂ concentration

Mauna Loa 1958 - 2019

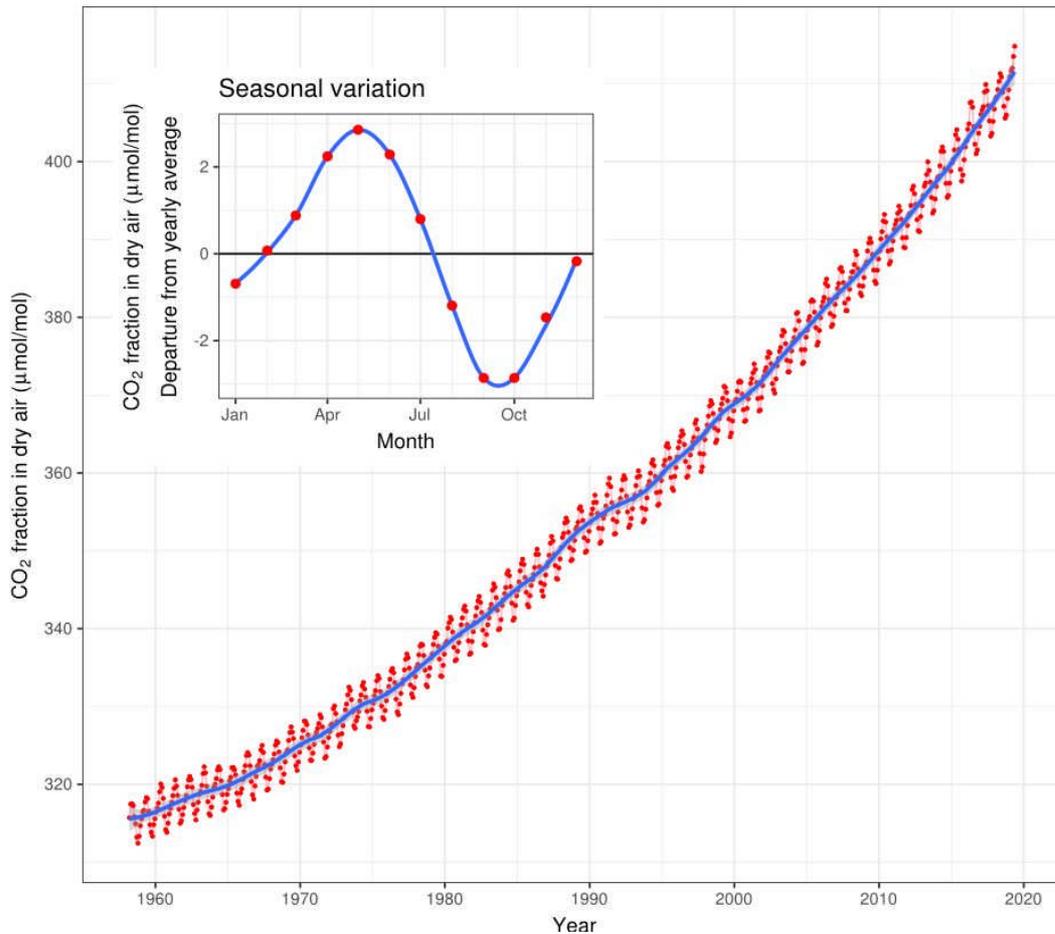


Fig. 5 Keeling Curve - By Delorme - Own work. Data from Dr. Pieter Tans, NOAA/ESRL and Dr. Ralph Keeling, Scripps Institution of Oceanography., CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=40636957>

Global warming became the most popular term after NASA climate scientist James Hansen used it in his 1988 testimony in the U.S. Senate.

In the 21st century the term Climate Change became more popular. As the advances in science were furthered, more and more alarms were raised to the general public. In 2019, the Oxford Dictionary chose the term "*climate emergency*" as word of the year and defined the term as "a situation in which urgent action is required to reduce or halt climate change and avoid potentially irreversible environmental damage resulting from it".



Fig. 6 James Hansen, Source: NASA

III.2. Climate change policies in Bulgaria

Legislative framework having bearing on climate change:

- **Law on Protection of the Environment** – lays out the main principles and premises concerning the social relations pertaining to protection of the environment. In the context of climate change, it sets up the functioning of the Emissions Trading System in Bulgaria. This regulation is later moved to the new Law on Reducing Climate Change (below). Being a more general piece of legislation, it lays the foundations for a number of Ordinances and other acts governing aspects of environment protection, including the assessment of emissions within the Environment Impact Assessment and Ecological Assessment procedures.
- **Law on Energy from Renewable Sources** – lays out the obligations of municipal councils to adopt long-term and short-term programmes for promoting the use of energy from renewable sources.
- **Law on Energy Efficiency** – regulates the detailed composition of the national action plans on energy efficiency. Since energy efficiency is deemed to be one of the avenues for reducing greenhouse gas emissions and effectively mitigating climate change, this law lays out specific requirements (called “National Indicative Objectives”) for energy savings towards industrial systems and public buildings, heating, ventilation and climate control systems. Such systems are subject to control and compulsory certification. In the Ordinance on the energy spending indicators and energy characteristics of buildings, a concrete reference is made for “healthcare buildings” (Art. 8, item 2, letter “c”). Having in mind that compliance with the Law on Energy Efficiency is compulsory for permission of construction and for commissioning of newly constructed or renewed buildings, this is a legal act of superb significance in the perspective of climate change.
- **Law on Purity of Atmospheric Air** – regulates and sets forth the requirements for reducing emissions from static sources, the quality of liquid fuels and the standards for emissions from internal combustion engines, thus contributing to the reduction of GHG.
- **Law on Collection of Carbon Dioxide in the Earth’s Interior** – promulgated in 2012, it regulates the assessment criteria and the conditions to be met by geologic formations in order to use them for storing carbon dioxide.
- **Law on Reducing Climate Change** – promulgated in 2014, it lays out the foundations for implementing the state policy on climate change, on applying into practice the obligations of the Republic of Bulgaria pursuant to the Kyoto Protocol and the Paris Agreement, as well as functioning of the EU ETS and the National Scheme for Green Investments, as well as other aspects of international treaties and European-level legislation concerning climate change. It also provides for the composition and functioning of the National Expert Council on Climate Change as a consultative body to the Minister of Environment and Waters.

At national level, the Bulgarian governments have taken the perspectives of global warming and climate change very seriously. This was demonstrated with the ratification of the United Nations

Framework Convention on Climate Change and the Kyoto Protocol thereto. Thus, the Bulgarian Government has clearly demonstrated its concern and willingness to join international efforts to prevent this change.

III.3. Action Plans and Strategies

The **First National Climate Change Action Plan** was drafted in 1996-98 and adopted in 2000. This plan included a set of concerted actions that assisted the country in fulfilling the commitments made by ratifying the Convention (1995) and signing of the Kyoto Protocol.

The **Second National Climate Change Action Plan** (NCCAP) is a government document aimed at organizing and directing the government's efforts to reduce the impacts leading to climate change. It is a continuation of the first one, but its development and adoption was necessitated by the economic growth in Bulgaria after 2000, together with the changes in the international and national policy and the corresponding legal framework (most of these changes are caused by the forthcoming accession to the European Union). This required updating and expansion of the First NCCAP. This was achieved in the Second NCCAP, which was implemented in the period 2005-2008.

The **third NCCAP** was adopted by Decision of the Council of Ministers No.459 of 1 June 2012 and was developed by the Ministry of Environment and Waters with the support of the Norwegian Government in the framework of the Norwegian Programme on Economic Growth and Sustainable Development in Bulgaria. The Action Plan covers the period 2013-2020 and is currently applicable. It reviews a number of legislative acts and strategic planning documents concerning their significance to the climate change problems and implications. It also recommends a number of sectoral measures and presents an economic analysis on the possibilities for undertaking those measures in each sector.

The Action Plans as laid out above outline a major point – although measures may be taken to mitigate the climate change at national level, simultaneous steps must be taken to adapt to a changing climate. This is due to the fact that the climatic system is global and has inertia – changes to it have already been going in the course of more than a century, and a reversal within a decade or two could hardly be observed. Thus, a **National Strategy on Climate Change Adaptation and Action Plan (NSCCAAP)** was developed with the assistance of the World Bank in 2018 within its Consultancy Programme. The National Strategy employs a more detailed and up-to-date approach with more recent data.

Our approach will be to interpret the recommendations of the NSCCAAP and the appendices thereto in the perspective of the health sector and the local context of Gotse Delchev Municipality, thus allowing us to provide more relevant and specific document and contributing to the concordance and applicability of future planning documents at local level in the area of climate change adaptation.

Although stakeholders in the field of Bulgarian healthcare (public, private and civil society) are aware of climate change and related health issues, there is a need for further effective communication on these issues. Furthermore, such awareness is not yet visible at the policy level, as for example the latest National Action Plan (MoEW 2012) on climate change does not include healthcare.

There are a number of gaps in research into climate change-related diseases, including: asthma, respiratory allergies, and respiratory diseases; cancer; cardiovascular diseases and strokes; food diseases and nutrition; morbidity and mortality associated with warming; the impact on human development; mental health and stress-related disorders; neurological diseases and disorders; vector-borne diseases and zoonotic diseases; water-related diseases and morbidity and mortality related to weather and weather conditions. In addition, interrelated and interdisciplinary issues related to the potential impact of climate change on health include: identifying vulnerable, vulnerable and displaced populations; improving public health and healthcare infrastructure; development of abilities and skills for modeling and forecasting; improving communication on risks and public health education. Such research will lead to the introduction of more effective early warning systems and raise public awareness of the health risks of climate change, which should become more successful mitigation and adaptation strategies.

IV. Regional challenges

As stated in the **Interreg-IPA Cross-border Cooperation Programme Bulgaria – Macedonia 2014-2020** document, “**Climate change** is a significant threat to the border region bearing risks of droughts, land erosion, floods, temperature extremes, forest fires and increasing water temperatures. Bulgaria as a whole is among the countries in the EU that are expected to be most severely affected by climate changes and the FYROM is even higher on the scale for climate change affection. The border area is part of a region with the highest degree of vulnerability to climate changes. Sectors like agriculture, hydropower, tourism shall be amongst the most affected.”

The above situation has not improved since the adoption of the Programme. The vulnerability of the region in these aspects remains high, and although human health is not explicitly stated, the negative effects on each of these sectors have health-related. Implications, as will be indicated below.

The challenges related to climate change as laid out in the Programme, state that

“The region is significantly vulnerable towards climate change while it is very weakly prepared to adequately respond to natural hazards and disasters.”

The related needs are defined as

“Strong measures are needed to be jointly taken in the area of climate resilience, risk prevention and mitigation of climate change effect (e.g. early warning systems, disaster management plans and related investments”.

As seen from the above, the regional challenges are mainly focused on the natural manifestations of the effects of climate change, expressed in more frequent natural disasters of higher magnitude.

The needs formulated at Programme level pertain mainly to disaster management plans and to putting into place of systems for early warning of floods, forest fires, etc.

Concerning floods and flood prevention, a number of early warning systems have been put into operation within the cross-border region. Also, at the West-Aegean River Basin Directorate a Flood Risk Management Plan is in place for the years 2016-2021, with the following plan for the years 2022-2027 being in development.

The West-Aegean River Basin Directorate covers the river basins of Struma, Mesta and Dospat rivers, with a total area of 11 970 km². The Struma and Mesta rivers belong to the cross-border region covered by the Programme. The Flood Risk Management Plan has outlined the nearby Kochan and Satovcha villages as areas of high flood risk, and has prescribed relevant infrastructure measures to mitigate that, namely construction of retaining walls in both villages.

A systemic risk of the Mesta river basin is its slope, especially in the upper current, where the average slope is 9%, coming down to almost 3% near Yakoruda. Thus, torrential rainfall is likely to cause flash floods – quick rise of the water levels when huge quantities of water accumulate in

the river basin and gain high velocity due to the steep slopes. This effect was strongly felt in nearby Yakoruda in 2004, when such a flood destroyed parts of the retaining wall of the river inside the town.

Concerning forest fires, the South-western Forestry Enterprise is carrying out a number of activities and projects to install early warning systems for fire detection and reporting. At Programme level, additional emphasis was placed on carrying out such actions by the beneficiaries, having in mind the exclusive prerogative of local governments on municipal forests.

V. Potential health impacts of climate change and their social implications

Assessing health outcomes in relation to climate change is a complex task that needs to address a number of ambiguities, including those related to GHG emission scenarios, limited data and models of climate-health links. Therefore, it is necessary to deepen the knowledge and assessments of the manifestations of climate change in Bulgaria and the mechanisms for their impact on human health.

The vulnerability of health to climate change may also be exacerbated by certain characteristics of the health sector, including infrastructure, as well as the understanding and competence of health staff on the impact of climate change on human health. Therefore, the severity of the health impact arising from the risks mentioned earlier will depend on the capacity of the public health sector to cope with and prepare for these conditions, as well as on factors such as the behavior of individuals, age, gender, socio-economic status and location.

The NSCCAAP would also outline in its Appendix 10 on Disaster Risk Management that in the event of a major earthquake, major flood, fire or other disaster, it is crucial that hospitals and emergency medical centers remain unaffected and operational, with backup electricity and communications so as to ensure care for the injured and maintain key functions such as maternal health. Emergency services (police, ambulances, fire safety and public protection) should remain equally functioning. Public schools, emergency services and national, district and municipal administration buildings should be located and constructed in such a way as to ensure the safety of human life (at least) and, ideally, minimal damage to allow rapid return and refund of services. An assessment should also be made, beyond the plan of the building itself, of determining access routes in the event of a disaster, as well as the sustainability of electricity, water and communication services. In order to prioritize risk mitigation measures, an assessment of the sustainability of such buildings should be undertaken, with particular emphasis on those built before modern construction standards and awareness of the risk of floods.

In addition, any effort to improve the public works and / or energy efficiency of buildings constructed during "riskier" periods should take into account the seismic resilience of the construction before concrete action is taken. All buildings in areas with high levels of flooding should take into account the safety of citizens who have access to them and provide for the positioning of expensive devices (e.g. medical equipment) on higher floors and / or the possibility of their relocation in the event of a flood threat.

The main health impacts in the Cross-border Cooperation Programme perspective, as mentioned above, are those resulting from catastrophic events, such as floods and forest fires. The available scenarios for climate change in Bulgaria predict a tendency to increase the frequency of extreme events and disasters, which is confirmed by the increasingly intense rainfall, hot and cold waves, floods and droughts, hurricane winds, forest fires and landslides.

Volunteers play an important role in the overall preparedness and response to disasters, and the involvement of the Bulgarian Red Cross and non-governmental organizations (NGOs) is serious.

Such events are, of course, life-threatening and could cost human lives. But in fact they are not so common and their effects are, in general, limited. The lost lives and sustained injuries have their **short-term implications** on the families of those suffering and on the communities. Apart from the grieving and stress from such occurrences, the social implications are related to the lost income (sometimes together with assets used for production) and could be mitigated with an effective mixture of infrastructural and awareness-raising activities.

Flooding could also contaminate water sources or destroy water supply infrastructure (catchments, wells, pumps, etc.), thus increasing the risk and occurrences of water- and food-borne diseases. The risks are multiplied with the vulnerable groups. Climate health impacts disproportionately affect more vulnerable groups, in particular children and adults, people with chronic diseases, people of low socio-economic status, those living in poverty and those with bad habits (alcohol use, drugs and tobacco). Indicators of the most vulnerable groups in recent decades show that the country is at a disadvantage compared to many other EU countries.

A more prolonged impact of such catastrophic events is on the human psyche. Numerous researches have shown a prevalence of post-traumatic stress disorders in populations struck with such events.

More **long-term health impacts**, encompassing entire regions and generations, are those related to changes in temperatures and humidity, and increased precipitations.

The rising temperatures will lead in the future to increased risk of thermal stress, especially in the urban areas, with the elderly population at an even higher risk. All statistical projections point to the aging of the population, thus putting the cross-border region at an increasing risk of cardiovascular and respiratory conditions requiring hospitalization, and at the risk of increased mortality rate in elderly patients due to thermal risks. At a population of 29 657 people, of which 18 250 in the town, Gotse Delchev is one of the towns at a higher risk of such heat-related impacts on the public health. According to other studies, climate change will lead to an increase in hospital admissions due to temperature-related respiratory diseases, from 11,000 (0.18%) in the period 1981–2010 to 26,000 (0.4%) in the period 2021–2050. The total number of hospitalizations and their increase as a result of climate change are the largest in Southern Europe, with the expectation that the share of hospitalizations for heat-related respiratory conditions provoked by heat will triple in this region over this period of time. (Aström et al., 2012). A research by M. Mihaylova in 2014 indicates a high probability of 40% to 60% increase of mortalities from cardiovascular and disease and brain hemorrhage in the larger cities in summer as a result of heat waves and the effect of the urban heat island.

Respiratory conditions are also likely to worsen by 10% to 30% due to the higher contents of carbon dioxide, dust (especially fine dust particles), as well as pollens, spores and other allergens caused by the warm air and earlier blossoming of the plants. Other allergic conditions are also likely to increase.

Another aspect of the high temperatures is the improved conditions for development of harmful bacteria. The same research shows a 50% to 100% probability of increase of Salmonella infections and 10% to 100% increase in Campylobacteriosis (food poisoning).

Coupled with the higher humidity and longer periods of warmth, a number of vector-borne diseases are likely to increase by 10% to 30%, especially I. Ricinus ticks and the relevant Borrelia burgdorferi (Lyme disease).



Fig. 7 Ixodes ricinus, castor bean tick, Source: Wikimedia

Some of the risks and opportunities for the human health arising from climate change are as follows:

Human health	Risks	Opportunities
Extremely high temperature (incl. heat waves)	<ul style="list-style-type: none"> • Heat stress • Cardiovascular disease • Complications with general morbidity • Greater availability of some vector-borne pathogens • Better conditions for adverse chemical reactions between air pollutants in warmer environments • Reducing food safety • Deterioration of mental state; nervous and psychiatric diseases 	<ul style="list-style-type: none"> • Fewer respiratory diseases • Climatotherapy of some diseases • Reduction of overall morbidity • Less availability of some other vector pathogens • Less temperature inversions - better air ventilation • Reduction of mold on food
Extremely low temperatures (incl. cold waves)	<ul style="list-style-type: none"> • Cold stress • Blood pressure, lung and respiratory diseases • Complications with general morbidity • More temperature inversions - poorer air ventilation - more air pool pollution • Deterioration of mental state 	<ul style="list-style-type: none"> • Climatotherapy (cryotherapy) for some diseases • Fewer vector pathogens • Worse conditions for some adverse chemical reactions between air pollutants • Better food safety

Human health	Risks	Opportunities
Increased precipitation and humidity	<ul style="list-style-type: none"> • Better conditions for chemical reactions related to air pollution at higher humidity • Increasing the transfer of air pollutants to the reinforcing surface and water • Worse conditions for outdoor climatotherapy • Deterioration of mental health • Asthmatic diseases • Mold and fungal diseases • Vector diseases • More aquatic pathogens 	<ul style="list-style-type: none"> • Air purification • Less pollen
Droughts	<ul style="list-style-type: none"> • Shortage of food and water 	<ul style="list-style-type: none"> • Fewer pathogens in the air and water • Better conditions for outdoor climatotherapy • Less asthmatic, lung, respiratory and allergic diseases • Fewer diseases associated with mold and fungus
More hours of sunlight	<ul style="list-style-type: none"> • UVB radiation-related conditions • Sun strokes 	<ul style="list-style-type: none"> • Better conditions for heliotherapy in the open • Less bone conditions • Improvement of the mental health
Winds and storms	<ul style="list-style-type: none"> • Thunder and lightning incidents • Physical injuries in strong winds • Worse conditions for outdoor climatotherapy 	<ul style="list-style-type: none"> • Better air quality • Less pollen
Floods	<ul style="list-style-type: none"> • Drowning incidents • Waterborne diseases • Water pollution • Deterioration of living conditions 	
Ozone layer depletion	<ul style="list-style-type: none"> • More UVB radiation-related effects 	

Other sectors play an important role in determining the risks of disease and injury from climate change. These may be risks of primary health consequences due to extreme weather events such as storms and floods, which are affected by the readiness of infrastructure in other sectors, including water and sanitation, agriculture, energy and transport. Risks can also be from side effects through other climatic factors such as vector diseases, contaminated food and deteriorating water and air quality. For example, water pollution can be affected by reduced water levels.

VI. Mitigation and adaptation measures – a plan for the future

*“If you fail to plan,
you plan to fail”*

Adaptation to the effects of climate change on health includes a wide range of public health interventions. Their success depends on awareness and information about the problem, the availability of effective response strategies and the availability of resources, information and incentives for their implementation. The main challenges in developing adaptation strategies for human health are taking into account the diversity of health impairments, regional conditions and actors involved in adaptation, and the high uncertainty about future changes in most climate risks. The adaptation options listed in the table include those to improve governance, build a knowledge and awareness base, and adapt the external environment to reduce the health impacts of climate change.

Options for adapting health to climate change must provide opportunities to take action to avoid, prepare for or respond to the adverse effects of observed or expected climate change. The identification and selection of options for planned health adaptation to climate change depends on various factors and should reflect issues such as the extent of existing risks and the potential for future risk change, to reduce the adverse health effects of climate change through a wide range of preventive public health measures to improve style of behavior, medical interventions, infrastructure, use of technology, education, institutional structures, policies, rules, etc.

VI.1. Healthcare sector measures

In the context of the NSCCAAP, a total of seven main categories of adaptation of the healthcare sector to the climate change have been outlined, each with its own thematic areas. They are formulated as follows:

- Legal and political capacity;
- Administrative, organizational, communication and financial capacity;
- Professional capacity;
- Information, communication and technological capacity;
- Capacity of the built-up and natural environment;
- Socio-economic capacity;
- Scientific and research capacity.

The possibilities of implementing these capacities and strengthening them at local level in the healthcare sector have been reviewed carefully in order to suggest relevant and comprehensive actions for the stakeholders and the local government:

VI.1A. Legal and political capacity

VI.1A.1. Review of all existing legislative and strategic planning documents at local level concerning climate change –related risks to human health, and improving them with a view on adaptation.

VI.1A.2. Review of all policies at local level and development of recommendations concerning incorporation of health-related climate change adaptation measures and approaches.

VI.1B. Administrative, organizational, communication and financial capacity

VI.1B.1. Establishment of an interdisciplinary working group to the Mayor of Gotse Delchev Municipality on the matters of climate change adaptation in healthcare.

VI.1B.2. Development of coordination procedure among healthcare institutions, as well as with other concerned actors at local and regional level on healthcare sector adaptation to climate change (ex. With regard to catastrophic events, temperature extremes, etc.)

VI.1B.3. Development of a communication plan to inform the general public about the effects of climate change on human health, and to raise awareness on adaptation measures (thus possibly reducing corresponding risks)

VI.1C. Professional capacity

VI.1C.1. Development of training materials and conducting a series of thematic seminars, lectures and trainings on the health impacts of climate change-related natural occurrences, covering all specialists aimed at enhancing the competence and skills of human resources in the field of health, as well as ambulance, civil protection and fire services (first responders for disasters).

VI.1C.2. Inclusion of climate change topics in the extracurricular activities in schools.

VI.1C.3. Development of a program in healthcare institutions for prophylactic control of the health condition with regard to the diseases and disorders arising from climate change, and organization of its implementation

VI.1D. Information, communication and technological capacity:

VI.1D.1. Introduction of the topic "Climate change and health" in the educational programs of primary and secondary schools

VI.1D.2. Conducting a broad mass media campaign on the topic of "Climate change and health"

VI.1D.3. Equipping the healthcare sector with high-tech and innovative installations for appropriate response to the health effects of climate change.

VI.1E. Capacity of the built-up and natural environment:

VI.1E.1. Improving the infrastructure resources (buildings, roads, power supply systems, etc.) of the health sector and adapting them to the effects of climate change, and to the corresponding increase in patient visits as a result of the climate change and related disasters.

VI.1E.2. Construction of public places with protective architecture and landscape design against extreme manifestations of the changing climate - hot, cold, humid, dry, windy, stormy, etc.

VI.1E.3. Application of strict control over air quality.

VI.1E.4. Preparation of places for protection from extreme weather conditions of people from vulnerable groups.

VI.1E.5 Territory risk assessment (at municipal level) according to the frequency and intensity of climate change and related disasters - geographical distribution and mapping (territorial and temporal).

VI.1E.6. Identification, assessment and mapping of the territorial distribution of favorable health opportunities arising from climate change.

VI.1E.7. Introduction of energy efficiency measures in healthcare institutions to reduce the exploitation of fossil fuels and minimize carbon footprint (incl. photovoltaics, insulations, heat pumps, etc.).

VI.1F. Socio-economic capacity:

VI.1F.1. Assessment of the vulnerability of healthcare sector to climate change in terms of increased number of hospitalizations, higher incidence of certain related conditions, etc.

VI.1F.2. Development of a Program for work with groups vulnerable to climate change and related disasters.

VI.1F.3. Development of a program for work with migration groups related to climate change.

VI.1G. Scientific and research capacity.

VI.1G.1. Development of a methodology for monitoring of climate change-related healthcare conditions at local level in order to contribute to the scientific research efforts at national and international level.

VI.2. Disaster Risk Management measures

Although not directly aimed at the healthcare sector or at the health and well-being of the general public, the disaster risk management is of utmost relevance and significance to the adaptation to climate changes of the sector itself and the population of Gotse Delchev Municipality as a whole. The connection is obvious – the natural disasters are more and more frequently caused by changes in the climate, and their severity grows for exactly the same reasons.

In this regard, the mitigation measures prescribed by the NSCCAAP are in three main directions:

- Risk Identification
- Risk Reduction
- Financial Safety

The last direction has a bearing on the financial ability to overcome damages to critical infrastructure and services, including healthcare, in order to restore their functioning as soon as possible. It is obvious that the increased risk of natural disasters caused by climate change would increase the price for restoring such services and infrastructure should they be hit badly.

Having in mind the institutional framework of the Republic of Bulgaria and the legally provided mechanisms of the municipality to undertake Disaster Risk Management measures concerning overall healthcare sector preparedness and resilience in the perspective of climate change, the measures proposed are:

VI.2A. Risk Identification

VI.2A.1. Urban flood risk assessment in the municipality for residential buildings, bridges, schools, hospitals, public buildings – such a measure would facilitate access to data for research institutions and authorities; also, it would serve for the design of targeted programs aimed at specific sectors, such as healthcare.

VI.2A.2. Assessment of compliance of local policies and zoning plans with the Flood Risk Management Plan for 2022-2027.

VI.2B. Risk Reduction

VI.2B.1. Design and investment in infrastructure for reducing the risk of urban floods caused by excessive rainfall – such as storm drains, etc.

VI.2C. Financial Safety

VI.2C.1. Increasing the intensity of insurance coverage of municipal buildings and healthcare institutions – that would allow for reduced financial strain in case of climate change-related emergency.

VII. Results from discussions

The first draft of the developed Climate Change Health Adaptation Strategy was presented at two workshops on 28.09.2020 that were organized by Gotse Delchev Municipality.

Both workshops included representatives of the municipal administration, including Mr. Moskov, the mayor, as well as mayors of villages, representatives of healthcare institutions and other stakeholders. Following the presentation, a number of concerns were raised not only for the measures for adaptation to climate change, but also towards the measures for its mitigation and reducing the carbon footprint of the local community as a whole. Some of the mayors of municipal villages mentioned areas where regular floods occur, but these are not included in the Flood Risk Management Plan of the West Aegean Basin Directorate for the 2016-2021.

Taking into account the comments and recommendations of the attendees, two more measures are added:

VI.1B.4. (towards Financial Capacity). Expanding the financial mechanisms and instruments to promote use of natural gas for household needs, incl. heating, instead of solid fuels (wood and coal) – such measure would allow more households to overcome the now high starting price of such a transition and improve not only the carbon footprint, but also help reduce a number of other emissions (such as fine dust particles, sulphuric gases, etc.) significantly affecting respiratory conditions.

VI.2A.2. (towards Risk Identification) Communicating the areas with frequent local floods to the West Aegean Basin Directorate for inclusion into the Flood Risk Management Plan of the territory for the 2022-2027 period – such a measure would have significant effect on adapting smaller and more vulnerable rural communities to climate change and adverse climatic occurrences, while improving the quality of disaster risk management within the entire region.

VIII. Conclusion

The present strategy is intended to serve as the basis for future assessments of the situation in the healthcare sector at local level in the perspective of the climate change and related occurrences.

The information is meant to contribute towards the development of policies and planning by the Municipality for climate change community adaptation. This will assist the local authorities and healthcare institutions in incorporating climate change into existing health programs and scaling-up of disaster risk reduction, emergency preparedness and response capacities in order to meet the increased risk of emergencies.

Some of the recommendations in the Action Plan concern improvement of the policy-making, clearly putting the municipal administration at the helm of the actions towards adaptation to climate change. Others concern increased interaction of local and regional actors and institutions in order to come to terms and to cope with a problem that grows each year in significance and in manifestations. The most important actions are those concerned with informing the local population about the climate changes, the risks, the proper behaviour and actions undertaken by the authorities to protect life and property. Preparedness is the best strategy.

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