PROTECTING HEALTH FROM CLIMATE CHANGE IN ALBANIA

VULNERABILITY ASSESSMENT REPORT
# TABLE OF CONTENT

Foreword ......................................................................................................................... 7  
Acknowledgements .......................................................................................................... 8  
List of Contributors ........................................................................................................ 9  
List of Abbreviations ...................................................................................................... 10  
Executive Summary ........................................................................................................ 11  
1. Introduction ................................................................................................................... 13  
   1.1. Country profile: Albania .......................................................................................... 13  
      1.1.1. Land and Population ...................................................................................... 13  
      1.1.2. Socioeconomic and Political Transition ....................................................... 13  
      1.1.3. Health Indicators ......................................................................................... 15  
   1.2. Climate Change ..................................................................................................... 20  
      1.2.1. Global Overview and Policy Context ......................................................... 20  
      1.2.2. Climate Change in Albania (Observed and Projected) ............................... 23  
2. Methods ...................................................................................................................... 31  
   2.1. Objective of the Assessment ................................................................................ 31  
   2.2. Methods of Review (Desk Review and Primary Data) ........................................... 32  
   2.3. Limitations .......................................................................................................... 33  
3. Health System and Adaptation Capacity in Albania ...................................................... 35  
   3.1. Leadership and Governance ............................................................................. 36  
   3.2. Public Health ....................................................................................................... 38  
   3.3. Health Care Financing ....................................................................................... 39  
   3.4. Primary Health Care ......................................................................................... 42  
   3.5. Hospital Care ..................................................................................................... 43  
   3.6. Health Information Systems ............................................................................... 44  
4. Extreme Weather Events and Health ............................................................................ 47  
   4.1. Heat Waves ......................................................................................................... 47  
   4.2. Droughts and Fires ............................................................................................. 51  
      4.2.1. Forest Fires During the Summer of 2007 ...................................................... 52  
      4.2.2. The Situation Created by Forest Fires in the summer of 2008 ................. 53  
      4.2.3. The Situation of Fires in the summer of 2009 ............................................. 53  
   4.3. Floods and Coastal Erosion .............................................................................. 54  
      4.3.1. Flooding of the Western Costal Lowlands ................................................. 56  
      4.3.2. Flooding Dangers from Small Rivers and Creeks ....................................... 56  
      4.3.3. Dams and Dangers ................................................................................... 57  
      4.3.4. Flooding of September 2002 .................................................................... 59  
      4.3.5. Flooding in the winter of 1962-1963 ............................................................ 58  
   4.4. Adaptation: Disaster Preparedness and Response .............................................. 64  
   4.5. Recommendations ............................................................................................. 67  
5. Air Quality, Climate Change and Health ....................................................................... 67  
   5.1. Air Pollution and Climate Change ...................................................................... 70  
      5.2. Respiratory Diseases ...................................................................................... 73  
      5.3. Pollens and Allergy ...................................................................................... 74  
      5.3.1. Allergic Pollens in Albania and the Influence of Climate Change ......... 75  
      5.3.2. Albanian Flora and Urban Environment .................................................... 77  
      5.3.3. Allergenic Pollens and their Daily Variations ........................................... 80  
   5.4. Adaptation: Air Pollution Mitigation and Health Benefits .................................. 81  
   5.5. Recommendations ............................................................................................. 82  
6. Communicable Diseases and Climate Change ............................................................... 82  
   6.1. Changes in Vector Patterns ............................................................................... 84  
      6.1.1. Key Vectors ............................................................................................... 96  
   6.2. Water- and Foodborne Diseases ....................................................................... 97  
   6.3. Adaptation: Surveillance System in Albania ..................................................... 102  
   6.4. Recommendations ............................................................................................. 104  
7. Evidence Gaps and Research Recommendations .......................................................... 102  
8. General Public Recommendations .............................................................................. 111  
9. References ................................................................................................................. 112
Foreword

The vulnerability assessment report will be the primary instrument for the Albanian institutions involved in the preparation of the strategy related to climate change in Albania.

Specifically, the current vulnerability assessment report evaluates the progress of national developments in all areas related to environmental issues and climate changes in Albania including a detailed analysis of hydro-meteorological challenges, extreme weather events including floods, droughts and fires, air quality issues, as well as major problems and challenges pertinent to environmental pollens and vectors.

Thorough the report, the health impact related to climate change in Albania is explored and scientifically analyzed based on the best available evidence including mortality and morbidity indicators.

From this point of view, the vulnerability assessment report is an important exercise and a key component of the forthcoming strategy on climate change in Albania, which will set goals and targets for Albania in line also with the regional progress and trends and, more broadly, with the global developments related to climate change.

The current vulnerability assessment report was mainly based on a desk review including a detailed analysis of all relevant documents, reports and policy papers related to climate change issues in Albania and elsewhere.

The available documents were reviewed from a team of key experts and health professionals operating at the Albanian Ministry of Health, the National Institute of Public Health, Regional Health Directorates, as well as university professors from Tirana University and other academic institutions in Albania.

The vulnerability assessment report emphasizes the principles of accountability, participation and multi-sectoral cooperation for tackling the climate change challenges, with a particular attention to vulnerability as well as economic and political empowerment and recognition and compliance with international treaties, standards and instruments pertinent to environmental issues and climate changes.

In this report, some important areas of health risks related to climate change have been identified as important to address in the Albanian context. However, the data available does not allow for attributing a burden of disease to specific environmental exposures. Yet, the existence of well developed elements in the Albanian health system can serve as an appropriate basis for undertaking effective measures against the negative impact of climate change on the health of the Albanian population.
Acknowledgements

This publication has been developed within the WHO/BMU project on protecting health from climate change in Europe, coordinated by Dr. Menne and Dr. Nurse, WHO Regional Office for Europe.

We are grateful for the financial support received from Germany. This project is part of the International Climate Initiative (ICI). The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag.

This work is part of a seven-country initiative of WHO/Europe and has been funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The project aims to protect health from climate change through addressing adaptation, strengthening of health systems and building institutional capacity.

WHO/Europe coordinates the projects, contributing to the implementation of the WHO regional workplan on climate change and health. It also has provided technical assistance, guidance, training and expertise. In each country, a multisectoral steering committee is established, and a project coordinator oversees implementation at the national level. Country coordinators are supported by WHO/Europe. All activities are being implemented in collaboration with the BMU and the national Governments of the seven countries.

Protecting health from climate change in Albania is part of the seven-country World Health Organization (WHO) Regional Office for Europe project entitled: “Protecting health from climate change in southeast Europe, central Asia and the Russian North”.

The funding for this project was provided by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Berlin, Germany.

WHO Euro office is providing the overall coordination of the seven country initiative through the Project Implementation Facility.

In Albania, the project is being carried out by the Ministry of Health, the National Institute of Public Health, and the Ministry for the Environment.
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## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>CCHF</td>
<td>Crimean-Congo Haemorrhagic Fever</td>
</tr>
<tr>
<td>CEDB</td>
<td>Council of Europe Development Bank</td>
</tr>
<tr>
<td>DALY</td>
<td>Disability Adjusted Life Years</td>
</tr>
<tr>
<td>DCCD</td>
<td>Department of Control of Communicable Diseases</td>
</tr>
<tr>
<td>DHIT</td>
<td>Directorate of Health Information Technology</td>
</tr>
<tr>
<td>DPR</td>
<td>Disaster Preparedness Response</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GHG</td>
<td>Green House Gas</td>
</tr>
<tr>
<td>HII</td>
<td>Health Insurance Institute</td>
</tr>
<tr>
<td>INSTAT</td>
<td>Institute of Statistics</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>IPH</td>
<td>Institute of Public Health</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCD</td>
<td>Non Communicable Disease</td>
</tr>
<tr>
<td>NSO</td>
<td>National Surveillance Office</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>RPHD</td>
<td>Regional Public Health Directorate</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually Transmitted Disease</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
</tr>
<tr>
<td>VA</td>
<td>Vulnerability Assessment</td>
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<tr>
<td>VBD</td>
<td>Vector Borne Disease</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WMO</td>
<td>World Meteorological Organization</td>
</tr>
<tr>
<td>WNV</td>
<td>West Nile Virus</td>
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</tbody>
</table>
Executive Summary

Climate change may affect peace and security (UNFCCC; Stability Pact for Southeastern Europe). In 2008, Albania signed a bilateral cooperative agreement with the World Health Organization (WHO), which has enabled the implementation process of the project “Protecting health from climate change in Albania” as part of a seven-country pilot initiative funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

In the framework of this project, here is presented a vulnerability assessment report which displays the major problems and challenges related to climate change and health in Albania. It serves as information basis for the development and adaptation strategy to protect the health of Albanian population from climate change.

The table below summarizes the key priorities from a workshop with relevant national stakeholders in Albania:

<table>
<thead>
<tr>
<th>CLIMATE CHANGE EXPOSUREE</th>
<th>MULTI-SECTOR IMPACTS (affecting health determinants)</th>
<th>HEALTH IMPACTS (Direct and indirect)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Increase extreme weather events</td>
<td>- Air Pollution</td>
<td>- Cardio-vascular diseases</td>
</tr>
<tr>
<td>- Air Quality</td>
<td>- Environmental habitat</td>
<td>Respiratory diseases and lung cancers</td>
</tr>
<tr>
<td>- Temperature increase, warming, heat and fire</td>
<td>- Agriculture and forest</td>
<td>- Water borne infections</td>
</tr>
<tr>
<td>- Sea level rise and precipitation changes (erosions and flood: including coastal and avalanches)</td>
<td>- Land management</td>
<td>- food-borne diseases</td>
</tr>
<tr>
<td></td>
<td>- Water management</td>
<td>- Vector borne &amp; zoonosis infections</td>
</tr>
<tr>
<td></td>
<td>- Waste water</td>
<td>- Mental health problems</td>
</tr>
<tr>
<td></td>
<td>- Food Safety</td>
<td>- Injuries</td>
</tr>
<tr>
<td></td>
<td>- Social and economic impacts (housing, employment, welfare)</td>
<td>- Skin diseases</td>
</tr>
</tbody>
</table>

**PREVENTION**

**MITIGATION** = Primary Prevention

**SECONDARY** = Secondary Prevention

**ADAPTIVE** = Adaptive Capacity

**TERTIARY** = Tertiary Prevention

Health Co-benefits
Taking into account global evidence and experiences from other countries, three main areas of health risks related to climate change have been identified as important to address in the Albanian context:

- Extreme weather events such as heatwaves, threatening cardiovascular and respiratory health and flooding, bringing injury and death, infectious diseases and mental health problems;

- Air quality, which already causes a high burden of disease in Albanian cities and not only will be worsened through changing weather patterns, but the sources of air pollution also contribute to further climate change;

- Communicable diseases that can emerge and increase as consequence of ecosystem and habitat changes for vectors, as consequence of a warming climate (foodborne diseases such as salmonella) and impaired water quality (waterborne diseases).

For none of these, the data available so far allows to really attributing a burden of disease to specific environmental exposures and in this report only fragments of potential future research are outlined. However, the existence of well developed elements in the Albanian health system can serve as a suitable basis for undertaking effective measures against the negative impact of climate change on the health of the Albanian population.

The most important recommendations from the current vulnerability assessment report are briefly summarized below:

**Cross-cutting recommendations:**

- High level, strategic, integrated policies:
  - Cross sector working
  - Communication and awareness raising
  - Capacity building and training
  - Monitoring, surveillance and research

**Specific recommendations for the main areas of health risks related to climate change:**

- Extreme weather events (heat, fires and flooding):
  - Emergency planning
  - Cross sector working for preparedness

- Air quality, climate change and health:
  - Monitoring and dissemination of results and cross sector actions contributing to plan

- Communicable diseases:
  - Relate to floods, heat and habitat changes
  - Surveillance and monitoring, capacity building
1. Introduction

1.1. Country profile: Albania

1.1.1. Land and Population

In the period following the Second World War, Albania was under the most isolated and totalitarian communist regime in Europe. After 1990, Albania joined the other former communist countries in their historical transition from socialist systems of government to market-oriented democracies. As a matter of fact, Albania is currently a parliamentary republic (Nuri, 2002; UNDP, 2004).

Albania has a total area of 28,748 km². It shares a border with Montenegro to the northwest and north east, the Former Yugoslavian Republic of Macedonia to the north and east and Greece to the south and southeast. The Adriatic Sea is to the west (Nuri, 2002).

Albania’s population was around 3.2 million persons in 2009; 42% of the population are urban dwellers (INSTAT, 2009). Albania has a relatively high proportion of young people 0 to 14 years of age (23.4%) and a low proportion of people over 65 years (9.4%) (INSTAT, 2009).

In contrast with the other former communist countries, Albania continues to exhibit one of the highest population growth rates in Europe (Rechel, 2003). However, accurate information is difficult to obtain due to intensive processes of internal and external migration. The distribution of the Albanian population by prefecture level is shown in Table 2.

1.1.2. Socioeconomic and Political Transition

Unique among former communist countries in Southeast Europe, Albania was under the most rigid Stalinist communist regime (Nuri, 2002; Rechel, 2003). Albania has long been one of the poorest countries in Europe and almost completely isolated for 45 years during the communist rule (Nuri, 2002; Rechel, 2003). After the collapse of the communist regime in 1990, the Albanian economy virtually collapsed (Nuri, 2002; Rechel, 2003). Subsequently, a market-oriented economic system emerged involving major social, cultural and economic reforms, similar to changes observed in the other former communist countries in Central and Eastern Europe (Rechel, 2003). However, the Albanian transition from a hermetic self-reliant system into an open democratic society was severely undermined at least twice: in 1997 and subsequently in 1999 (due to the war in Kosovo) (Nuri, 2002; Rechel, 2003). The 1997 turmoil was due to the collapse of savings schemes known as “pyramids”. The “pyramid phenomenon”, to a certain extent experienced by most of the countries in transition (Rechel, 2003), was nevertheless unique in Albania due to the extremely large scale of involvement. It is estimated that almost 2/3rds of the Albanian population took part in these savings schemes, and that the total sum lost exceeded one billion USD in a country whose total GDP was not more than 2.5 billion USD (Nuri, 2002). The social consequences of this collapse were immense and anomie reigned for a prolonged period. Effects on socio-economic status and social mobility were probably profound. The psychosocial environment in Albania is still enveloped by the “pyramid” effect and its sequelae are still shaping to a certain extent the political, economic and social environment.
Since the early 1990s, the transition process in Albania was accompanied by a sudden rise in unemployment and poverty (UNDP, 2000). The official unemployment rate in 2004 was reported at 14.4% (INSTAT, 2005), but the actual rate is believed to be much higher. In 2004, the GDP per capita (in $US) based on purchasing-power-parity in Albania was $4,937 (CEDB, 2005), which was higher than in Moldova ($2,119), but lower than the other countries in Southeast Europe (where Croatia had the highest GDP at $11,568), and remarkably lower than the European Union average ($27,491) (CEDB, 2005).

The particularly rapid process of transition in Albania over the past 15 years was associated with intensive internal and external migration (Nuri, 2002). Thus, not only was there an unprecedented level of internal migration from rural to urban areas (Nuri, 2002), but large numbers of people also left the country – over 750,000 between 1990 and 1999 (Nuri, 2002; Rechel, 2003), representing about 20% of the entire population. This emigration process continues unabated, both legally and illegally (Nuri, 2002), mostly to Greece and Italy (UNDP, 2000). Consequently, according to the census conducted in 2001, the population of Albania decreased slightly between 1989–2001 (UNDP, 2000), notwithstanding the country’s high fertility and relatively low mortality (Nuri, 2002). Economic factors are believed to be the most important determinants of emigration of Albanians (UNDP, 2000).

The country’s poor economic situation and the lack of rapid economic expansion due to limited domestic resources continue to encourage Albanian adults to emigrate (UNDP, 2000). Currently the Albanian economy remains heavily dependent upon remittances from migrants working abroad, who constitute the largest source of foreign exchange and about 20% of GDP in Albania (Nuri, 2002; Rechel, 2003).

In Albania, God was officially “outlawed” in 1967 when the dictator Hoxha ordered all religious institutions demolished or converted into sport arenas and other secular facilities (Nuri, 2002; Rechel, 2003). Ever since, the general perception has been that Albania is largely a secular state (Nuri, 2002). Yet, although religion has not been an important identity element in Albanian society for half a century, with the return of religious freedom in 1991 numerous mosques and churches have now reopened. Although the last census asking about religious affiliation in Albania was conducted in 1938, it is believed that 70% of the population are Muslims, 20% are Orthodox Christian and 10% are Roman Catholic (Nuri, 2002; UNDP, 2000).

In summary, the rapid transition from state-enforced collectivism towards a market-oriented system which is associated with poverty, high unemployment rates, financial damage and social mobility, and massive emigration, though at the same time with increased personal and religious freedom in a predominantly Muslim secular society, continue to mark Albania as a unique country in Europe, although it shares many characteristics with other transitional countries.
1.1.3. Health Indicators

Regarding life expectancy at birth, according to WHO estimates, a person born in Albania in 2005 can expect to live on average 71.0 years; 74.1 years if female and 67.3 years if male (WHO, 2009).

Table 1 below presents a comparative analysis of the life expectancy indicator in countries of Southeast Europe including Albania:

**Table 1. Life expectancy at birth in countries of Southeast Europe (SEE)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Life expectancy at birth (in years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year</td>
</tr>
<tr>
<td>Albania</td>
<td>2004</td>
</tr>
<tr>
<td>Bosnia-Herzegovina</td>
<td>1991</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2004</td>
</tr>
<tr>
<td>Croatia</td>
<td>2006</td>
</tr>
<tr>
<td>Macedonia</td>
<td>2003</td>
</tr>
<tr>
<td>Moldova</td>
<td>2006</td>
</tr>
<tr>
<td>Montenegro</td>
<td>2005</td>
</tr>
<tr>
<td>Romania</td>
<td>2007</td>
</tr>
<tr>
<td>Serbia</td>
<td>2006</td>
</tr>
<tr>
<td>Slovenia</td>
<td>2006</td>
</tr>
<tr>
<td>EU-25 average</td>
<td>2006</td>
</tr>
</tbody>
</table>


Infant mortality as well as child (under 5 years of age) mortality rate is decreasing steadily in Albania (Table 3), although still remains high compared to EU countries (WHO, 2009). According to MoH figures, the overall infant mortality rate in Albania dropped to 16 deaths per 1000 live births in 2003 (UNDP, 2004). Yet, these figures should be interpreted with caution, considering the difficult economic situation, and the poor quality and the low rates of access to health services. Indeed, UNICEF reported an infant mortality rate of 28 per 1000 live births in 2000, which is double the official figure for the same year (UNDP, 2004).

Maternal mortality is decreasing in Albania as well (Table 4). It showed a significant decrease in 2003 (9 deaths per 100000 live births), but it remains high compared with other European countries (UNDP, 2004). Haemorrhage is the leading cause of maternal deaths (accounting for about 40% in 2000), followed by eclampsia (25%). The high proportion of deaths due to bleeding can be partly attributed to the high rates of anaemia, which increases by 4-5 times the risk of death. In some rural areas pertinent to the northern districts, the maternal mortality is twice as high as in urban areas (UNDP, 2004).
In 2003, selected non communicable diseases accounted for about 76% of all deaths (52% of deaths were caused by diseases of the circulatory system and 14% by cancer), external causes for about 5% and communicable diseases for about 0.5% (INSTAT, 2005). In men, unintentional injuries and in both sexes, cardiovascular disease and neuropsychiatric conditions account for the highest burden of disease (INSTAT, 2005). Tobacco, alcohol and high blood pressure are the main risk factors causing the greatest disease burden in men while high blood pressure and high body mass index are the leading risk factors in women (INSTAT, 2005).

Likewise the other transitional countries worldwide, the epidemiological profile is changing in Albania. Levels of cardiovascular diseases, cancer and external causes of death are increasing. In parallel, the burden of communicable diseases is decreasing. These diseases cause 0.5% of all deaths. On average, there are 18 new cases of tuberculosis per 100 000 (WHO, 2009). There are 0.7 new cases of HIV infection per 100 000 (WHO, 2009). The rates of sexually transmitted infections (per 100 000 per year) are low compared to EU figures: 0.2 new cases of syphilis in 2008 (WHO, 2009).

Cardiovascular diseases are the leading causes of death in Albania comprising 52% of the total number of deaths (INSTAT, 2005). Within this group, the major killers are – ischemic heart disease: cause of 7% of the disease burden and 15% of all deaths (INSTAT, 2005).

Cancer is responsible for 14% of all deaths: 132 deaths per 100 000 populations (INSTAT, 2005). Cancer incidence remains lower than EU (there are 96 new cases of cancer per 100 000 per year, a quarter of the rate in the EU25) (WHO, 2009), but is increasing. For some cancers, such as breast cancer and other cancers affected by changes in lifestyle, the increase can't be explained only by demographic changes.

Unintentional injuries are responsible for 43 deaths per 100 000 per year, a figure higher than rates of western European countries. EU25: 45, EU15: 39, or EU10: 13 (WHO, 2009).

In Albania, injuries from road traffic accidents cause 12 deaths per 100 000 (INSTAT, 2005).

Smoking accounts for 22% of the disease burden, alcohol consumption 6%, obesity for an estimated 10%, whereas physical inactivity accounts for 5.3% of the burden of disease (INSTAT, 2005).

As for the health care personnel, there are 2039 GPs (general practitioners), 1587 specialized physicians and 12746 nurses who provide health care services in Albania (INSTAT, 2005).
In Figures 1-2 below are presented selected indicators related to cardiovascular disease, which is the leading cause of death for the Albanian population, similar to the situation in the industrialized/developed economies:

*Figure 1. Cardiovascular disease in Albania (Source: INSTAT/MoH)*

*Figure 2. Crude CVD death rate (per 100,000) by sex in Albania during 1994-2000 (Source: INSTAT)*
The “major” and “minor” causes of death in Albania are presented in Figures 3-4 below:

Figure 3. “Major” causes of death (per 100,000) in Albania during 2000-2003 (Source: INSTAT)

Figure 4. “Minor” causes of death (per 100,000) in Albania during 2000-2003 (Source: INSTAT)
### Table 2. Albanian population by prefecture

<table>
<thead>
<tr>
<th>Prefecture</th>
<th>Catchment population (thousand)</th>
<th>% urban population</th>
<th>% sparse population</th>
<th>Total area covered (Km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiranë</td>
<td>677,879</td>
<td>68.20</td>
<td>31.80</td>
<td>1,652</td>
</tr>
<tr>
<td>Shkodër</td>
<td>250,551</td>
<td>36.30</td>
<td>61.70</td>
<td>3,562</td>
</tr>
<tr>
<td>Vlorë</td>
<td>202,295</td>
<td>56.90</td>
<td>43.10</td>
<td>2,166</td>
</tr>
<tr>
<td>Korçë</td>
<td>263,586</td>
<td>38.70</td>
<td>61.30</td>
<td>3,711</td>
</tr>
<tr>
<td>Durrës</td>
<td>280,996</td>
<td>56.80</td>
<td>43.20</td>
<td>766</td>
</tr>
<tr>
<td>Fier</td>
<td>380,737</td>
<td>32.00</td>
<td>68.00</td>
<td>1,980</td>
</tr>
<tr>
<td>Berat</td>
<td>18,191</td>
<td>40.60</td>
<td>59.40</td>
<td>1,798</td>
</tr>
<tr>
<td>Gjirokastër</td>
<td>10,715</td>
<td>41.02</td>
<td>58.98</td>
<td>2,884</td>
</tr>
<tr>
<td>Elbasan</td>
<td>35,382</td>
<td>35.60</td>
<td>64.40</td>
<td>3,199</td>
</tr>
<tr>
<td>Dibër</td>
<td>116,602</td>
<td>26.60</td>
<td>73.40</td>
<td>2,586</td>
</tr>
<tr>
<td>Kukës</td>
<td>102,036</td>
<td>24.20</td>
<td>75.80</td>
<td>2,374</td>
</tr>
<tr>
<td>Lezhë</td>
<td>159,882</td>
<td>31.40</td>
<td>68.60</td>
<td>1,619</td>
</tr>
</tbody>
</table>

Source: MoH

### Table 3. Infant mortality in Albania

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</tr>
</thead>
<tbody>
<tr>
<td>Number of live births</td>
<td>67,730</td>
<td>72,179</td>
<td>72,081</td>
<td>68,358</td>
<td>61,739</td>
<td>60,139</td>
<td>57,948</td>
<td>53,833</td>
<td>52,888</td>
<td>42,315</td>
<td>45,132</td>
<td>40,866</td>
<td>38,789</td>
<td>35,816</td>
<td>33,368</td>
<td>34,044</td>
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</tr>
<tr>
<td>Number of deaths</td>
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<td>2,547</td>
<td>2,162</td>
<td>1,762</td>
<td>1,387</td>
<td>1,215</td>
<td>957</td>
<td>864</td>
<td>924</td>
<td>730</td>
<td>701</td>
<td>617</td>
<td>569</td>
<td>466</td>
<td>411</td>
<td>372</td>
<td>352</td>
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<tr>
<td>Infant mortality (per 1000 borns)</td>
<td>35.4</td>
<td>28.3</td>
<td>30.0</td>
<td>25.8</td>
<td>22.5</td>
<td>20.5</td>
<td>17.5</td>
<td>16.0</td>
<td>17.5</td>
<td>17.3</td>
<td>15.5</td>
<td>14.7</td>
<td>13.0</td>
<td>11.9</td>
<td>11.1</td>
<td>10.3</td>
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Source: MoH

### Table 4. Maternal mortality in Albania

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<tr>
<td>Women age 15-49 years</td>
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<td>820</td>
<td>836</td>
<td>845</td>
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<td>Maternal deaths</td>
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<td>21</td>
<td>22</td>
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<td>6</td>
<td>5</td>
<td>7</td>
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<tr>
<td>Deaths (per 100.000 women,age 15-49)</td>
<td>1.7</td>
<td>3.5</td>
<td>2.5</td>
<td>2.6</td>
<td>2.0</td>
<td>1.5</td>
<td>1.4</td>
<td>1.4</td>
<td>1.50</td>
<td>1.36</td>
<td>1.00</td>
<td>0.36</td>
<td>1.22</td>
<td>0.69</td>
<td>0.58</td>
<td>0.78</td>
<td>0.00</td>
</tr>
<tr>
<td>Deaths (per 100.000 live births)</td>
<td>19.7</td>
<td>40.2</td>
<td>29.1</td>
<td>32.2</td>
<td>27.5</td>
<td>21.6</td>
<td>20.7</td>
<td>22.6</td>
<td>22.7</td>
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<td>23.2</td>
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Source: MoH
1.2. Climate Change

1.2.1. Global Overview and Policy Context

Climate change is the biggest global health threat of the 21st Century (Costello, 2009). Effects of climate change on health will affect most populations in the next decades and put the lives and wellbeing of billions of people at increased risk (Costello, 2009). As a matter of fact, 300 000 people die every year around the world due to climate change.

On average, global temperatures on land have risen by 0.8°C compared with pre-industrial times (Weart, 2004). European land areas have warmed up more rapidly, however, increasing by more than 1.2°C so far (IPCC, 2007), with a further increase of 1.0–5.5°C expected by the end of the 21st Century (IPCC, 2007).

Although vector-borne diseases will expand their reach, and because of heatwaves death tolls will increase especially among elderly people, the indirect effects of climate change on water, food security, and extreme climatic events are likely to have the biggest effect on global health (Costello, 2009).

Climate change has been responsible for 5.5 million Disability Adjusted Life Years (DALYs) lost in 2000 (Costello, 2009). The disease burden attributable to climate change relate mostly to deaths caused by cardiovascular diseases, diarrhoea, malaria, accidental injuries in coastal floods and inland floods or landslides, and the unavailability of recommended daily calorie intake (which is an indicator of malnutrition). However, estimates show that small increases in the risk for climate-sensitive conditions, such as diarrhoea and malnutrition, could result in very large increases in the total disease burden (Costello, 2009).

Observed increases in climate change related events, such as heat-waves, extreme precipitation events, storms and extreme temperature, cause different climate-related exposures: for example, water scarcity, reduced food productivity, deterioration of air quality, changes in ecosystems, infrastructure damage and economic consequences. Health is affected through various pathways (IPCC, 2007).

An increase of frequency and intensity of heat-waves could be leading to additional summer heat related cardiovascular and respiratory deaths. Also, an increase of extreme precipitation events could aggravate current problems already existing in the area of water related diseases, accidents and injuries (IPCC, 2007).

More importantly, climate change effects on health will exacerbate inequities between rich and poor worldwide. This has direct implications especially for the developing countries which will not reach the Millennium Development Goal (MDG) health targets by 2015.

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1 Any process that causes adjustments to a climate system – from a volcanic eruption to a cyclical change in solar activity – could be described as creating “climate change”. Today, however, the phrase is most often used as shorthand for anthropogenic climate change – in other words, climate change caused by humans. The principal way in which humans are understood to be affecting the climate is through the release of heat-trapping greenhouse gases into the air. Climate change is used interchangeably with another phrase – “global warming” – reflecting the strong warming trend that scientists have observed over the past century or so. Strictly speaking, however, climate change is a more accurate phrase than global warming, not least because rising temperatures can cause a host of other climatic impacts, such as changes in rainfall patterns.
Management of the health effects of climate change will require inputs from all sectors of government and civil society, collaboration between many academic disciplines, and new ways of international cooperation (Costello, 2009).

Southern Europe has already experienced extremely dry weather conditions, with rainfall decreasing by up to 20% during the 20th Century (IPCC, 2007).

All countries in the WHO European Region observe an increase in temperature, with projected further significant increases. The type and severity of climate change risks for human health vary widely across the Region (IPCC, 2007).

Key Messages

- Climate change is one of the most challenging issues the world is facing toady and is indeed considered the biggest global health threat of the 21st Century.
- More importantly, the issue of climate change is projected to be much worse.
- It is critical that the scientific community relating to this ongoing crisis reach the communities at large in order to raise the awareness that climate change is a fundamental threat to human health.
- 300,000 people die every year around the world due to climate change.
- Health effects of global warming hit hardest the poor nations.
- Climate change affects the fundamental requirements for health – clean air, safe drinking water, sufficient food and secure shelter.
- Many of the major killers such as diarrheal diseases, malnutrition, malaria and dengue are highly climate-sensitive and are expected to worsen as the climate changes.
- Areas with weak health infrastructure – mostly in developing countries – will be the least able to cope without assistance to prepare and respond.
- The extinction of biodiversity due to global warming is thousand times higher than natural extinction and irreparable degradation may take place if ecosystems are pushed beyond certain tipping point.
- There’s a gap between environmental work and health effects. There’s a lot of work to be done in this regard.
- It is imperative to coordinate with all partners and ensure that health is properly represented in the climate change agenda.
- Furthermore, it is crucial to collect, coordinate and disseminate the scientific evidence on the links between climate change and health.
Figure 5 summarizes the health impact of climate change:

Figure 5. Health impact of climate change (adapted from Confalonieri et al. 2007: 396)
1.2.2. Climate Change in Albania (Observed and Projected)

Climate change effects have started to be felt since the late 1990s in Albania, more precisely in 1997, when the winter came with very little or no snow at all. It used to snow a lot on the Albanian highlands, but in 1997 it snowed just once and very little, and the whole March and April were hot, and with very little rain. Since 1997, winters in Albania have become shorter and milder, whereas summers have become longer and hotter, sometimes with temperatures above 40°C (Nuri, 2002).

Droughts in summer and sometimes even in fall, and then sudden floods, became a frequent phenomenon.

However, the climate change impacts started to become visible to naked eye only recently. The coasts have started to erode almost in the entire Adriatic coastline in Albania due to sea level increase—in some places the sea has advanced more than 50m inland, destroying the coastal forests and vegetation, and increasing the salinity in the lagoons and fields near the seacoast.

The climate change effects have increased the number and the intensity of fires in Albania. During 2006-2007 there were 352 fires that burned throughout Albanian parks and forests, burning entire ecosystems and pastures. In some areas you could drive for tens of kilometers without seeing a single tree unburned—the fires devastated entire forests sometimes. The fires can be attributed to a higher temperature in summer, prolonged droughts and earlier melting of snow in the mountain caps (Nuri, 2002).

The climate change has brought mild winters, which have favored the growth of tropical plants even in Albania, and made it possible for mosquitoes to appear in altitudes above 400-500 m above the sea level (mosquitoes were present only in lower altitudes before the 1990s).

Seasons have shifted a lot too—trees used to lose their leaves by October and flower in March, but now they lose leaves late in November and flower sometimes even by the end January.

Last year, the weather behaved differently—the winter was mild and with a lot of rain, but the strange thing is that summer came with a lot of rain, and there have been two weeks of continuous rain, which is very unusual for the Albanian summer which used to be dry and with short rains of some hours.

The Albanian (Rechel, 2003) public and government are largely unaware of the climate change impacts—there is ignorance on the issue and many times also denial that the effects are caused by climate change.

Levels of greenhouse gas (GHG) emissions in Albania are about four to five times lower than average international levels. This is because a high percentage of electricity is produced by hydropower, but also because energy consumption per person is low and industrial productivity has continued to fall (Rechel, 2003).
Albania being in the Mediterranean area is subject to potential disease outbreaks of tropical origin such as Chikungunya, dengue and malaria, other diseases. Climate change will further aggravate air quality related health problems in the major cities of Albania, but in particular in Tirana.

According to the climate change scenarios for Albania\(^2\) an increase in annual temperature up to 3.6 °C and decrease in precipitation to -12.5% are expected by 2100 compared to 1990. Summers with higher temperatures (up to 4.1 °C) and low precipitation (up to -27%) are expected. Water quality and quantity for human consumption is expected to worsen in Albania. Reduced hydrological resources affect the energy production, which is based to a large extent on hydro-power.

Below are presented climate change projections for Albania for the 2020s, 2050s and 2080s. The projections are taken from nine of the most up-to-date global climate models used in the Intergovernmental Panel on Climate Change\(^3\) Fourth Assessment Report (IPCC AR4), for a range of greenhouse gas emissions scenarios.

<table>
<thead>
<tr>
<th>Table 5. Selected climate change projections for Albania</th>
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</thead>
<tbody>
<tr>
<td><strong>Climate variable</strong></td>
</tr>
<tr>
<td><strong>Temperature (°C)</strong></td>
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<tr>
<td><strong>Precipitation (mm/day)</strong></td>
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<tr>
<td><strong>Windspeed (m/s)</strong></td>
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<tr>
<td><strong>Relative humidity (%)</strong></td>
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<tr>
<td><strong>Cloudiness (%)</strong></td>
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<tr>
<td><strong>Sea surface temperature (°C)</strong></td>
</tr>
<tr>
<td><strong>Sea level rise (cm)</strong></td>
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</tbody>
</table>

Notes:
(a) Unless otherwise indicated, the ranges provided are the average across 9 climate models, under 3 greenhouse gas emissions scenarios.
(b) Figures shown in brackets are the ranges across the 9 individual climate models, under a single greenhouse gas emission scenario.
(c) Projections for windspeed are highly uncertain. Only 1 greenhouse gas emissions scenario has been proposed.

\(^2\) The climate change studies in Albania are based on geothermal inversion results and meteorological observation data. There is analyzed the ground surface history and paleo-climate change according to the temperature measurements in the different wells in Albania. Climate changes during the last half of the XX century has been analyzed also based on the meteorological data.

\(^3\) The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. It was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts. The IPCC is a scientific body. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. It does not conduct any research nor does it monitor climate related data or parameters.
### Figure 6: Hazards by districts identified by regional commissions of CEPR through group's technique

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<tr>
<th>Hazards</th>
<th>Durrës</th>
<th>Elbasan</th>
<th>Haxhinica</th>
<th>Jal</th>
<th>Krujë</th>
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</thead>
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<tr>
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Two very important points related to the meteorological conditions in Albania are listed below:

- The rise of the average temperature in the past 30 years in Albania is a signal that should alert authorities and the population about the overwhelming threat of climate change;
- Extreme weather events are becoming more and more frequent in Albania and predictions for the future are even worse.

Albania is a Mediterranean country. It lies in a subtropical zone, characterised with hot, dry summers and mild, wet winters with abundant rainfalls. Yet in the mountain regions, (so-called Inlands) prevails a continental climate with marked seasonal extremes of temperatures, while in the littoral Lowlands the climate resembles a subtropical one.

Albania is a small country, but there are important climatic differences, which are the result of the very broken country’s relief devided in four climatic areas: Lowland-Mediterranean area, Hilly-Mediterranean area, Pre-mountain-Mediterranean area, and Mountain-Mediterranean area. Typical Mediterranean climate characterizes the lowlands and the plains. The mountainous area has in principle typical continental climate with a slight Mediterranean influence. But there is a significant difference between the North and the South. In the South, the summers are dryer and the differences between summer and winter temperatures are not as big as in the North. In general, the period from June to September is hot, while from October to May it is cold and wet.

The meteorological conditions change from southwest to northwest in a downward tendency concerning the temperatures and precipitations. The annual average temperature varies from 14.8°C in northern Albania to 16.5°C in the southern part of the country. July is the hottest month in Albania with an average temperature of 25°C. The highest summer temperature of 43.9°C is registered in Kucova. The coldest month of the year is January with an average temperature of 6°C. Eastern Albania in general is characterized by very cold winters. The lowest temperature of -34°C is recorded at the resort of Biza, 35 km east of Tirana.

The winds in Albania are numerous and have a seasonal character. The sea breezes (mainly in the months of June, July and August), ice winds in northern Albania and hot and dry winds blowing in the southwestern direction are the most typical of the country. The so-called “Murlan” cold dry and very strong wind is the most characteristic winter wind in Albania. The “Sorocco” or native “Juga” wind is warm and moist oppressive wind, which brings most of the rainfalls in the mountainous regions.

During the south windstorms the velocities of 35 to 40 m/s have been observed. The highest sea waves in the coastal zone are 3 to 4 m. The tidal process is irregular and it has a period of 12 hours. It is characterized by oscillations with small amplitudes. Thus, in 50% of cases the mean daily amplitude is more than 25 cm and only in 1% of cases its value is more than 49 cm.

Winter is relatively short and mild, humid near the seaside areas. Summer lasts very long and it is hot and dry. To the east, in the mountain areas, the climate is Mediterranean mountainous. There, the temperature is lower than in seaside zones and the rainfalls decrease.

Sunshine varies from 2560 hours per year in Tirana, down to 2046 hours in Kukës City. Average yearly temperature varies from 16.5oC in Vlora City, 11.8oC in Kukës and 7.0oC in the northern area of the Albanian Alps.
Table 6. Maximal absolute temperature observed in Albania by selected decades

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1951-60</th>
<th>1961-70</th>
<th>1971-80</th>
<th>1981-90</th>
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<td>39</td>
<td>35.2</td>
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<td>38.4</td>
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<td>36.5</td>
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</tbody>
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Table 7. Minimal absolute temperature observed in Albania by selected decades

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<thead>
<tr>
<th>YEAR</th>
<th>1951-60</th>
<th>1961-70</th>
<th>1971-80</th>
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<td>-13.3</td>
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<td>-19</td>
<td>-20.9</td>
<td>-17.5</td>
<td>-16.7</td>
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</table>

Water resources constitute an important natural resource for Albania which, compared with the other European countries, is considered as one of the richest.

Average annual precipitation in Albania ranges from about 1,000 mm/m² on the coast to nearly 2,500 mm/m² in the northern mountainous regions. Thus, the mean annual precipitation for the whole territory is 1485 mm, and the mean annual runoff 891 mm, or about 40 kml, which is discharged in the sea by rivers. Albanian Alps are one of the most humid territories in Europe, with up to 4444 mm/year rainfalls.

The highest annual precipitation of 3,094 mm/m² is registered around the northern Albanian village of Boga, in the northern Albanian Alps, ranking Boga among the regions with highest precipitation in the European continent. The slight precipitations of 638 mm/m² in Sheqerës and of 790 mm/m² in Korca are registered in southern Albania. Summer precipitations are slight throughout the country.

Water regime is typical Mediterranean; about 82-85% of the annual runoff is observed during the wet season (October-May) and only 6-9% during the dry season (July-September).

Snowfalls meet seldom in seaside areas and no snow cover holds there. In northern Albania, around the Shkodër Lake (Scutari Lake) the snow averagely holds 4-5 days a year, while in the Korça plain it holds about 35 days a year. In northern Albania, in northern Albanian Alps and in Vermosh region the snow holds 99 days a year and the snow cover reaches to 2-3 m.
The Table 9 and Figure 7 below present a few possible scenarios related to climate change in Albania:

<table>
<thead>
<tr>
<th>Scenarios for Albania</th>
<th>Time Horizon</th>
<th>2025</th>
<th>2050</th>
<th>2100</th>
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<td></td>
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<td>2025</td>
<td>2050</td>
<td>2100</td>
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<tr>
<td><strong>Annual</strong></td>
<td>temperature (°C)</td>
<td>0.8 to 1.1</td>
<td>1.7 to 2.3</td>
<td>2.9 to 5.3</td>
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<tr>
<td></td>
<td>precipitation (%)</td>
<td>-3.4 to -2.6</td>
<td>-6.9 to -5.3</td>
<td>-16.2 to -8.8</td>
</tr>
<tr>
<td><strong>Winter</strong></td>
<td>temperature (°C)</td>
<td>0.7 to 0.9</td>
<td>1.5 to 1.9</td>
<td>2.4 to 4.5</td>
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<tr>
<td></td>
<td>precipitation (%)</td>
<td>-1.8 to -1.3</td>
<td>-3.6 to -2.8</td>
<td>-8.4 to -4.6</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td>temperature (°C)</td>
<td>0.7 to 0.9</td>
<td>1.4 to 1.8</td>
<td>2.3 to 4.2</td>
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<tr>
<td></td>
<td>precipitation (%)</td>
<td>-1.2 to -0.9</td>
<td>-2.5 to -1.9</td>
<td>-5.8 to -3.2</td>
</tr>
<tr>
<td><strong>Summer</strong></td>
<td>temperature (°C)</td>
<td>1.2 to 1.5</td>
<td>2.4 to 3.1</td>
<td>4.0 to 7.3</td>
</tr>
<tr>
<td></td>
<td>precipitation (%)</td>
<td>-11.5 to -8.7</td>
<td>-23.2 to -17.8</td>
<td>-54.1 to -29.5</td>
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<tr>
<td><strong>Autumn</strong></td>
<td>temperature (°C)</td>
<td>0.8 to 1.1</td>
<td>1.7 to 2.2</td>
<td>2.9 to 5.2</td>
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<tr>
<td></td>
<td>precipitation (%)</td>
<td>-3.0 to -2.3</td>
<td>-6.1 to -4.7</td>
<td>-14.2 to -7.7</td>
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</table>
Figure 7. Expected changes in the Drini river cascade

Likely changes in the other climatic parameters are as follows:

- Draught is expected during summer due to increased temperature (likely increase up to 5.6°C) and potential evaporation, not balanced by precipitation (reduction by 41%).

- Increasing temperatures will raise probability of extreme events and higher intra-annual variability of minimum temperatures. Higher increase of daily minimum than maximum temperatures is likely to occur. More frequent and severe droughts with greater fire risk are likely.

- Decreased number of frosty days (temperatures ≤-5°C) in high altitudes is likely to occur. Expected decrease is 4-5 days, 9 days and 15 days by 2025, 2050 and 2100 respectively.

- Due to higher average temperatures in winter more precipitation is likely to fall in the form of rain rather than snow, what will increase both soil moisture and run-off. Increase in total precipitation rate may induce greater risks of soil erosion, depending on the intensity of rain episodes.

- Increase in summer temperature is likely to result in increase of frequency and intensity of extreme weather events (heat waves).

The number of days with the temperature ≥35°C is likely to increase by 1-2 days by 2025 and by 3-4 days by 2050 compared to 1951-2000 average. By 2100 the expected increase is 5-6 days over the mountainous part, and up to 8 days in the low land.
• The expected changes in surface air temperature and humidity will increase the heat index (combined effect of temperature and moisture). More hot days and heat waves are very likely over nearly all study area. The increase will be the largest in the lower part of the study area where soil moisture decrease is likely.

Although total precipitation is expected to decrease, an increase of intensive rain episodes is likely. Number of days with heavy precipitation (24 hours maximum) compared to 1951-2000 average is likely to increase by 1-2 days by 2025, 2-3 days by 2050, and 3-5 days by 2100.

Based on the results of temperature inversions recorded in deep wells and boreholes for the evaluation of the ground surface temperature history and hydro-meteorological data, the following conclusions can be drawn:

• The climate at coastal plain region of Western of Albania was cooled by 0.6 K before the middle of the 19th Century. Later, a warming of 0.6 K occurred, from the last quarter of the 19th Century until present-day.

• Temperature records in northwestern mountainous region of Albania confirmed also a climate warming of 0.6 K during 20th Century. At mountains regions, the warming has started about a quarter of century later than at coastal plain area of western Albania.

• Warming, mainly during the last quarter of the 20th Century, is also shown by the meteorological data.

• The rainfall regime changes have their consequences in the fresh water resources of the country, of surface’s and underground waters.

• Warming has shown its impact on country’s climate and ecosystems. There is evidence of a decrease in the water resources of the country, and thermal stress in the wetlands, lagoons and lakes of Albania. Its impact is observed first of all on the biodiversity.

• The oceanographic situation in the Adriatic Sea is characterized by the formation of “The bridge” with continental water in the Adriatic Sea. “The bridge” is closely linked with the intensity of the river flow.

• These climate changes have a significant negative health impact for the Albanian population.
2. Methods

2.1. Objective of the Assessment

Protecting health from climate change in Albania is part of the seven-country WHO Regional Office for Europe project entitled: “Protecting health from climate change in southeast Europe, central Asia and the Russian North”. The funding for this project was provided by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Berlin, Germany. The seven country initiative is under the overall coordination of the WHO Euro office, through the Project Implementation Facility. In Albania, the project is being carried out by the Ministry of Health, the National Institute of Public Health, and the Ministry for the Environment.

The vulnerability assessment report will be the primary instrument for the Albanian institutions involved in the preparation of the strategy related to climate change in Albania.

More specifically, the current vulnerability assessment report evaluates the progress of national developments in all areas related to environmental issues and climate changes in Albania including a detailed analysis of hydro-meteorological challenges, extreme weather events including floods, droughts and fires, air quality issues, as well as major problems and challenges pertinent to environmental pollens and vectors.

Through the report, the health impact related to climate change in Albania is explored and scientifically analyzed based on the best available evidence including mortality and morbidity indicators.

From this point of view, the vulnerability assessment report is an important exercise and a key component of the forthcoming strategy on climate change in Albania, which will set goals and targets for Albania in line also with the regional progress and trends and, more broadly, with the global developments related to climate change.

Audience

The vulnerability assessment report intends to reach a multitude of relevant stakeholders dealing with climate change issues in Albania:

- Albanian governmental institutions both central and local, but particularly those institutions involved and concerned with the preparation of the upcoming strategy on climate change in Albania;
- Civil society, non-governmental organizations, academia and media;
- United Nation (UN) Agencies operating in Albania;
- Other UN Agencies not present in the country, but with an interest in Albanian development and, more broadly, in global climate changes;
- Other donor and international organizations present in Albania;
- Last but not least, the general public in Albania.
2.2. Methods of Review (Desk Review and Primary Data)

The current vulnerability assessment report was mainly based on a desk review including a systematic analysis of all relevant documents, reports and policy papers related to climate change issues in Albania and elsewhere.

The available documents were reviewed from a team of key experts and health professionals operating at the Albanian Ministry of Health, the National Institute of Public Health, Regional Health Directorates, as well as university professors from Tirana University and other academic institutions in Albania.

The vulnerability assessment report emphasizes the principles of accountability, participation and multi-sectoral cooperation for tackling the climate change challenges, with a particular attention to vulnerability as well as economic and political empowerment and recognition and compliance with international treaties, standards and instruments pertinent to environmental issues and climate changes.

The Vulnerability Assessment Report is based on:

- A detailed analysis identifying the root causes and group-specific impact of several dimensions and components related to climate change in Albania;

- The identification of capacity gaps between the current situation and the anticipated benchmarks and expected results of the implemented programs and activities pertinent to environmental and climate challenges in Albania;

- The determination of opportunities for active and meaningful participation in national governance and development processes, as well as the identification of obstacles to tackle climate change issues in Albania;

- The identification of the main climate change challenges and goals for the Albanian institutions and other partner initiatives;

- The development of crisis prevention measures and capacities for effective interventions, particularly in extreme weather events.
This report is based on the research work conducted both by Albanians and foreign experts in the framework of the BMU project: “Protecting health from climate change in Albania”, previous research, various workshops and a review of the Albanian and foreign literature.

More specifically, the research was concentrated on the following areas which were identified by Albanian policy makers and technical people in the launching workshop in May 2009:

- Mosquito mapping
- Rodent mapping
- Infectious diseases (including waterborne)
- Air pollution
- Heat-related morbidity and mortality
- Respiratory diseases
- Pollen-related allergies
- Floods
- Precipitation and extreme events
- Review of the existing legal framework related to climate change
- Review of current policies and strategies adopted by Albania
- Capacities of the health system to cope with Climate change
- Climate change and health indicators

Some more research work is ongoing especially regarding disaster preparedness response, energy efficiency, International Health Regulations, vector-borne diseases (ticks), etc.

### 2.3. Limitations

In Albania, little research on climate change and health has been done. Few scientific publications are available and this report is mainly based on grey literature (health reports, strategies, working documents from governmental institutions such as the Ministry of Health, or the Institute of Public Health). Therefore, this is not a systematic review, but result of an iterative and dynamic communication process within the project. The report does not claim comprehensiveness, it is as exhaustive as possible by end of 2010.

The contributions to this report including sources of information and references have been compiled by well-known experts in Albania. Notwithstanding their laudable efforts and expertise, issues related to partial and subjective perspective may have affected this report. The report does not imply the expression of any opinion whatsoever on the part of WHO concerning the findings and recommendations for Albania.
Data limitations include as follows:

- No monitoring, no surveys, no reporting of essential environmental and health indicators;
- Not enough detail (causes of death, age groups, morbidity, spatial and temporal distribution);
- Methodological concerns with regard to calculations of key indicators (such as e.g. life expectancy);
- Delayed in reporting, no real time data;
- In-operational format of data (on paper, not digital);
- No linking of different information, fragmented reporting systems;
- Lack of a proper central information system.

In conclusion, health impact of climate change is difficult to be established for the Albanian population given the lack of information.

Generally and in a broader context, climate change studies and attribution of causes is always a challenge in environmental epidemiology – this is an invitation to i) generalize and apply global evidence, and; ii) to act in line with the precautionary principle, especially when win-win solutions are feasible (e.g. transport, energy, waste management, water and sanitation, etc.).
3. Health System and Adaptation Capacity in Albania

Health Care System in Albania is undergoing the following important reforms (MoH, 2007):

- Public Health Services guaranteed to every citizen;
- Increase of the autonomy of Primary Health Care centers (Health Centers);
- Coverage of Health Care Services by the insurance scheme (one single purchaser);
- Reconfiguration of the health care system at each level;
- Regionalization of services (prefecture level).

Key Messages

- Climate change and global warming are getting increasingly more attention from the government of Albania agenda although not specifically worded as such;
- Factors that contribute to the increase of greenhouse gas (GHG) are being tackled from regulatory perspective;
- Addressing climate change issues is an inter-sectoral endeavor requiring coordinated regulatory framework and implementation efforts;
- There is a pressing need to adapt the existing capacities in health sector in Albania in order to face the new challenges of climate change and its impact on health.
3.1. Leadership and Governance

**Government oversight**

The basic task of government oversight in the health sector is threefold (WHO, 2004):

- Formulating health policy by defining vision and direction for the sector;
- Regulating the actors in the health system;
- Collecting and using information.

Governance is commonly defined as the relationship between the owner and management of an organization (WHO, 2004).

The Ministry of Health (MoH) is moving from its role as the owner and provider of services towards one where it provides sectoral stewardship and strategic direction across the full sector by means of policy development. This would mean that the MoH is evolving into a body which sets the overall policy framework, develops system wide strategies, provides guidance, oversight and ensures quality through accreditation processes and monitoring (MoH, 2007).

Many former MoH functions have been delegated to existing or newly established health sector institutions—the Institute of Public Health (IPH), the Health Insurance Institute (HII), National Center for Quality, Safety and Accreditation of Health Institutions (NCQSA), National Center for Continuing Education (NCCE), National Centre of Drug’s Control (NCDC), and National Centre of Blood Transfusion (NCBT) (MoH, 2007).

A systematic and transparent process of monitoring and evaluation has been developed and approved in 2009 in order to plan activities in a strategic and coordinated way, and monitor the impact of health sector policies and programs, as well as the performance of the health system as a whole. The Strategic Priorities in the “Health System Strategy 2007-2013” are used as an organizing principle for the Health Sector Monitoring and Evaluation (M&E) system. Furthermore, the four Strategic Priorities of the Health System Strategy capture all of the dimensions of health system performance (MoH, 2007).

Thus, the current Strategic Priorities are as follows:

1. **Strategic Priority 1**: Increase the capacity to manage services and facilities in an efficient way
2. **Strategic Priority 2**: Increase access to effective health services;
3. **Strategic Priority 3**: Improve health system financing;
4. **Strategic Priority 4**: Improve health system governance.

A set of 137 health system performance outcome indicators are being used to assess the overall performance of the health system. Indicators are chosen to reflect progress in each of the activity areas identified in the logical framework linking activities to outputs, outcomes and impacts (MoH, 2007).
Production of the required key policies and strategies as per the objectives of the reform are as follows (MoH, 2004):

- Health System Strategy 2007-2013 (as part of National Strategy for Development and Integration)
- The Public Health and Health Promotion Strategy
- Reproductive Health Strategy
- National Strategy for Prevention and Control of HIV/AIDS in Albania
- Albanian Strategy for Safe Blood Transfusion
- The Policy and the Operational Plan for Mental Health Services Development in Albania (the 2011-2017 one being drafted)
- The National Strategy for Management of Congenital Blood Diseases
- Draft Strategy “For the reduction of harm caused by alcohol”
- Draft Strategy “For the Control of TB”

On the other hand, policy development is in compliance with the following key points:

- Social Cohesion Strategy
- National Strategy for Development and Integration
- Millennium Development Goals

Fundamental laws include the following:

- Health Care Law (approved in 2009)
- Health Financing Law (approved in 2011)
- Public Health Law (approved in 2009)

Other laws approved in the last 5 years:

- Law “For the prevention of disorders caused by iodine deficiency”
- Law “For the Dentistry Service in the Republic of Albania”
- Law “For HIV/AIDS”
3.2. Public Health

Public Health is the cornerstone of the Albanian Health Care system. The Law “On Public Health” (Albanian MoH, 2010) defines the functions and services of Public Health, their implementation, the role of the state in ensuring and funding them and sharing of responsibilities among the responsible institutions.

Public Health is organized based on the following principles:

- Collective responsibility for health
- Leading role of the state in protection and improving population’ health
- Actions extended on the whole population
- Impact of the action in an equal manner on all groups of the population
- Focusing on socio-economic determinants of health
- Focusing on the risk factors for populations based on evidence
- Multidisciplinary approach

The state takes measures to guarantee the following (basic) public health services (Albanian MoH, 2010):

- Health promotion
- Health education
- Disease prevention including immunization and screening
- Food safety including monitoring of drinking water
- Occupational health
- Environmental health including also urban waste
- Reproductive health including mother and child health and sexual health
- Mental health
- Public health information system
- Public health surveillance
- Public health laboratories
- Monitoring of public health services in the Primary Health Care
- Scientific research in public health
- Training in public health

The main responsible institutions for Public Health include the following (Albanian MoH, 2010):

- All the central institutions and institutions of local government which, while exercising their duties, have an impact on people’s health;
- Ministry of Health remains the institution responsible for determining, coordinating, and directing the policies of public health;
- Institute of Public Health supports the Ministry of Health and regional structures of public health to perform their duties including public health services;
- Primary health care institutions, private or public, offer services of public health under the supervision of regional structures of public health as determined in the primary health care package of services approved by the Albanian Council of Ministers;
- Furthermore, non-for-profit organizations and other organizations, employers, families, and citizens are held responsible for preserving and improving public health.
Specialized institutions in public health are as follows:

- Ministry of Health (Directorate of Public Health)
- Institute of Public Health (200 employees)
- Regional Public Health Structures (12 prefectures comprising 36 districts)
- Sanitary Inspectorate

The Institute of Public Health (IPH) is the national center of scientific research in public health, the reference centre of services in the field of public health, training center in public health, as well as an important information centre.

IPH runs the surveillance system of infectious diseases, immunization programs, monitors environment and risk factors, carries out health surveys, offers advice on public health policy, initiates and organizes health education and health promotion programs.

The laboratories of Measles and Rubella, Poliomyelitis, Influenza and Enterobacteria are accredited every year by WHO.

### 3.3. Health Care Financing

Në vitet e fundit (2007-2009), Shqipëria ka shpenzuar për kujdesin shëndetësor rrëth 5.4-5.7% të PBB-së (Tabela 10), që është nën mesatoren e Evropës Qendrore dhe Lindore, por është sa mesatarja e vendeve me të ardhura të ulëta në të mesme:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>in 000/ Leke</strong></td>
</tr>
<tr>
<td><strong>HF.1 Public Financing</strong></td>
</tr>
<tr>
<td>2007 25,441,700</td>
</tr>
<tr>
<td>2008 29,112,314</td>
</tr>
<tr>
<td>2009 32,414,293</td>
</tr>
<tr>
<td><strong>HF.2 Private Financing</strong></td>
</tr>
<tr>
<td>2007 25,940,352</td>
</tr>
<tr>
<td>2008 28,923,492</td>
</tr>
<tr>
<td>2009 30,647,333</td>
</tr>
<tr>
<td><strong>HF.3 Foreign Aid</strong></td>
</tr>
<tr>
<td>2007 622,926</td>
</tr>
<tr>
<td>2008 1,582,959</td>
</tr>
<tr>
<td>2009 2,104,734</td>
</tr>
<tr>
<td><strong>Total Expenditures for Health Care</strong></td>
</tr>
<tr>
<td>2007 52,004,977</td>
</tr>
<tr>
<td>2008 59,618,766</td>
</tr>
<tr>
<td>2009 65,166,360</td>
</tr>
<tr>
<td><strong>as % of GDP</strong></td>
</tr>
<tr>
<td><strong>HF.1 Public Financing</strong></td>
</tr>
<tr>
<td>2007 2.63</td>
</tr>
<tr>
<td>2008 2.68</td>
</tr>
<tr>
<td>2009 2.81</td>
</tr>
<tr>
<td><strong>HF.2 Private Financing</strong></td>
</tr>
<tr>
<td>2007 2.68</td>
</tr>
<tr>
<td>2008 2.66</td>
</tr>
<tr>
<td>2009 2.66</td>
</tr>
<tr>
<td><strong>HF.3 Foreign Aid</strong></td>
</tr>
<tr>
<td>2007 0.06</td>
</tr>
<tr>
<td>2008 0.15</td>
</tr>
<tr>
<td>2009 0.18</td>
</tr>
<tr>
<td><strong>Total Expenditures for Health Care</strong></td>
</tr>
<tr>
<td>2007 5.38</td>
</tr>
<tr>
<td>2008 5.48</td>
</tr>
<tr>
<td>2009 5.65</td>
</tr>
</tbody>
</table>
Table 11. Selected indicators on health care resources and health care expenditure

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Range</th>
<th>Average European Region</th>
<th>Albania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doktorë/1,000 banorë 2002-2006</td>
<td>0.3 – 5.0</td>
<td>3.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Nurses/1000 Population 2002-2006</td>
<td>2.9 – 19.5</td>
<td>7.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Pharmacists/1000 Population 2002-2006</td>
<td>&lt; 0.1 – 1.1</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Beds per 1000 Population 2002-2007</td>
<td>3.0 – 11.2</td>
<td>6.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Total expenditure on Health as % GDP 2009</td>
<td>3.9 – 11.4</td>
<td>8.6</td>
<td>5.65</td>
</tr>
<tr>
<td>Gov expenditure on health as % total health expenditure 2005</td>
<td>19.5 – 90.7</td>
<td>74.3</td>
<td>52</td>
</tr>
<tr>
<td>Per capita expenditure on health international $ PPP 2009</td>
<td>106 – 5.521</td>
<td>1.649</td>
<td>353</td>
</tr>
</tbody>
</table>


Public sector spending has become somewhat more skewed towards hospital spending over the past four years. Spending on recurrent costs for hospitals posted a real growth rate of 20 percent, whereas Primary Care and Public Health expenditure growth it is not considerable.

*Figure 8. Financial Protection: Financial Barriers to Access to Care and Catastrophic Health Expenditures (Source: INSTAT)*
Table 12. Health care expenditure in Albania in selected years

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For GOODS</td>
<td>10.747</td>
<td>10.941</td>
<td>18.938</td>
<td>10.622</td>
</tr>
<tr>
<td>1. For SERVICES</td>
<td>10.734</td>
<td>12.756</td>
<td>7.003</td>
<td>15.730</td>
</tr>
<tr>
<td>a) by type of service:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inpatient care</td>
<td>2.533</td>
<td>3.825</td>
<td>4.214</td>
<td>3.063</td>
</tr>
<tr>
<td>Outpatient care</td>
<td>8.201</td>
<td>8.930</td>
<td>2.188</td>
<td>12.667</td>
</tr>
<tr>
<td>physicians</td>
<td>3.659</td>
<td>4.156</td>
<td>741</td>
<td>7.839</td>
</tr>
<tr>
<td>dentists</td>
<td>2.176</td>
<td>2.697</td>
<td>838</td>
<td>2.125</td>
</tr>
<tr>
<td>labs/imageing</td>
<td>1.832</td>
<td>1.719</td>
<td>1.130</td>
<td>2.409</td>
</tr>
<tr>
<td>nurses</td>
<td>535</td>
<td>359</td>
<td>77</td>
<td>294</td>
</tr>
<tr>
<td>a) by mode of payment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal payments/charges</td>
<td>8.995</td>
<td>10.937</td>
<td>4.845</td>
<td>13.803</td>
</tr>
<tr>
<td>Informal payments/gifts</td>
<td>1.739</td>
<td>1.818</td>
<td>2.158</td>
<td>1.927</td>
</tr>
</tbody>
</table>

Challenges of the existing health financing system in Albania include the following (MoH, 2007):

- Sectoral funding remains fragmented;
- General revenues account for more than 90% of the public sector funding despite a mandatory contributory health insurance system;
- Effective coverage by HII is limited and only about one third of the active work force make contribution;
- Contributions incentives for the active labor force are overall weak, as the scheme provides limited benefits.
3.4. Primary Health Care

Basic principles of the Albanian primary health care system include the following (MoH, 2007; Nuri, 2002):

- Gatekeeper of the system;
- Built on the principles of Family Medicine;
- Offering Public Health Services through the approved Package of Services;
- Territorial and population coverage:
  - 420 Health Care Centers all over the country;
  - One family doctor per 2000 inhabitants in urban areas, and one per 1700 in rural areas.

Primary Health Care services in Albania are provided through 420 Health Centers, 1500 Health Posts, 1630 physicians and 6636 nurses.

The Decision of Council of Ministers, No. 857, date 20.12.2006, anticipated the establishment of health centers in the whole country as autonomous, legal entities with separate budgets, run by a director and responsible to a board. The process started nationwide thus not being affected by the limitations of pilot projects. Representatives from Ministry of Health (regional directories), Health Insurance Institute (regional directorate) and Local Government sit in the Board of the Health Center.

Health Centers are still funded based on the historical budget. Anyway, only 85% of the expenditures of the Health Centers is conditioned by the historical budget; 10% is conditioned by the productivity and 5% by the quality of care.

Health Insurance Institute (1995) is the only purchaser of health services in Albania. The portfolio of services purchased by Health Insurance Institute includes primary health care services (salaries and current expenditures), hospital care services (salaries and current expenditures) and a list of drugs.

Investments (buildings and equipment) are under Ministry of Health and Local Government.

The HII is funded by payroll tax contributions (3.4 percent of salaries or wages up to a maximum of three times the annual average personal taxable income), contributions of the self-employed and farmers (between 3 percent and 7 percent of the minimum wage, depending on the category), and budgetary contributions for the dependent population. The dependent population includes all children up to one year, pregnant women, war veterans, the disabled, the unemployed and recipients of social assistance, cancer patients, people under compulsory military service, and pensioners.
3.5. Hospital Care

In January 2009, hospital care started to be financed through the Health Insurance Institute. Investments (buildings and equipment) are still being financed directly by the state budget.

Secondary care

Health care in the hospital service in the Republic of Albania is covered by 46 public hospitals: 27 district hospitals, 11 Regional hospitals, 4 University Hospitals, 1 Traumatology University Centre, 2 psychiatric hospitals, 1 National Centre on Child development and rehabilitation (MoH, 2007).

A large number of small hospitals have low utilization and occupancy rates (Table 6). While low compared to European averages, Albania’s hospital capacity (2.9 beds per 1,000 population) compares favorably to that of many other low-middle income countries and is similar to that of Spain and Turkey.

However, the actual configuration of the hospital network points to inefficiencies. Over 60 percent of Albania’s hospitals are too small to exploit scale economies in the general acute care hospital setting. Thirty out of 46 hospitals have less than 200 beds and jointly account for only one quarter of all hospital admissions, while they continue to consume a considerable amount of scarce resources. Low admission and occupancy rates lead to high staff per occupied bed ratios in the smaller hospitals and raise serious concerns about fixed costs, ineffective utilization of limited resources, and quality assurance. Several hospitals exhibit an oversupply of identical departments that could be merged, thus allowing for substantial efficiency gains. The health care infrastructure (HCI) is excessive for its current use but the geographical situation, climate and transportation challenges in the more mountainous locations inhibits any rush decision on the HCI without making alternative health care arrangements for its regionally based population (MoH, 2007; Nuri, 2002).

Tertiary care

Tertiary care remains is located mainly in Tirana, including the following services:

- Tirana University Hospital “Mother Teresa” (TUH), the biggest hospital in the country (around 1600 beds), offers secondary and tertiary care;
- Two Tirana Obstetric and Gynecology Hospitals offers secondary and tertiary care;
- Lung Disease Hospital offers secondary and tertiary care and long-term treatment for TB patients; this hospital is being transformed into a general hospital offering secondary and tertiary care services;
- The Military Hospital (under the authority of the Ministry of Defense) that offers specialized care in traumatology and also accommodates the University Department of Orthopedics and Traumatology.
A department of Communicable Diseases with 100 beds including an Intensive Care Unit (4 beds for isolation and negative pressure) is at Tirana University Hospital and it is the reference hospital centre for communicable diseases. Every regional hospital (12) has a department of communicable diseases with 10-20 beds according to the population density. There are 120 consultants on communicable diseases all over the country in 36 districts.

The national service of blood transfusion is being reconfigured aiming at its centralisation as follows: 1 National Centre of Blood Transfusion, 4 Regional centres of blood banks, 15 collection and delivery blood banks, 11 blood banks for the hospital services.

3.6. Health Information Systems

The system of health data and statistics gathering, processing, and reporting in the Republic of Albania is based on the following legal basis:


The management of health data is one of the functions of the Ministry of Health. The Directorate of Health Information Technology at the Ministry of Health, gathers data from health institutions in accordance with the National Health Statistics Program based on Law No. 9180, on 05.04.2004 “Official Statistics”. This program is composed of some statistical health reviews which are drafted and processed with software designed for these data.

The statistical reviews include the following information:

- The activity of institutions with beds
- Hospital diseases’ rates
- Hospital death rates
- Obstetrics activity
- The activity of specialized policlinics
- Emergency service activity
- Activity of family planning centers
- Dental service activity
- Infectious diseases
- Inoculation
- Activity of bacteriology laboratory
- Activity of hygiene laboratory
- Syndrome and etiology report (infectious diseases)
- Activity of clinical bio-chemistry laboratory
- Activity of chronic disease dispensaries
- Activity of blood collection centers
First, the health care centres send their reports to the Regional Public Health Directorate, which after a preliminary processing send it to the Directorate of Health Information Technology (DHIT) at the Ministry of Health. Some health institutions such as the Tirana University Hospital Center and other university hospitals send their reports directly to DHIT. The DHIT exhaustively processes the entire information gathered through software created for processing such data and prepares summary reports. The Ministry of Health sends the information to INSTAT, IPH and other interested institutions with which it has cooperation agreements (MoH, 2007).

The Institute of Public Health (IPH) is a central institution under the Ministry of Health. IPH operates through Regional Public Health Directorates (RPHD). IPH gathers information on infectious diseases (surveillance of infectious diseases) based on diagnosis and syndromes and also gathers vaccination data. IPH undertakes epidemiological studies, gathers and analyses information on healthy behavior and determining risk factors (HIV/AIDS, STDs, psycho active substances, tobacco, and alcohol), healthy environment and healthy nutrition. IPH drafts annual reports, and reports to WHO on the required indicators (MoH, 2007).

The National Statistics Institute (INSTAT) based on health statistics processes information on health services and causes of death. Sources for health service data are administrative and health data from the Ministry of Health, while for causes of death, sources are death certificates. Health statistics produced by INSTAT can also be supplemented by different studies that may be undertaken by this institution. INSTAT has its own offices at the regional level. INSTAT measures health indicators routinely, which may be found on the institution's web page or in the annual INSTAT report, which is drafted regularly.

The Institute of Health Care Insurance (IHCI) functions through twelve regional directorates and the Tropoja and Saranda Directorates. Regional Directorates gather data from the primary care providers, pharmacies (information on patients using the health insurance scheme, data on physicians, on diagnoses using the ICD-9 system for disease classification, reimbursable prescriptions, drug list). They gather statistics on drugs from drug depots and importers and medical data from the Durres Regional Hospital. The information is usually produced and kept in hard copy, with the exception of pharmacies and drug depots/importer reports, which are registered in an electronic system at the regional level and are again electronically transferred to the IHCI. The IHCI offers information to the Ministry of Health and INSTAT upon request. Currently the IHCI is in the process of modernizing its health information system.

The Social Security Institute (SSI) keeps statistics on the dynamics of invalidity from diseases (ICD-9), invalidity class and other variables. The annual statistical information is sent to the Ministry of Health, State Social Service, Ministry of Labor, Social Affairs and Equal Opportunities, and other interested parties. The SSI gathers social security taxes from the self employed (farmers) and transfers this information to the IHCI monthly.

The State Social Service (SSS) manages the fund for the unemployed, individuals with limited abilities and also manages funds for social care institutions (orphanages, homes for seniors, and development centers). The SSS has its own offices at the regional level and reports to the Ministry of Labor, Social Affairs and Equal Opportunities and INSTAT pursuant an agreement between them.
The National Center for Quality Security and Accreditation of Health Institutions (NC-QSAHI) supports the Ministry of Health in the implementation of strategies regarding the quality of health care. Support comes in the following: training and education of health care professionals and other partners in order to ensure quality health services; drafting, distributing, and monitoring clinical guides on the best practice; the accreditation of public and private health institutions; empowering patient rights; medicine based on evidence and the best clinical practice (MoH, 2007).

Figure 9. Albanian HIS organizational structure
4. Extreme Weather Events and Health

Extreme weather events have direct health effects on humans and indirect costs for the economy. Extreme weather events include droughts, floods and associated landslides, storms, cyclones and tornadoes, ocean and coastal surges, heat waves and cold snaps. A warmer world should in theory be wetter as well, since the rate of evaporation is increased and the atmosphere will contain more moisture for precipitation. Changes in precipitation however, will not be the same all over the world. Wet areas are likely to become wetter, with more frequent episodes of flooding, whilst dry areas may become drier, with longer periods of drought leading to an increased threat of desertification. In general, as more heat and moisture is put into the atmosphere, the likelihood of storms, hurricanes and tornadoes will increase.

Extreme heat, drought, and wide-scale fires, storms, and flooding, as well as other manifestations of climate change, will alter the incidence and severity of allergies, atopic dermatitis, and asthma.

Albania is more prone to floods and associated landslides, storms, heat waves and cold snaps.

4.1. Heat Waves

The impact of heat on health has been thoroughly investigated in the literature. Excess heat represents a serious threat for the entire population, but specific groups are more susceptible because of an impaired physiological or behavioural response. These groups include the elderly and potentially all individuals that have a reduced capability to care for themselves, such as the handicapped and small children, those with pre-existing cardiovascular, respiratory and renal diseases, diabetes, neurological disorders and psychiatric illness. In addition, heat can have a different impact from locality to locality dependent on environmental, socioeconomic, and behavioural patterns.

The most appropriate methodology for identifying the association between temperature and mortality and to provide an estimate of the impact of high temperatures on mortality in a specific location is time series analysis. The effect estimates provide insights into the degree of vulnerability of local populations. However, such analyses are complex.

The relationship between high temperature and mortality is typically J shaped, with mortality rates rising progressively as temperatures increase. Studies suggest that there is a “harvesting effect” in which an excess in mortality associated with high temperatures may be partially compensated by reduce rates in the following (cooler) period.

As well as the demographic and socioeconomic factors, cities and urban areas tend to be hotter than rural areas. This is a result of the heat reflection from hard surfaces and the heat from buildings and vehicles (the so-called ‘heat island’ effect).

As the maximum effect on mortality has been noted to be one or two days after start of the period of high temperature, such as a heat wave, there is a need to have an early warning system based on reliable meteorological forecasting, and have in place an Action Plan.
The data below are taken in the Emergency unit of the Internal Diseases Clinic in “Mother Teresa” Hospital in Tirana:

Figures 10.1-10.2. Pulmonary diseases and cases of arrhythmia for July 2010

Figures 10.3-10.4. Cases of heart failure and coronary artery disease for July 2010

Figures 10.5-10.6. Cases of high blood pressure and lypotheimia for July 2010
Here could be a correlation between the number of cases showing up in the emergency unit and the highest daily temperatures.

Figures 10.7-10.8. Total cases in July 2010 and pulmonary disease cases in August 2010

Figures 10.9-10.10. Cases of arythmia and heart failure for August 2010

Figures 10.11-10.12. Cases of coronary artery disease and HBP for August 2010
Figures 10.13-10.14. Cases of lypothimia and overall number of cases in August 2010

Table 13. Percentage of visits by temperature levels for selected years

<table>
<thead>
<tr>
<th>Year</th>
<th>Temp °C</th>
<th>Percentage of visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>39.2</td>
<td>53.8</td>
</tr>
<tr>
<td>2008</td>
<td>38.2</td>
<td>55.13</td>
</tr>
<tr>
<td>2009</td>
<td>37.0</td>
<td>71.53</td>
</tr>
<tr>
<td>2010</td>
<td>36.2</td>
<td>65.2</td>
</tr>
</tbody>
</table>

Figures 10.15-10.16. Cases of arythmia and heart failure for August 2010
Table 14. Diagnosis by year

<table>
<thead>
<tr>
<th>Year</th>
<th>Pulmonary</th>
<th>Arrhythmia</th>
<th>CHD</th>
<th>Heart failure</th>
<th>HBP</th>
<th>Lypoithmia</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>213</td>
<td>627</td>
<td>528</td>
<td>147</td>
<td>1,137</td>
<td>563</td>
</tr>
<tr>
<td>2008</td>
<td>237</td>
<td>605</td>
<td>581</td>
<td>127</td>
<td>1,202</td>
<td>579</td>
</tr>
<tr>
<td>2009</td>
<td>306</td>
<td>913</td>
<td>747</td>
<td>191</td>
<td>1,516</td>
<td>732</td>
</tr>
<tr>
<td>2010</td>
<td>245</td>
<td>852</td>
<td>556</td>
<td>194</td>
<td>1,238</td>
<td>630</td>
</tr>
</tbody>
</table>

In the future, detailed studies of the above indicators are needed, by taking into consideration not only the highest, but also the lowest temperatures as well as the humidity.

The number of cases with selected diseases and conditions should be seen in relation to the total number of cases showing up during that period and should be compared with other periods of the year.

Data on mortality for these periods would be very useful. The study should be extended to other areas (Korce, Kukes, Berat, Durres, Gjirokastra, Shkodra, etc.).

4.2. Droughts and Fires

The droughts usually occur in the summer period and often bring to electricity (energy) crisis in the country, as about 90% of Albanian power production is provided by hydropower stations. The electricity blackouts further cause shortage of running water in the town regions as the water supply is usually carried out in electricity pumps. Yet, Albania makes best possible to over come these problems, such as to modernize its power grid, to look for alternative sources of electricity and to upgrade the water supply networks in the country. The summer draughts also bring wild fires in Albania, mainly in the forests of Lura, Munella, Martanesh, in the region of Llogara, the hills of Renc, etc.

During these past two decades the number of forest fires in Albania has increased, and so have the affected areas. The danger map from forest fires for Albania has been based on the district level. It is based on the frequency of these fires, the areas affected by them and other parameters of importance which are gleaned from the statistical data on forest fires. Devoll has the greatest danger from forest fires, while the western lowland and the Shkumbin river valley have the lowest one.

Protection of the forest is a responsibility of the Forest Service, but in the case when a considerable part of these forests are under the jurisdiction of the local authorities, their role becomes ever more important. Up till the 90’s Albania had great success in mobilizing the population through the voluntary work mobilization method, which helped to fight against forest fires. And though these measures used to be rather obligatory they have helped to reduce the number of fires. However, the attitude of the population toward the public property has changed dramatically under the market economy conditions to where it is impossible now to mobilize the people again to take part in the fight against forest fires.
Albanian forests are prone to forest fires, especially during the end of spring and the hot and dry summer months. The major causes of forest fires in Albania are of the anthropogenic character (human carelessness, bushfires set by shepherds, etc., and to a smaller degree, intentional or criminal fires) and natural causes (lightning). Majority of damages effect conifer forests. The misuse of fires by people (accompanied by deforestation, as well as negligence of the prevention measures during past years) and practices for clearing pastures make up the greatest causes for damages to the forests. Meanwhile, uncontrolled grazing and uncontrolled fires, caused both accidentally and intentionally for agricultural reasons, continue to occur in our country.

In forest areas prone to danger from fires there is an observation and signaling network which is used by the Forest Service force during the fire season. Meanwhile the fire fighting infrastructure and equipment is insufficient. In order to create the necessary capacities for the management of forest fires there is need for efficient structures, updated mechanical and technical equipment to fight the fires on land and with aerial support. Based on the recent experiences in our country as well as the international ones, the combination of the fight against fires from the land and the air brings about much more efficient results which reduce costs and loses. We have to understand that based on the economic potential of our country currently it is not possible to select the option to fight fires from the air alone. The most effective means are to fight these fires since their inception, through containment so they do not expand or get out of control and in necessary cases to fight them from the air in conjunction with land means.

4.2.1. Forest Fires During the Summer of 2007

Since 1992 there has been an increase in the danger from forest fires. The summer of 2007 saw a climax. In the period July-September of 2007 there were about 1321 recorded cases of forest fires of which 520 were deemed problematic (about 486 in forests and meadows or 37% of total fires), 640 fires were relatively small and 195 fires affected buildings, livestock feed, production factories and other small objects. During the same period about 24 buildings were burned down in the whole country. Meanwhile the territory damaged by these fires was estimated at 4,150 hectares.
Some of the factors stimulating the creation of this situation by forest fires during 2007, included:

- The unfavorable combination of climatic conditions (high summer temperatures) and the presence of dry vegetation, which favored a great number of fires.

- Very high temperatures reaching up to 43 Celsius (unusual for our country) which continued for a long period.

- The situation created by these summer fires was an unusual phenomenon which had not happened in 60 years.

- Climate conditions coupled with careless human activity, caused fires in forests, meadows and orchards, which in many cases endangered inhabited areas even putting human lives in danger.

The situation was especially difficult in the districts of: Shkodra, Kukes, Dibra, Korca, Lezha, Gjirokastra, Vlora where there were a considerable number of forest fires, effecting at times even areas marked as national parks.

Due to the rapid increase in the number of fires, which became massive and affected entire geographical regions of the country, which was unusual compared to previous years, the situation became very difficult almost uncontrollable for the responsible firefighting structures (firefighters and forest service).

4.2.2. The Situation Created by Forest Fires in the summer of 2008

The summer of 2008 presented an improved situation based both on improved climate conditions but also on the preparatory measures undertaken by the respective structures so as to reduce the number of damages from fires compared to those in 2007. Nevertheless, high temperatures and the prolonged rainless season made it so that there were a considerable number of forest fires causing damages mainly to orchards and vineyards.

It’s important to mention that during this summer there were a smaller number of fires in high forest and especially in protected areas and parks, compared to the previous year. During 1 July-31 August 2008 period there were an estimated 1050 cases of fires, of which 95 were considered problematic.

4.2.3. The Situation of Fires in the summer of 2009

The summer of that year started with humidity which is unusual for that season. As regards the creation of the conditions for forest fires during that summer it should be said that the humidity and the existence of vegetation as a result, influenced the lowering of the cases of fires in forests and meadows. Nevertheless, even during that summer there were several cases of major fires such as those in the commune of Livadhja in the district of Saranda, in the commune of Orosh in Mirdita, etc.
4.3. Floods and Coastal Erosion

Flooding is probably the most common type of extreme climatic event both worldwide and in the WHO European area. Among the climate-related natural disasters (storms, floods, droughts, extreme temperatures, wildfires, wet landslides), flooding represent 43.4% of the total of these events recorded in the EM-DAT database in the WHO European countries during the last 16 years (1993-2008).

The EU Flood Directive (2007/60/EC) is now in force and applies to all kinds of floods (river, lakes, flash floods, urban floods, coastal floods, including storm surges and tsunamis), in all of the EU territory. It is concerned with all aspects of flood disasters, including economic and environmental effects as well as the effect on people.

Flooding and droughts are frequent problems for Albania. Similar to most of the Mediterranean countries, Albania is at a high risk of flooding.

The flooding is usually resulting from snow melting and torrential rains in the spring and autumn periods, which cause sudden changes in river slopes. Another factor for frequent flooding in Albania is that over 50% of the population lives in plains with an altitude of below 100 m above see level. Therefore the flooding usually causes devastation of spring and autumn agricultural crops (sown fields) and damages on family houses mainly in village areas. The lowlands along the Adriatic Sea coast and the inner mountainous plains are the areas with highest risk of flooding in Albania. Although the flooding in Albania is considered a natural phenomenon, the intensity and the frequency of flooding have been increased due to the reckless deforestation in the country.

The main points related to floods in Albania can be summarized as follows:

• Floods in Albania are caused by heavy rainfall alone but are compounded by other factors like unlicensed construction over drainage collectors used to draw excess waters.

• Many drainage collectors have insufficient capacity to draw the entire amount of water dumped by heavy rains and therefore allow a portion of that water to flow on streets.

• Rivers have experienced changes to the layout of their channels and the flow of the water in those channels, which may have caused loss of agricultural land.

• It is evident that maintenance of the protective works along rivers is not being carried out at a sufficient level.

• Human intervention around dams, dikes, and levees is a major influence, especially by individuals and companies that use resources from riverbeds for new construction.

• Lack of a continuous supply of electrical power interrupts the work of pumping stations.

Computer predictions say that we can expect to see more extreme weather events such as flooding in the future.
Flooding can turn even the most harmless looking watercourse into a raging torrent of large-scale destruction - buildings may prove no obstacle to its power; food crops may be ruined leading to food shortages and even starvation; peoples lives may be lost through drowning disease and homelessness.

In the last 150 years there have been 6 major flooding in Albania, the biggest one in 1962.

Due to its morphological characteristics Albania is very rich in rivers and has a coastline of about 400 km. More than 152 rivers and streams join ultimately to form 8 major rivers flowing southeast to northwest, mainly towards the Adriatic coast. Around 65% of their catchment basins lie inside Albanian territory. These rivers pour water into the Adriatic Sea at an average rate of 1308 m³/s (min. 649 m³/s, and max. 2164 m³/s); the mean rate of runoff is 30.2 l/s/km². Of the total annual flow of 42.25 billion m³, only 12.8 billion m³ is underground flow.

Average annual rainfall on Albania is 1430 mm/year, which is not uniformly distributed throughout the year: around 40% falls in the winter, 32% in the spring, 17% in the fall, and 11% in the summer. Due to the irregular rainfall, the rivers are fast-flowing and erosive (in the eastern part of the country), and they generally form wide sinuous stream beds. Mineral content of the water is generally low, between 150 and 500 mg/l, mostly bicarbonates. Water temperature fluctuates in the range 3.5–8.9°C in the winter and 17.8–24.6°C in the summer. All the rivers flow into the Adriatic Sea, in an area about 150 km long.

Though earthquakes are considered as the gravest disasters affecting our country, in the past years the frequency of flooding has caused considerable damage especially to property, infrastructure and the environment.

*Estimation of the potential dangers from flooding*

The eight major rivers of Albania, grouped into six major water collecting dams traverse the country from east to west. Flooding is caused mainly from rivers and occurs during the September-March period, which is when the country receives about 80-85% of its annual rainfall. The consequences, which in the past could be minimized to a certain level through investments made to prevent flooding, today are stimulated easily due to the degradation of the conditions of the barrier systems, drainage channels, unplanned constructions over objects or danger zones, the conditions of the pumping stations and other equipment used for the management of flooding.
4.3.1. Flooding of the Western Costal Lowlands

Albania has a long recorded history of flooding in the western lowlands. The November 1962 – January 1963 flooding is remembered as the biggest historically.

The latest flooding has occurred in September 2002, October 2003 and February-March 2004. They were caused by the Drin, Gjader, Erzen, Osum rivers and some smaller ones such as: the Manatise creek (in the Lezha region), Zeze creek (in Fushe-Kruje), Drinosi, Gjanica, etc.

The waters mainly flooded the Lezha, Shkodra and other rural areas and lands along the aforementioned river banks.

The map above represents the potential flooding that could repeat itself every one hundred years. According to the summary in the Study Evaluation on the Dangers in Albania, the flooding with a repetitive cycle of about every one hundred years could affect 20 districts, 110 communes, 341 villages, 85,500 buildings and 7,900, m² of constructed areas with 565,000 inhabitants.

4.3.2. Flooding Dangers from Small Rivers and Creeks

The flooding caused by small rivers and creeks often affects the valleys of Northern, Central and Southern Albania damaging the roads network and agricultural lands. There are 19 different small rivers and creeks which represent a continuous danger of flooding. Their major characteristic is the fact that they are fast and often “unreliable”, bringing large volumes of alluvium that can cause unforeseen damages to infrastructure, buildings and farming.

4.3.3. Dams and Dangers

Albania started erecting dams back in the 1950s. The first dams were built for agricultural purposes. Today there are 630 reservoir systems with dams, of which, 307 are considered as high dams (height ≥15 m), or reservoir systems with big dams.

The designing and construction of dams is based on a thorough analysis of all the factors relating to it and that can affect the security of the dam itself as well as the reservoir’s system. In order to ensure the security levels during its existence, a great importance is placed on maintenance of its systems during use. Regular and effective maintenance, including rehabilitation at the proper time, are essential aspects of the dams built with rock and dirt. Operational security becomes a problem with their ageing. This increases the need for attention with regard to inspections, evaluations, modifications and general improvement of older dams so that they can keep up with the current standards and technological regulations.

The great migration of the last five years has brought about the creation of new inhabited centers, some even located under existing dams. A major number of dams have been constructed in the districts of Tirana and Durrës which have been greatly exposed to the migration processes. Infrastructural constructions such as water-supply systems, sewage pipes and other digging works, as well as other human activities have a grave affect on the general sustainability and security of the dams.
Basic Characteristics:

- Sudden floodings occur rapidly and can bring about damages with everything occurring in a few hours.

- Human victims and sudden flooding damages often occur due to the speed of the rushing water, the solid residue and destruction of prevention measures, rather than the depth of the accumulated water caused by the flooding.

- Nevertheless, if the water accumulated from the flooding covers a wider area, then its initial effect may be small, but growing depth could have a greater effect on the people living in the affected area or their property, and would require a longer period to recuperate.

- Even with successful evacuation plans, flooding waters remaining for long periods of time cause people to stay away longer from their homes (based on the assistance received) and cause damages on their livestock and sowings, as well as considerable damages to the infrastructure.

- In the case of reservoir dams, it may be necessary to take the decision to open the floodgates which may cause local flooding, which is much easier than the catastrophic destruction of the reservoir itself. In such cases the careful monitoring, analysis and timely implementation of measures are very important.

- Continuous flooding brings about economic damages to the inhabitants. Several such zones may become unsuitable for permanent constructions.

For Albania the system of rivers represents the greatest danger from flooding, where such flooding is of pluvial origin.

Flooding in the winter of 1962-1963

Of all the flooding that has occurred till now from the rivers of Albania, the largest ones are those that happened during the 1962-1963 years based on the flooded area, length and damages caused. This flooding affected not only Albania but the whole Mediterranean Basin including parts of Western Europe. They were most intense in the southwestern and eastern parts of the Balkan Peninsula and in Italy.

On 16 November 1962 the rivers of Ishëm, Shkumbin, Seman and Vjosa had elevated levels of water. The lowlands of Thumanë, Myzeqe, Kavaja, etc., were flooded. The waters of the Shkumbin River joined with those of the Seman River thus flooding the fields of Tërbuf. On the 13th of January of the following year, the water levels of the rivers of Ishëm, Shkumbin, Seman, Vjosa and their branches were higher than those in November. The rivers broke their banks and flooded the fields of Thumanë, Myzeqe, Kavaja, etc. The flooding of this period were almost of the same nature as those in November, but expanded to a wider area of the country. Majority of the fields of Shkodra and Zadrina were flooded by the rivers Drin and Buna. The waters of the Mat and Drin rivers flooded the fields of Lezha. The waters of Ishëm flooded again the fields of Thumanë, while the waters of Shkumbin joined with those of Seman thus flooding the surrounding fields.
According to a rough estimate of damages, 70,000 hectares of agricultural land was flooded also causing economic damages and considerable loses of livestock. The cities of Shkodra, Berat, Lezha, etc., were the ones most affected, while the road network was greatly damaged as well. There were no human casualties.

During the rainfalls there were major land erosions and slides. The intensity of sediments carried by the rivers was high. As a result of the speed of the rain, wind storms, etc., considerable amounts of water entered in the costal lagoons bringing about changes to the salt, oxygen and sediment levels. Elevated levels of water were also noted in the lakes of Ohrid, Prespa and that of Shkodra. The tables of subterranean water in the western lowlands grew and in some places reached the water levels, especially in Myzeqe of Lushnja, in Thumanë, Maliq, etc.

Almost the same damages and effects, may be even higher than the flooding of the winter of 1962-1963, were noticed during the flooding of the 31 December 1971 – 1 January 1972.

4.3.4. Flooding of September 2002

In the period between 21 September and mid October of 2002, heavy showers, with an intensity reaching up to 240 mm in 24 hours (which lasted for about two months), caused floorings in 11 prefectures. Major damages were caused to private homes, businesses, roads, bridges, pumping stations, dams, electricity stations, power converters, schools, hospitals and important parts of the infrastructure. Over 33,035 hectares of land was flooded causing major loses in the agricultural sector. General damages were estimated at about 17.5 million U.S. dollars, based on government estimations of damages on September 25th. The areas worst affected were those in Lezha and Shkodra in the northeast and those of Gjirokastra and Berat in the southwest. All these districts had at least temporary interruptions of the water supply and energy. There was an immediate concern about the safety of the drinkable water in several prefectures. Many villages around the country became isolated. Many families living in rural areas lost their livestock including their feed. Records speak about 16,671 families seriously affected. At least 9,727 people were immediately evacuated from their homes and 45 were saved from danger. 3,910 of them found temporary shelter (mainly near their kin), while 2,900 of them were from Lezha alone. The total number of those affected is estimated at 66,884 which include even those whose houses were mildly damaged. There was no record of any causalities or lost persons.

Based on the analysis of the data collected in the hydrometric stations during the flooding of September 2002, it was noticed that besides the rivers of Erzen, Osum and several smaller ones such as Drinosi, Gjanica, Gjadri, the Manatis creek of Lezha, Zezas in Fushë-Kruja, etc., the levels of the rivers of Buna, Drin, Mat, Shkumbin, Seman and Vjosa were lower than the levels recorded during the flooding of 1962-1963.

By comparing the flooding of 1962 with that of 2002 (40 years later), it is clear that the latest flooding was at a lower level than that of 1962, but caused almost the same level of damages. It is obvious that this is the case where the country was less threatened by the flooding of 2002 compared to that of 1962.
4.3.5. Flooding of December 2009-February 2010

The December 2009 – February 2010 period has been characterized by unusual climatic conditions, with heavy showers and snow which have been considered above average levels for the period. As a result there was an increase in the levels of the rivers Drin and Buna, as well as that of the Shkodra Lake. In the same way the lake levels of hydropower-plants on the Drin cascade grew above expected levels. Under such conditions the opening of the dam gates from the Drin cascade was unavoidable so as to maintain the technical parameters.

Upon analysis, several of the primary causes that brought about this situation were as follows:

- The high level of showers and snow which are considered above the average levels for the period and that even include the territories of the neighboring countries through which the river Drin flows;
- The immediate increase in temperatures resulting in the quick melting of the first snow;
- The tide and the increase in sea levels for a considerable period of time.

The combination of the above mentioned factors with other ones considered as secondary, such as the damage of flood prevention measures, blocking of drainage channels of all levels, illegal constructions in high-danger flood areas, uncontrolled cutting of trees, uncontrolled exploitation of the basins of rivers, etc., brought about a difficult situations mainly in the sub-Shkodra area thus threatening and causing damages to the public and private property, as well as putting in danger the lives of the area inhabitants.

As a result of this situation many houses, businesses, arable land, food sources and livestock were damaged considerably.

From the ground evaluations in the districts of Shkodra and Lezha it is estimated that about 4361 families faced damages amounting to 504,716,791 Albanian Leke. Meanwhile, in the district of Shkodra about 4,152 subjects affected with damages amounting to a total of 490,514,721 Leke. While, in the district of Lezha about 209 subjects were assessed amounting to a total of 14,202,070 Leke.

Figure 13. Recent floods in Shkodra district
4.4. Adaptation: Disaster Preparedness and Response

Key Messages

• Climate change is expected to trigger, compound and increase disasters and exacerbate existing vulnerabilities.

• The humanitarian consequences of climate change will present humanitarian actors with a far-reaching, multi-sectoral challenge, especially since they affect people in low-income countries disproportionately.

• Poor and marginalized people and communities that have little access to adaptation schemes will fall back on emergency humanitarian assistance, as they face an increased frequency and intensity of weather-related hazards.

• While it is impossible to prevent natural events from occurring, the vulnerability of those living in disaster prone areas should be reduced. Disaster Risk Management should integrate to the greatest possible extent the risks induced by climate change.

Emergency responders will face disasters of larger scale, more frequent and intense and it will have major implications in terms of capacity, approaches, logistics and financing. This results in greater demands on their capacities for more and larger operations.

The Government of Albania joined the United Nations Framework Convention on Climate Change (UNFCCC) on January 1995 and has a status of non-Annex I country. As such, Albania has accepted the commitment to produce national communications to the Conference of the Parties (COP) of the UNFCCC. The national focal point for UNFCCC and CDM is the Climate Change Unit in the Ministry of Environment of Albania.

Albania ratified Kyoto Protocol on the 16th of December 2004 therefore accepting in this way the importance of the problem of climate changes and the need to take effective measures to lower the causes of these changes.

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4 The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from 3 to 14 June 1992.

5 Non-Annex I Parties are mostly developing countries. Certain groups of developing countries are recognized by the Convention as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. Others (such as countries that rely heavily on income from fossil fuel production and commerce) feel more vulnerable to the potential economic impacts of climate change response measures. The Convention emphasizes activities that promise to answer the special needs and concerns of these vulnerable countries, such as investment, insurance and technology transfer.

The 49 Parties classified as least developed countries (LDCs) by the United Nations are given special consideration under the Convention on account of their limited capacity to respond to climate change and adapt to its adverse effects. Parties are urged to take full account of the special situation of LDCs when considering funding and technology-transfer activities.

6 The Conference of the Parties is the governing body of the Convention, and advances implementation of the Convention through the decisions it takes at its periodic meetings.
The Government of Albania has taken considerable steps toward the implementation of the UNFCCC, such as:

- The preparation of the First and Second National Communication;
- A Technology Needs Assessment (TNA);
- The National Action Plan (NAP) to address climate change.

The approval of the Constitution of Republic of Albania in 1998 represents the most important legislative step in the realization of the environmental legal framework. The specific articles of the Constitution, sanction the goal of the government for “…healthy environment and proper ecology for today’s and future generations…” for “…rational use of forests, waters, pastures and other natural resources on the basis of sustainable development principle…” as well as the right of everyone “…to be informed about environment and its protection…”.

During the last decade, Albania has developed an environmental legal framework, including climate change aspects, for the treatment of environmental problems. This legal framework is being increasingly amended. Since 2008, Albania has in place the Designated National Authorities (DNA)\(^7\), as well as rules and procedures to review and approve Clean Development Mechanism (CDM)\(^8\) projects, thus benefiting from the flexible mechanisms of Kyoto Protocol.

Except for the laws on ratification of the UNFCCC and the Kyoto Protocol from the Albania’s parliament there are no laws that address explicitly the issue of climate change. Because the energy sector emits a significant share of Green House Gases emissions, the sector has been the focus of analysis and recommendations for climate change mitigation. In addition, the most relevant laws that relate to climate change are adopted under the energy sector. A legislative framework on energy in Albania comprises a relatively large number of different pieces of legislation at present.

The main political documents that address climate change issues are:

- Intersectorial Environmental Strategy 2007-2013
- First National Communication for UNFCCC
- Second National Communication for UNFCCC
- Policy document of Carbon Financing in Albania, 2009
- Plan of action for the implementation of the Policy Document for Carbon Financing in Albania

According to the Inter-sectorial Environment Strategy, the main focus for climate change is to improve energy efficiency in all sectors in order to reduce the demand for power and the level of emissions. The strategy also requires a joint programme of public awareness and enforcement of relevant standards – such as for the insulation of buildings.

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\(^7\) A designated national authority (DNA) is the body granted responsibility by a Party to authorise and approve participation in CDM projects. Establishment of a DNA is one of the requirements for participation by a Party in the CDM. The main task of the DNA is to assess potential CDM projects to determine whether they will assist the host country in achieving its sustainable development goals and to provide a letter of approval to project participants in CDM projects. This letter of approval must confirm that the project activity contributes to sustainable development in the country. It is then submitted to CDM Executive Board to support the registration of the project.

\(^8\) The Clean Development Mechanism (CDM), defined in Article 12 of the Protocol, allows a country with an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries.
The strongest instrument for reducing the amount of gases emitted is the integration of the GHG emissions reduction target in the decision-making process at a variety of levels (MoH, 2007):

- **Government** – in particular strategies for energy, the economy and transportation should include steps to limit the GHG emissions;
- **Industry and trade** – should be encouraged to be efficient from the standpoint of energy consumption and technology used in order to reduce the level of emissions;
- **Individuals** – must be convinced to see energy efficiency as a criterion in their actions and purchases.

These measures need to be accompanied by changes in the legal framework and the introduction of economic instruments to promote the reduction of GHG emissions and the use of renewable energy sources.

A more detailed analysis of the current legislation is given below:

- **Law on the adherence of the Republic of Albania in the protocol ‘for the control of pollutions from nitrogen oxides or their cross-border influx,’ the convention of year 1979 “for cross-border air pollution in long distances.”** 2009
- **Law “For the adherence of the Republic of Albania in the protocol ‘for the reduction of sulfur pollutions or their cross-border influx, at least in the mass of 30 percent’ of the convention of year 1979 “For cross-border air pollution in long distances.”** 2009
- **Law on Energy Efficiency and Renewable Energy Sources (2005).** This is the most important law for climate change in general and GHG mitigation in particular. It focuses on promoting energy efficiency and energy conservation, creation of an energy efficiency fund, energy efficiency labelling, and promoting energy audits schemes. The purpose of this law is to create the legal framework required for the promotion and improvement of the efficient use of energy throughout the energy cycle. This law establishes the economical use of energy sources, the establishment of more reliable energy supply conditions, as well as the minimization of impact on the environment
- **Law for the adherence of the Republic of Albania in the international convention “For the creation of national fund of damage compensation from fuel pollution,”** (2004)
- **Law on Power Sector (2003).** It assures the conditions of electricity supply to consumers, efficient functioning of the electricity market and adjusts the power sector to market economy condition. The overall aim of the Law on Power Sector is to enhance the economic effectiveness and the quality of services for power generation, transmission and distribution and provide a transparent and comprehensive legal framework for the mentioned activities.
- **Law on Energy Conservation in Buildings (2002).** This law declares that the design and construction of buildings should meet the necessary technical parameters for conservation, saving and efficient use of energy. All buildings to be constructed so as to limit thermal losses, and provides thermal insulation of building sand central or district heating schemes.
- **Law “For the protection of air from pollution.”** 2002

• Governmental Decree for Strategy of Energy (No. 424 of June 2003). This governmental decree approves the National Strategy of Energy until 2015. According to the decree, the Ministry of the Industry and Energy and the NAE are appointed to update this strategy every two years.

• Law on Electrical Police (No. 8637 of July 2000). Based on this law, a specialized executive body for controlling the enforcement of legislation and use of electricity—the Electrical Police—was established. The purpose of such a structure is to monitor and punish abuses in the power sector, particularly with electricity consumption.

• Law on Regulation of Power Sector 1995). This law prescribes the establishment of an Energy Regulatory Body (ERE) in the power sector and defines its duties. According to this law, ERE is responsible for tariff regulation and licensing in the power sector.

• Law on Electricity (1995). This law specifies the conditions for activities in the power sector and the rights and duties of all physical and legal persons involved in one of these activities. It also regulates the relationship between consumers and suppliers in terms of their basic duties and obligations. The law provides for operational and technical management of the power network as well as for connections to the grid and measurements of electricity.

Below is described briefly the DPR situation by health system’s functions in Albania:

• **Stewardship:** institutional framework is not established and sustainable (crises management committee, units, experts), particularly at sub-national levels (regions, districts) and individual health facilities. Health sector crisis management policy and legislation has significant gaps related to capacity building, resources, risk reduction, preparedness planning, partnership, public information, vulnerable groups and safety of health facility (Structural, non-structural, functional). Health information system has shortcomings related to early warning system, risk needs assessment and reporting procedures. Health sector risk reduction and crisis management programme (hazard analysis, vulnerability, crises preparedness plans, stakeholders’ partnerships, crises health education, monitoring and evaluation) are in a initial stage as separate activities.

• **Resource Generation:** the human resources capacities for crisis management and the programs for building these capacities are lacking. Essential pharmaceuticals, medical supplies and equipment are limited. The emergent procurement procedures for rapid mobilization of essential pharmaceuticals, medical supplies and equipment are not in place.

• **Financing:** preparedness funding for health crises planning process, vulnerability assessment, risk reduction of health facilities and simulation exercises practically do not exist in case of Albania. Furthermore, contingency funds are quite insufficient.
• **Service Delivery:** capacity and capability for management of mass casualty incidents (mass casualty plans, protocols and guidelines for: triage, scene medical operation, basic life saving, evacuation) are not in place. Mechanisms and tools to ensure effective management of health care facilities in crises situations are lacking (risk reduction and mitigation plans, hospital crises response planes, network of hospitals and referral system, backup up of critical resources). Furthermore, there are no operational procedures and protocols for continuity of essential medical services.

4.5. Recommendations

Recommendations and proposed measures to improve the situation of soil erosion along river banks in Albania:

• Strict control over the irresponsible use of inert materials from riverbanks with harsh penalties for violators, and a complete stop to using materials from the lower parts of the rivers Vjosa, Osum, Shkumbin, and Mat.

• Forestation as quickly as possible and construction of various hydro-technical works to manage the flow of the water on the river channel.

• Elimination of mechanical interventions near the riverbeds for the purpose of plowing and other activities (it is proposed that specific legal decrees be adopted to define a protective area for this purpose, following examples from the western world).

• Maintaining and ensuring a normal and uniform regime of the flow of water and solids down rivers and maintaining a natural balance for controlling river mouths.

• Undertaking a whole series of engineering, hydro-technical, and other measures with the purpose of maintaining wet wildlife habitats and the channels of these rivers.

Recommendations and proposed measures to improve the situation of DPR in Albania:

• There is a need for more robust sectoral policies.

• Furthermore, there is a pressing need to assess health vulnerabilities and build the necessary capacities in order to reduce health vulnerability to climate change.

• Reviewing of the legal framework is similarly vital in order to take into consideration the health aspects of climate change.

• A clear communication strategy on global warming and health should be established.

• Long term research work is needed in order to link possible health impact to the changing of the climate.
• **Stewardship:** recommendations for improvement of the situation include the following:
  
  - Assessment of health sector crisis management capacities;
  - Preparation of health sector crisis management policy;
  - Amendment of current crises management legislation;
  - Setting up and strengthening of crises health sector institutional framework;
  - Designing and approval by MoH of crises management programs for: risk reduction, crises preparedness, coordination and partnership, crises health education, public information, and monitoring & evaluation.

• **Resource generation:** recommendations for improvement of the situation include the following:
  
  - Preparations of training modules and accredited training programs on health crises planning and management;
  - Preparation of procedures, guidelines, incentives to ensure the availability & security of staff, volunteers and community;
  - Compiling of guidelines and procedures for emergency procurement, rapid mobilization, coordination and distribution of essential pharmaceuticals, equipments and medical supplies;
  - Strengthening of early warning system with particular attention to outbreaks, influenza pandemic, extreme weather events, food scarcity, technological and industrial hazards;
  - Preparation of protocols and guidelines for hazard & vulnerability assessment, damage & need assessment and reporting.

• **Financing:** recommendations for improvement of the situation include the following:
  
  - Ensure preparedness funding for health crises planning process, vulnerability assessment, risk reduction of health facilities and simulation exercises;
  - Ensure contingency funds.

• **Service delivery:** recommendations for improvement of the situation include the following:
  
  - Preparation at all levels of health sector of:
    - crisis emergency plans (generic disaster plans);
    - risk reduction and mitigation plans;
    - contingency plans (based on hazard & vulnerability assessment);
  
  - Preparation of protocols and guidelines for triage (at scene medical operational, pre-hospital & hospital services):
    - infection control;
    - organization/function of advance medical post;
    - management of health problems in mass gathering situations;
    - international cooperation and sharing of information;
    - management of the dead and the missing persons.
  
  - Setting up of surge capacity system/network to activate in time all available assets (human resources, supplies, technical & medical expertise, transport) from various sources: other sector, private sector, NGOs)
• Organization of coordination system/referral system for dispatching the patients among the receiving health care facilities, including international evacuation.

• Preparation of operational practices, procedures and protocols for the continuity of essential medical services:
  - Prevention and control of communicable diseases and immunization;
  - Mother and child health care and reproductive health;
  - Mental health and psycho-social support;
  - Environmental health;
  - treatment for chronic and non-communicable diseases;
  - diagnostic capacities;
  - blood donation and safety;
  - nutrition & food safety.
5. Air Quality, Climate Change and Health

5.1. Air Pollution and Climate Change

Air pollution is a major environmental risk to health and is estimated to cause approximately 2 million premature deaths worldwide per year (Costello, 2009; IPCC, 2007).

It is important to remember that air pollutants are trans-boundary, i.e. they know no borders and travel easily from their sources towards other locations spreading pollution throughout the world (Costello, 2009).

Exposure to air pollutants is largely beyond the control of individuals and requires action by public authorities at the national, regional and even international levels.

The poor air quality in Tirana adds substantially to the population burden of disease.

By reducing air pollution levels, we can help countries reduce the global burden of disease from respiratory infections, heart disease, and lung cancer (Costello, 2009; IPCC, 2007).

In Albania, air quality situation can be divided in two historical parts (Hansen, 2007):

1. Up to 1989 year industry had been the main air pollutant of the country;
2. With the change of the old system, place of industry in air emissions was taken by traffic.

Vehicle fleet increase is very fast and tendency is constant.

Main sources of air emissions are now particles from roads, and pollutants from vehicles discharges.

Their impact on human population is more difficult to control and more dangerous than two decades ago.

The structures of Public Health are monitoring air quality in Albania since the distant year 1976. Although the equipment used till recently was old and not in compliance with technical requirements of EU directives, according to an evaluation from WHO expertise indicate that the level of pollution is very high (WHO, 2009). In 2004, annual average PM10 level ranged from 67 to 126ug/m3 in urban centre of Tirana and residential areas, and reached 432 ug/m3 at the kerb-site. NO2 levels (21-40 and 57 ug/m3, respectively) from a more reliable passive monitoring confirm that the road traffic contributes a substantial part of the pollution. It can be assumed that these levels of pollution significantly affect health of people of Tirana. If the assessments done in other parts of Europe would be extrapolated to Tirana, the estimated loss of life expectancy of Tirana population due to the pollution would exceed 1.5 – 2 years of life. The concerns for air quality and the need to integrate policies of various sectors in order to improve it, were confirmed by a series of national conferences. The recent one (June 2006) involved the prime minister. The EU approximation process puts additional pressure to upgrade national legislation related to air quality and factors affecting it (WHO, 2009). Transport is pointed out as an important source of it though the quantitative data supporting this opinion are almost missing.
Our urgent need for defending public health in the country is to evaluate the percentage of population exposed to ambient air quality exceeding limit values. Time series made out of this indicator show the trend over time, which can speak of success or failure of the response mechanisms activated by the government. It requires initially at least 10 automatic air monitoring stations, duly distributed throughout the country (primarily in the main cities). This kind of stations do not exist till now in Albania, and they give in principle detailed hourly and daily data on the concentration of main urban air pollutants such as PM (PM 10 and PM 2.5), CO, SO2, NOx, O3 and lead (M. Krzyzanowski, Vandenberg, J., Stieb, D., 2005).

A separate project for a cross-sectional study of the problem in a representative urban center should be of special interest, requesting at the same time appropriate support from international organizations.

Serious and continuous co-ordination with the Ministry of Environment and Ministry of Public Works and Transports inside the country, is very important for beginning the process of lowering already high levels of air pollution in urban centers. Financial assistance and technical support from WHO organisms is crucial (M. Krzyzanowski, Vandenberg, J., Stieb, D., 2005).

Preliminary measurement (as of the end of May 2001 until October 22, 2010) made with the two newly purchased modern equipment within the climate change project are presented in the graph and the table below.

Most important remark is that Tirana air is polluted seriously not only from particles, but also from gases (NO₂ and O₃).

Preliminary results of the PM10 measurements indicate very high pollution levels. Out of 28 PM10 and PM 2.5 measurements made with the newly purchased equipment until May 28, 2007, all results were above EU daily Limit Value.

Figure 14. Air pollution in Tirana from the end of May to the end of October 2010

9Equipment in every station: PM10, PM2.5, PM1 monitors; Calibration PM gravimetric; SO2, CO, NOx(NO+NO2), O3 monitors; BTX (benzene, toluene, xylene) monitors; Meteo (Precipitation, t, p, WD, WS, Global radiation) monitors; Communication on line.
The results exceed the 1st Interim Target for 24-hour PM10 mean set by the WHO Air Quality Guidelines. According to the WHO assessments, ca. 200 deaths per year are currently associated with air pollution in Albania, most of it in Tirana (WHO, 2009). We can also expect that there are a substantial number of cases of respiratory disease, especially in children, associated with the pollution.

Some comments on the results:

- In red colour are given exceedences of EU limits.
- Sulphur dioxide SO2 is below EU limits in both monitored sites.
- Nitrogen dioxide NO2 is below EU limit at IPH site, but consistently above EU limit at Tirana center site. It is emitted chiefly from burning of fuels, so it is traffic oriented.
- Fine particles PM 2.5 are consistently and dangerously above EU/USA limits in both sites. Their origin is re-suspension of road dust and diesel vehicles emission.
- Last but not least, ozone O3 is above limits in city center site during summer months. Its concentrations are calculated as daily averages of max 8-hour means. This is done after a complicated procedure, used for the first time in our country. So, ozone also is a big health issue in summer months in Tirana center. Ozone is created from a set of combinations between NOx and hydrocarbons in the air, catalyzed from sunlight – so it is traffic oriented.

<table>
<thead>
<tr>
<th>23.5-23.10.2010</th>
<th>Alba_1 SO2</th>
<th>Alba_1 O3*</th>
<th>Alba_1 NO2</th>
<th>Alba_1 PM2.5</th>
<th>Alba_2 SO2</th>
<th>Alba_2 O3*</th>
<th>Alba_2 NO2</th>
<th>Alba_2 PM2.5</th>
<th>Alba_2 PM2_5nc</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>2.43</td>
<td>63.4</td>
<td>12.96</td>
<td>23.70</td>
<td>3.08</td>
<td>122.6</td>
<td>19.60</td>
<td>36.07</td>
<td>36.07</td>
</tr>
<tr>
<td>June</td>
<td>1.32</td>
<td>59.4</td>
<td>13.29</td>
<td>27.95</td>
<td>1.54</td>
<td>130.8</td>
<td>26.545</td>
<td>31.96</td>
<td>31.96</td>
</tr>
<tr>
<td>July</td>
<td>1.31</td>
<td>57.4</td>
<td>12.49</td>
<td>20.84</td>
<td>5.275</td>
<td>142.8</td>
<td>20.07143</td>
<td>33.96</td>
<td>33.96</td>
</tr>
<tr>
<td>Aug</td>
<td>3.62</td>
<td>56.8</td>
<td>14.61</td>
<td>23.00</td>
<td>10.47778</td>
<td>116.4</td>
<td>23.23704</td>
<td>38.70</td>
<td>38.70</td>
</tr>
<tr>
<td>Sept</td>
<td>1.47</td>
<td>38.8</td>
<td>13.37</td>
<td>28.96</td>
<td>1.65</td>
<td>81.4</td>
<td>25.75</td>
<td>31.71</td>
<td>31.71</td>
</tr>
<tr>
<td>Oct.</td>
<td>1.27</td>
<td>24.2</td>
<td>13.46</td>
<td>27.20</td>
<td>1.55</td>
<td>55.2</td>
<td>26.09</td>
<td>32.32</td>
<td>32.32</td>
</tr>
<tr>
<td>Average</td>
<td>2.56</td>
<td>47.32</td>
<td>13.41</td>
<td>23.14</td>
<td>5.81</td>
<td>108.2</td>
<td>22.97</td>
<td>34.86</td>
<td>34.86</td>
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<tr>
<td>Max daily</td>
<td>8.00</td>
<td>149</td>
<td>20.90</td>
<td>58.30</td>
<td>19.30</td>
<td>160.6</td>
<td>34.80</td>
<td>63.20</td>
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<td>Limit EU</td>
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<td>110</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>110</td>
<td>20</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

* Calculated from daily max 8-hr means.

The concentration of air pollutants in the atmosphere is highly dependent on the weather, particularly for those pollutants that result from photochemical reactions e.g. tropospheric ozone itself a potent greenhouse gas. In urban areas, transport vehicles are key sources of nitrogen oxides and volatile organic compounds. Temperature, wind, solar radiation, atmospheric moisture, venting, and mixing affects both emissions of ozone precursors and production of ozone. Because ozone formation depends on sunlight, concentrations typically are highest during the summer months.
Climate change is expected to alter the concentration and distribution of these pollutants in the atmosphere, but the magnitude and direction of the change is unclear. Certain weather patterns enhance the development of the urban heat island, the intensity of which may be important for secondary chemical reactions within the urban atmosphere, leading to elevated levels of some pollutants, mainly to troposphere ozone concentrations.

This could have important health consequences, especially for those suffering from chronic respiratory diseases. Ozone is a powerful oxidant that has been associated with reduced lung function, exacerbation of chronic respiratory diseases and increases in respiratory hospital admissions and mortality with some evidence of a synergistic effect between high temperature and ozone.

5.2. Respiratory Diseases

The most direct impacts of climate change in health include those of changes in exposing because of extreme changes of weather climate (heat waves, extreme cold), on the other side the increase of extreme weather occurrences (flooding, cyclones, hurricanes, droughts), as well as the increase of the production of some air and allergic airborne pollution. In winter the decrease of mortality because of the mild winters, could be compensated with the increase of mortality in summer because of the increased frequencies of heat waves.

*Figure 15. Deaths from urban air pollution at a global level*
The biggest impacts of climate changes and health changes in Europe are mainly dedicated to the temperature-related, air pollution, vector-borne and food-borne related disease, disease relating to water and flooding effects.

Air polluters are capable to affect the respiratory system and the cardiac one. In the table below are introduced the data on mortality from the tumors of respiratory system for the time period 2003 - 2007.

Table 16. Mortality rate from the diseases of respiratory tract (Source: INSTAT)

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>793</td>
</tr>
<tr>
<td>2004</td>
<td>709</td>
</tr>
<tr>
<td>2005</td>
<td>690</td>
</tr>
<tr>
<td>2006</td>
<td>705</td>
</tr>
<tr>
<td>2007</td>
<td>604</td>
</tr>
</tbody>
</table>

Table 17. The mortality from diseases of the blood circulation apparatus (Source: INSTAT)

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>9,020</td>
</tr>
<tr>
<td>2004</td>
<td>8,924</td>
</tr>
<tr>
<td>2005</td>
<td>8,844</td>
</tr>
<tr>
<td>2006</td>
<td>8,959</td>
</tr>
<tr>
<td>2007</td>
<td>7,734</td>
</tr>
</tbody>
</table>

In a study that has been done in the city of Tirana to observe the effects of air pollution, that as we have mentioned above are closely related with the climate change, on the health of middle school pupils, was shown a significant deviation from the recommended values of respiratory functions among these pupils.

The graphics below speak clearly on this change. In the first graphic are introduced the deviations from the predicted results for the forced vital capacity (FVC), while in the second graphic are given the deviations for forced expiratory volume in the first second (FEV1).

The main respiratory functions, such as FVC and FEV1 on the children included in the study, result in the mass of 70-77% of the normal value.
In a study made to observe the effects of pollution in the health of road traffic police, has been noticed that these have a decrease of main respiratory functions in almost 69-75% of norms, respectively for FVC and FEV1, as well as an increased prevalence of non specific respiratory diseases (chronic bronchitis, acute bronchitis, asthma, etc.).
Most probably climate change after the quarter of this century might have some increased impacts in several health indicators. Although, the time in which any of these impacts will be visible, in a special way it will depend on the sensitivity of its reaction and from the fact that might be any limit that results in “trespassing its functions”.

Furthermore, the impact findings are influenced from the availability of the high quality data, as well as from the background variability of the variables related to health.

In a study performed to the population that lives in the oil-bearing area of Patos – Marinëz, the outcome was that almost all the population was poisoned from the oil fuel gases and that during the summer season the cases were increased of inhabitants who needed medical help, as a result of poisoning from the products of oil fuel and gases which were released from the oil fuel wells.

The results of this study have shown that there is a big risk for the development of lung cancer in this population or 4.1 (95% CI 1.19 – 16.83). Also, a strong relation between the pollution and the ability for the development of restricted respiratory diseases was detected OR 6.75 (95% CI 1.75 – 27.93), as well as those of asthma OR 2.38 (95% CI 1.13 – 5.27).

### 5.3. Pollens and Allergy

During the last few decades evidence indicates that there has been an increase in the prevalence of pollen allergy in most European countries (Spieksma, 1989). Pollen related allergy is a common disease resulting in symptoms of hay fever and asthma in about 10% of the population with notably higher prevalence rates in some countries, especially in young age groups (D’Amato, 1991). For example the ISAAC study showed that 35% of 13-14 years old in the UK have hay fever while a more recent study following the ISSAC methods showed increases to near 38% in this age group (Strachan, 1997). In Spain and Italy the comparable rates for 1991 were 9% and 16% respectively (Strachan, 1997).

In some countries of Europe such as the U.K, Spain and Italy, pollen monitoring and forecasting is well developed. It has proved to be useful for many groups including allergy sufferers, medical professionals and pharmaceutical companies. In contrast many countries have very few pollen monitoring sites and no developed models for forecasting. This is the case in Albania situated in the eastern Mediterranean region with a population of 3.4 million inhabitants.

The Fourth Assessment Report of the IPCC has recognized evidence to suggest that:

- Climate change could have caused an early onset of spring pollen season in the northern hemisphere, leading to an increase in the duration of the pollen season.
- In addition, new allergenic pollen types might appear.
- A warmer climate increases the risk of proliferation of new plants with well-known allergenic pollens like ragweed, etc.
- Climate change could cause an increase in heavy thunderstorms on summer days in the grass pollen season, which are known to increase the chance of asthma exacerbations.
Environmental scientists have further suggested that the rapidly changing climate could have altered the interaction between air pollutants and respiratory allergens. This phenomenon could be due to the atmospheric air pollutants adhering to the surface of micro aerosol suspensions of pollens and other plant allergens which may be present even before the usual peak pollen months. They then cause morphological change in these antigen carrying agents, thereby rendering them more allergenic. Furthermore, these ultra small particles can travel easily to the lower airways, thus increasing the morbidity in pollen sensitive asthmatics.

Pollens that are grown in temperatures more than usual could possibly have stronger antigenicity. Production of pollen too is enhanced by an increase in atmospheric CO2 concentration.

5.3.1. Allergic Pollens in Albania and the Influence of Climate Change

A survey was conducted by the European Community Respiratory Health Survey in Albania (Priftanji, 1999) with subjects that were residents of Tirana aged 20-44 years. A total of 2653 subjects completed a screening questionnaire. A more detailed questionnaire was administered to a random sample of 564 respondents together with skin prick tests and serum IgE assays.

The findings confirmed the hypothesis of a low prevalence of allergy in Albania. The results of skin tests have shown that the house dust mite was by far the most important allergen to which people were sensitized, followed by grass pollen (Priftanji, 1999).

The results have shown that prevalence of specific serum IgE (501 specimens) to Parietaria was 7.6%, and to Olive was also 7.6%. Possible reasons for the low prevalence of allergy in Albania include the recent economic isolation of Albania, the infrequency of smoking by women, the lack of domestic pets and the high incidence of childhood infection and parasitic infestation (Priftanji, 1999). The prevalence of allergy and its potential determinants should be monitored in Albania as this country acquires the characteristics of other parts of Western Europe.

The most allergenic pollens in the Mediterranean countries are those belonging to Poaceae (Grass), Olea (Olive), Urticaceae (Nettle) (De la Guardia, 1995; Frenguelli, 1989).

Pollen from the grass family (Poaceae) is considered to be one of the most important aeroallergens in Europe.

The Olive tree is very common in Albania and is comprised of two species, In Mediterranean climates, pollen from the Urticaceae family can be found in the atmosphere throughout almost the entire year.

Aerobiology, which is the study of organic particles (bacteria, fungal spores, pollen, small insects) passively transported by the air has received very little attention in Albania. The current research information represents a major advance as it is the first work of its kind in Albania. It represents also information how the climate change has influenced the daily pattern of pollen concentration for the most allergenic pollens in Albania.

The study area for pollen analysis is based in Tirana, which is situated on the east of Dajti Mountain and on the west 30 km to the Adriatic sea. The census in 2002 showed that the district of Tirana has 627,204 inhabitants. The Tirana region has seen a population increase of 30% due to internal
migration mainly from rural areas in the north. The study area is a typical dense urban area. There are no taller buildings in the immediate vicinity of the place where the trap was placed. The pollen collection was performed by a Burkard Volumetric 7-day Spore Trap (Burkard Manufacturing Co. Ltd). The trap was placed on the flat roof 15m above the ground level at the University Hospital Centre in Tirana for the study years (1995, 1996, 1998, 2002-2008, 2009) in the east side of the city.

Meteorological data were obtained from the Meteorological Institute of Tirana, which is situated 5 km away from the sampling place. Tirana has a maritime Mediterranean climate, with hot, dry summers and mild winters. The annual average temperature is 15°C, in January 17°C and in July 28°C. Generally, it ranges from 17-31°C in July, to 2-21°C in January. The average precipitation is 1247mm, 70% of it in the cold half part of the year.

Generally, the Tirana plain is surrounded by low hills, except on the east where there is the Dajti Mountain (1612 m). It keeps the city protected from cold winds from the east in wintertime and produces downslope during summer nights.

Tirana city with geographical data: latitude: 41° 19’ 39N and longitude: 19° 49’ 8E is bordered by low hills in the South, average height of 300m above sea level, in the North by the Tirana river, in the East by Dajti mountain, height 1612 m and in the West by lowland areas descending towards the Adriatic sea (about 35 km air line).

The average altitude of the city is about 110 m above sea level. Tirana lies on relatively flat ground but sloping East-West.

5.3.2. Albanian Flora and Urban Environment

Albania has a rich diversity of flora with about 3200 vascular flora species. Approximately 30% of the European flora occurs in Albania.

There are 27 plant species with 150 subspecies, which are endemic in Albania.

Since 1990, the post-communist period, the great demographic increase of urban zones following the political changes resulted in the enlargement of urbanized areas and the deterioration of the environment, by destroying green areas in particular. Green areas in cities such Tirana suffered because of illegal constructions, but the most damaged sites are the central park and the banks of Lana River in Tirana.

It is estimated that in the capital city of Tirana, the green surface area has been reduced from 12.5m²/inhabitant to 5m²/inhabitant.

The vegetation around the Tirana area, at least at a level of 5-600m above the sea level, is dominated flora of the maquis type with small amount of shrubs.

The surrounding hills are generally dominated by:

Carpinus orientalis, Colutea arborescens, Juniperus oxycedrus and Juniperus communis. Local sources are comprised of different vegetation types: parkland and gardens, trees planted along transport routes and around Mountain Dajti (4 km away), trees and plants within the sampling area.
The small parks around the sampling area consist of mixed trees and grassland. The trees that predominate are: Acer negundo, Aesculus hippocastanum, Pinus maritima, Phalepensis, Cedrus deodora, Acacia dealbata, Platanus orientalis, Quercus ilex, Ligustrum vulgare, Ligustrum lucidum, Rosa sp, Tilia tomentosa, Prunus sp etc.

The most predominant sources of pollen are from the regions of the of Dajti mountain which going to the high level has the following types of vegetation.

There are a lot of trees and shrubs planted on the area of University Hospital Center of Tirana where the trap was placed. Among them are: Cupressus sempervirens, Pinus halapensis, Pinus maritima, Tilia spp, Quercus ilex, Olea europea, Ligustrum vulgare, Hedera helix, Ulmus sp. Chenopodium album, Thuja orientalis. There are grasslands on this area (1ha), which produce a notable amount of grass pollen.

The microscope examination was under the method described by (Kapyla, 1981) that consists in reading 12 vertical transverses. The results were expressed as the number of pollen grains per cubic meter of the air and given as daily average values.

The standard sampling procedures proposed by the British Aerobiology Federation (BAF) were employed (BAF, 1995).

The daily weather data for temperature (maximum, minimum) and rainfall for the study period has been obtained from the Meteorological Institute in Tirana.

To study the features of the pollen season, the pollen count days are often referred to as the number of days starting from the 1st of January.

Also the daily average pollen counts were presented as 10-day running means in order to compile a Pollen calendar for Tirana. The presentation of the pollen count data in this form for the pollen calendar was made according the technique by Stix and Ferretti, 1974 (Stix, 1974). The registration of pollen concentrations in the air started in Albania in the year 1995. Before this date no pollen monitoring had been done in this country.

A Burkard volumetric trap was placed on the roof of the University Hospital Center of Tirana at a height of 18 metres. Starting from the year 2002, two additional traps were installed in two other cities, Lezha (northwest) and Vlora (southwest).

Due to technical problems running the trap, unfortunately there are some years with missing data. It should be noted that through those years Albania was in a difficult economic situation and it experienced a lack of electricity that affected the trap motor. The missing data are from the years of 1997, 1999, 2000 and 2001.

The selection of the 15 taxa including eight prescribed taxa selected was on the basis of either their abundant airborne occurrence and/ or their allergenic significance: and seven additional taxa selected from ten allergenic less important, or aero-biologically less frequent taxa (Spieksma, 1989).

As a perquisite for building pollen forecast models it was necessary to determine the main pollen types in the air of Tirana and to gain knowledge of their pollen seasons. For this reason the basic methodology included the construction a pollen calendar for the area.
5.3.3. Allergenic Pollens and their Daily Variations

The main allergenic pollens in Albania are described below:

- **Graminaeae** is considered to be one of the most important aeroallergens in Europe. This is because of its ubiquitous nature and the allergenic capacity of pollen grains from its species. In Albania this family is widespread in almost all the regions of the country. There are differences in the yearly total pollen counts with the lowest one in 1995 with 1118 grass pollen grains and the highest one in 2006 with 2552 grains. The difference in the timing of the peak day was 8 days within the study years with the earliest one in year 2002 and the latest one in 2006. The pollen concentration during the peak day was high (an average of 300p/m3). Grass pollen occurred from March until September with two months between with very high pollen counts respectively in May and June. In all the study years May was the month with the highest pollen concentrations recorded. The amount of pollen collected ranged between 10 and 20.5% of the annual total with the year 2002 being the highest (Gjebrea, 2010).

- **The Cupressaceae** family is widely distributed in Albania. Cupressaceae allergy appears to be a new aspect of pollinosis in some Mediterranean areas. The maximum values of 8379 pollen grains were recorded in 1998, followed by 2008 with 6610 grains. The percentage of Cupressaceae pollen with regard to the annual total oscillated between 26.5% in 1995 and 53.5% in 2008. The Cupressaceae pollen was present in the atmosphere, to a greater or lesser degree, during the entire period under the study (December to January), except for five months (Aug-Dec) in 1995 and two months in 2002 (Oct-Nov). The highest values were recorded in February, March and April. The timing of the peak day in the study years shows a difference of 13 days and the pollen concentrations on that day were extremely high with about 1000p/m3 as a average except in 1995 in which the peak value reached only 180p/m3 (Gjebrea, 2010).

- **The Urticaceae** pollen in Tirana constituted between the third and fourth important of pollens over the study years with a percentage that varied from 5.7% in 2008 as the lowest one to 18.1% in 1995 as the highest one. The Urticaceae pollen release period is a long one starting from April and lasting until November. The months with most abundant pollen were those from May until September. Also the peak days vary between the four years having the earlier one in 1998 in day 147 and the latest one in 2005 in day 201. The daily peak value did not reach high counts and was counted a peak value as an average of 42 p/m3 (Gjebrea, 2010). The Urticaceae pollen persists for a long time in the air, but with not very high values.

- **Olea**: the olive pollen has been recognized as one of the most important allergenic pollens in the Mediterranean areas, where olive pollinosos is a widespread form of respiratory allergic disease. The Olea pollination season lasts from May till June reaching very high pollen concentrations. It has a short pollen period but with high counts reaching in peak days to a maximum of a 200 p/m3. The difference in peak days for four years was 14 days with the earliest one in 2002 in day 139 and the latest on in 2005 in day 143. It was noted that the Olea total pollen counts have two years with high values respectively in 1995, and 2008 and two years with low totals respectively in 1996 and in 2005. There are two different peaks in the Olea pollination season with the first peak at about the end of May and the second peak in approximately ten days after the first one. The Olea pattern is slightly different in 1995 compared with other years (Gjebrea, 2010).
• **The Pinaceae family:** although the Pinaceae family contributes to the pollen calendar with the high pollen values, the allergy cases resulting from this family are very rare. The pollen from this taxon is present in the air for most the year with the exception of three months in 1995 (Aug-Oct) and two months in 1996 and 2007 (Jan-Feb). The total pollen sum of this family registered high and low sums with the highest one in 1998 with 1366 Pinaceae pollen grains and the lowest one in 1995 with 792 total pollen sum and in 2007 with 834. The months with the high pollen concentrations were March, April, May and June. The pollen curve of this family is very long with different pollen peaks probably because there are many species contributing to it. The highest peak during the years under the study occurs in the month of March with a difference of 25 days between those years. The Pinaceae family contributes to the pollen calendar with a percentage that varies between 8.2% in 1995 to 15.6% in 2002 (Gjebrea, 2010).

• **Quercus:** although it is assumed that European Quercus pollen has a low allergenic effect, allergic sensitisation has yet to be fully clarified. Quercus pollen types in Tirana contributed to the pollen calendar with no more than 1.8% during the four years. This percentage varied over the years. Also the total pollen sum from this genera did not reach high values. The highest total sum was registered in the year 1996 with 236 oak pollen grains and 2007 with 303 pollen grains and the lowest one in 1997 with 91 pollen grains. The difference in the timing of the peak day among the study years was only 11 days. The pollen of Quercus is present in the atmosphere only during two months, namely April and May. Only in the year 2002 was this pollen type found in more than two months (February-March) besides April and May (Gjebrea, 2010).

• **Corylaceae:** as Corylus type pollen is easily distinguished from other genera of the Corylaceae family it was decided to separate the Corylus pollen type from the two other genera. It is well known that Corylaceae pollen can cause allergic respiratory symptoms in sensitised subjects, particularly in the northern areas of Europe. The Corylaceae presented in the pollen calendar contributed with a percentage, which varied from 4.5% in 1995 to 0.9% in 2006. The highest total pollen sum from this family was registered in the year 1995 with 438 Corylaceae pollen grains and the lowest total sum was registered in year 2002 with only 60 Corylaceae pollen grains. The timing of the peak day varied a lot with the earliest one in day 57 in 1996 (26/2) and the latest one in day 122 in 2005 (30/4). This possibly could be explained with the different species contributing to the pollen curve of this family. The Corylaceae pollen is present from February till May with the highest pollen counts recorded in April (Gjebrea, 2010).

• **Ericaceae:** there is no documented evidence on the allergic reaction from this family. The relative amount of pollen collected ranged between 0.7% in 1995 and 3.3% in 2007. The Ericaceae pollen was present in the air from February until May although the highest pollen concentrations from this family were registered in March and April. The difference in the timing of the peak day was 25 days with the earliest in 1998 in day 69 (10/3) and the latest in 2006 in day 97 (3/4). Also the pollen concentrations on the peak day did not reach high levels recording the highest one in 1996 with 78p/m3 (Gjebrea, 2010).

• **Fraxinus:** it is known that Fraxinus is not considered to be a highly allergenic species but there is a high degree of cross-reactivity among the Oleaceae family. In the pollen calendar of Tirana, Fraxinus does not represent a high percentage. It contributes with a range of percentage that goes from 0.5% in 2002 to 1.7% in 2009. The Fraxinus pollen is present in the air from February till May, except in the year 1995 when pollen from this family was found even in June. Also the monthly total sum from this taxa varied between the years. In 1995 the highest pollen concentrations of Fraxinus were found in May whereas in 1996 and 2002 and 2007 they were found in April and in 2009 in March (Gjebrea, 2010).
Corylus is a winter-pollinated tree. The pollen is present in the air from January until April with the exception of three years (1998, 2002 and 2008) where the pollen curve of this family was shorter from January until March. The relative amount of pollen collected from this taxon ranged between 1.1% in 1995 and 2002 to 1.9% in 1998 and 2007. The difference in the timing of the peak day was 56 days with the earliest in 1995 in day 42 (11/2) and the latest in 1996 in 98 (7/4) (Gjebrea, 2010).

Alnus: this is an even more important allergen but it is not present in the Tirana vegetation. Except in the year 1995 when Alnus begin to pollinate in January, the pollen of Alnus in other years started in February. It should be noted that the year 2002 was exceptional for the pollen curve of this genus as Alnus was found only in the month of February. The difference in the timing of the peak day was 46 days with the earliest in day 52 (21/2) in 1998 and the latest in day 98 (9/4) in 2006. The pollen concentrations in the peak day did not reach high concentrations, the highest one was in 2006 with 53 p/m3 in the peak day (Gjebrea, 2010).

Rumex: this lead to the hypothesis that a possible simultaneous allergy to sorrel should be considered in cases of allergy to grasses and/or weeds. In the pollen calendar, Rumex contributed with relative amounts of pollen collected from 0/6% in 1998 to 2.2% in 2006. The pollen was present in the air from April until July with the highest pollen counts in June (Gjebrea, 2010).

Plantago is present in the air from April until September contributing to the total pollen collected at a range from 1.3% in 1998 to 5.4% in 2005. Also the difference in the timing of the peak day was 10 days with the earliest in day 157 (6/6) in 1995 to the latest in day 169 (26/7) in 2005. The yearly total pollen recorded was highest in 2008 with 518 grains compared with the lowest in 1998 with 207 grains (Gjebrea, 2010).

Chenopodiaceae: Chenopods are plants with a widespread distribution and in some cases are of major importance in inducing seasonal allergic disease. The Chenopodiaceae family in Albania is composed of 14 genera and 36 species. Pollen grains of Chenopodiaceae/Amaranthaceae family are present in the air from May until October. They do not release large amounts of pollen reaching relative amount of pollen collected from 0.6% in 1995 to 1.3% in 2009. The difference in the timing of the peak day was 42 days with the earliest in day 224 (12/8) in 1995 and the latest in day 258 (10/9) in 2008. August and September were the months when the highest pollen concentrations were recorded (Gjebrea, 2010).

Ulmus was the first pollen found in the air from January until March. The highest concentrations were in February and March in all years of the study. It contributed to the amount of pollen collected at a range from 0.6% in 1995 to 1% in 2006 and 2007. The difference in the timing of the peak day was 34 days with the earliest in day 13 (13/1) in 1998 and the latest in day 45 (13/2) in 2005. The highest total pollen sum recorded was in year 1996 with 133 grains and the lowest in year 2005 with only 54 grains (Gjebrea, 2010).
5.4. Adaptation: Air Pollution Mitigation and Health Benefits

According to WHO (WHO, 2004), there are several co-benefits to health of climate change mitigation, where the active transport is one of the most important components to tackle. From this perspective, “win-win” health and transport mitigation strategies are feasible (M. Krzyzanowski, Kuna-Dibbert, B., Schneider, J., 2005) and include improved active transport, rapid transit/public transport and land use strategies, which can be cost-effective in many settings, including rapidly developing cities such as the case of Tirana. Therefore, investment in active transport (healthy transport mitigation) is very important and can also improve access to jobs, goods and services for disadvantaged socioeconomic groups.

The figure below describes the health effects of transport-related air pollution (M. Krzyzanowski, Kuna-Dibbert, B., Schneider, J., 2005):

Figure 18. Health effects of transport-related air pollution (source: Krzyzanowski M et al. 2005)
5.5. Recommendations

- More efforts are needed to counteract on the synergic effect of climate change and air pollutants.
- Particular efforts should be made to improve the quality of data collection related to air quality issues.
- New modern equipment are needed to measure the quality of air in other big urban areas other than Tirana.
- There is a need for regular and frequent communication to the public of the level of pollutants and the health risks.
- The impact of ozone on health is not known by the doctors and may be attributed to other factors.
- There is a clear evidence of the air pollution in Tirana and respiratory functions of groups of residents clearly exposed to such risks.
- Long term-prospective studies are needed to study the correlation between climate change and some respiratory and cardiovascular disease.
- Special focus should be put on the morbidity and mortality from heat wave.
6. Communicable Diseases and Climate Change

6.1. Changes in Vector Patterns

A vector-borne disease is one in which the pathogenic microorganism is transmitted from an infected individual to another individual by an arthropod or other agent, sometimes with other animals serving as intermediary hosts. The transmission depends upon the attributes and requirements of at least three different living organisms: the pathologic agent, either a virus, protozoa, bacteria, or helminth (worm); the vector, which are commonly arthropods such as ticks or mosquitoes; and the human host. In addition, intermediary hosts such as domesticated and/or wild animals often serve as a reservoir for the pathogen until susceptible human populations are exposed (Costello, 2009).

Nearly half of the world’s population is infected by vector-borne diseases, resulting in high morbidity and mortality. The distribution of the incidence of vector-borne diseases is grossly disproportionate, with the overwhelming impact in developing countries located in tropical and subtropical areas (Costello, 2009; Friel, 2008).

Weather affects vector population dynamics and disease transmission, with temperature and humidity considered key variables. Only recently have researchers attempted to predict how climate change might affect the distribution of vector-borne diseases. A comprehensive model should consider both the direct impacts (such as changes in temperature or rainfall) and indirect impacts (such as changes in hydrology or agriculture) of global warming on the agent, vector, intermediary host, and the human host (Friel, 2008). The response of each element of the disease process to climate change may have ramifications for the others.

**Key Messages**

- In general, climate plays an important role in the seasonal pattern or temporal distribution of diseases that are carried and transmitted through vectors because the vector animals often thrive in particular climate conditions.
- In the last 20-30 years there is noted a change in the geography of the vectors, their reproductive behaviors that could be attributed to both to climate change and man-made interventions.
- Expanded geographic ranges of tick and parasite vectors due to climate change already are pushing infectious diseases into unfamiliar territory.
The recent appearance in Europe of several vector-borne, parasitic and infectious diseases (some of them of zoonotic interest) has caused alarm, particularly about the risk of local transmission of exotic pathogens as has happened for Chikungunya or Dengue viruses, so that there is concern about how to avoid occurrence of new outbreaks or persistence of other, even autochthonous, Vector-Borne Diseases.

The 4th Assessment Report of the IPCC (IPCC, 2007) stated that climate change currently contributes to the global burden of disease and premature deaths (very high confidence). The report states that emerging evidence of climate change effects on human health shows that climate change has altered the distribution of some infectious disease vectors with medium confidence.

Vector borne diseases (VBDs) are among the most well studied of the diseases associated with climate change due to their widespread occurrence and sensitivity to climatic factors. There is some evidence of climate change related shifts in the distribution of tick vectors of disease, of some (non-malarial) mosquito vectors in Europe.

Based on the reports of the EDEN project, in many parts of Europe northern or altitudinal shifts in tick distribution have been observed. An increase in incidence of tick-borne encephalitis [TBE] and the bacterial Lyme disease has been observed within regions of Europe - this increase is likely to be related to levels of climate change.

TBE is spread in Northern and central part of Europe; it is not present in the Mediterranean regions, while Lyme borreliosis can be detected all over Europe. However, in the latter regions another tick-borne viral infection is endemic: Crimean-Congo hemorrhagic fever (CCHF). The EDEN expert group called the attention on the very different time patterns observed in the affected countries between 1995 and 2003, these data do not support a major influence of climate change in the upsurge of this disease. Nevertheless, in countries where there is a long series of data concerning the prevalence of CCHF, it is worth continuing data collection and analysis in relation to temperature to assess their relationship.

Rodent-borne viruses (e.g. hanta virus) were identified throughout Europe with a major importance in the Balkan area. The major disease transmitted by rodents is the hemorrhagic fever with renal syndrome. There are climate-related differences in hanta virus dynamics between northern and central Europe.

Shadfly-borne diseases – especially Leishmaniasis have persisted within Europe. The close association of these vectors with human habitation in the Mediterranean region ensures transmission to humans from domestic and other animal reservoirs. It is very likely that leishmaniasis will spread with increasing global and environmental change and the reduced effectiveness of existing chemotherapies (especially in cases of co-infection with HIV), the lack of any vaccine make leishmaniasis a disease of high importance to be monitored.

Coetaneous leishmaniasis has been reported in dogs (reservoir hosts) further north in Europe, although the possibility of previous under-reporting cannot be excluded. Changes in the geographical distribution of the sand fly vector have been reported in southern Europe.
Concerning mosquito-borne diseases West Nile virus infection in Europe has not been detected for longer periods, however in the recent years there were large outbreaks like in Bucharest and Volgograd/Volzskii, where sub-standard buildings, high production of a competent vector and an abundance of avian hosts (pigeons and sparrows) associated with poor disposal of household provided all factors for urban transmission. This problem is very likely to promote such outbreaks in the less developed countries in the future.

There is enough evidence that WNV is transported from Africa (and maybe Asia) by migratory birds. In Europe, it has been suggested that WNV outbreaks are associated with hot dry summers, but the relationship needs further scientific evidence.

In Albania there exists a mandatory reporting/surveillance of infectious diseases. Infectious diseases are grouped into three groups (namely A, B, C) according to the degree of their public health importance, they should be reported within one day to one week. The registry is maintained by the National Institute of Public Health.

6.1.1. Key Vectors

A review of existing logistical, technical, strategic and operational plans and documentation was conducted in order to identify gaps in the current capacity for the control of the following vectors at both national and local levels:

- mosquitoes,
- sand flies,
- ticks,
- rodents

The review, carried out from December 2009 to April 2010, focused on the following aspects: vector-mapping, surveillance, laboratory capacity, training needs, inter-sectoral and inter-disciplinary interactions. Particular attention has been given to reviewing the implementation of vector control measures at ports and airports and at all strategic environmental sites (lagoons, the countryside, towns and outskirts).

Mosquitoes

During the last 20 years in Albania, there have been no surveys or specific studies about mosquitoes and no mosquito control programs have been carried out.

Mosquitoes are the most important group from the viewpoint of importance to public health, not only because they serve as vectors for various diseases, but also because of the annoyance and discomfort caused by their bites.

The information about mosquitoes in Albania was taken mainly from the existing literature, studies conducted years ago by the Institute of Public Health and from some entomological studies conducted by the Laboratory of Entomology, Department of Infectious Disease Control, Institute of Public Health during 2001-2009.
Mosquito species present in Albania:

There are several species from the following genera found in Albania:

- Aedes
- Anopheles
- Orthopodomia
- Theobaldia
- Uranotaenia

Aedes

Aedes species in Albania include several anthropophilic species such as the salt marsh Aedes detritus, Aedes caspius, the fresh water Ae. caspius, Aedes dorsalis, Aedes rusticus, Aedes sticticus, and Aedes vexans, the rock pool Aedes zammittii, and the three hole Aedes geniculatus and Aedes pulcritarsis species (J. Adhami, Reiter, P., 1998).

Information on the population densities of these species is scarce and their real impact on human life quality is not known.

The Asian Tiger mosquito Aedes albopictus is considered one of the most invasive species of the world and is a potential vector of at least 24 arboviruses dangerous to human health (including Yellow fever, Dengue, Chikungunya, and Japanese encephalitis). Moreover, it is a highly anthropophilic day biting mosquito which is a severe nuisance in inhabited areas. Ae.albopictus has become established in recent years in several European countries, first appearing in the Mediterranean basin in Albania in 1979, probably imported from China. Today it is well established across the Adriatic coast in Italy, Montenegro, Croatia, Bosnia, Slovenia, and Greece (Gratz, 2004).

Globalization and increased tourism towards endemic areas expose Europe to the risk of new arrivals of infected people, and of new epidemics (1485 Dengue cases were imported in 2009 in Europe). In Albania, Ae. albopictus is present in almost all districts except those in the mountains. It was discovered for the first time in 1979 and the initial infestation probably happened at a rubber factory adjacent to the port of Durrës, from where the mosquito was shipped in tyres to recapping plants in other parts of the country (J. Adhami, Reiter, P., 1998).

There were three monitoring campaigns: in the late 1970s, in 2001-02 and recently (2006-09).

The risk for disease transmission related to the autochthonous Aedes species is considered low at this moment. There is a considerable increase in the risk that Rift Valley fever may be introduced into the Mediterranean countries, due to the spread of this virus in Africa and Middle East, but the importation of animals, which may act as viraemic hosts is improbable because of the current regulations on animal movements.

It is important to identify possible areas/sites where Aedes may achieve the highest densities in order to focus specific entomological surveillance activities designed to follow their dynamics in the years to come. This will ensure sufficient updating of the personnel concerned, as well as providing sufficient information for risk assessment purposes, critically important to support the national authorities (J. Adhami, Reiter, P., 1998).
The control of Ae. albopictus is exclusively based on adulticides which are sprayed occasionally. It is not clear which institution is responsible for this activity. In the municipality of Tirana there is a Directory which is responsible only for school pest control (disinfection-des-infestation-de-rattization) activities. Citizens voluntarily obtain the service from private companies, but it is not clear how many companies there are, and what products they use. No larvicide treatments are conducted and there are insufficient stores of products for emergency treatment.

The infestation density and pattern of Ae.albopictus are not available; however, it is probable that infestation rates of Ae. albopictus are high in municipalities and cities below a certain altitude (to be established). The presence of a huge amount of car washes without water drainage as well as an enormous number of piles of tires left near garages, and the common practice of leaving bowls and tanks of water etc outside private homes increases the level of mosquito infestation because these are all potential breeding sites for tiger mosquitoes. At the moment, the possibility of introducing pathogens potentially transmitted by Ae. albopictus seems to be very unlikely in Albania; according to our data, the movement of people to and from Albania is directed to Europe, thus minimizing the risk of transmission from areas endemic for these pathogens (Gratz, 2004).

It is fundamentally important to organize specific entomological surveillance activities to gather information on:

- The distribution and abundance of this vector in different areas and seasons;
- To establish correlation with altitude, town, districts, and village dimensions;
- To collect information on the population size, densities, seasonal dynamics, typology of Ae.albopictus breeding sites.

**Aedes Aegypti**

This species is of increasing major concern due to the risk of its importation into the Mediterranean countries. It was actually present in most of the port cities until the mid-20th century (including Durres), and then progressively disappeared without clear explanation factors. In the period 1927-28 a large Dengue epidemic estimated at more than 1 million cases occurred in the Athens area, causing about 1,000 deaths (J. Adhami, Reiter, P., 1998). At the moment, this species has not been detected in Albania, but in the case of its introduction there is an increasing risk of its establishment due to the impact of climate change on ecological conditions. The technicians involved in the entomological surveillance need to have the expertise to discriminate this species from the similar Ae.albopictus and Ae.cretinus in order to detect the species promptly and so make it possible to implement successful elimination actions should the importation take place (Gratz, 2004).

**Culex spp**

The genus Culex is important because several species serve as vectors of important diseases, such as West Nile, filariasis, Japanese encephalitis and St. Louis encephalitis. At the moment in Europe, the circulation of West Nile virus is of great concern, because of the numerous outbreaks registered in different ecological situations: Romania in 1996-2000, Russia in 1999; and the North-eastern part of Italy in 2008-2009. In Europe, the principal vectors are considered to be Culex pipiens and Culex modestus, the former being a very common species in urban and rural areas, the latter mostly related to irrigation canals (Gratz, 2004).
Cx. pipiens and other Culex species must be considered in an Action Plan mainly because of their potential implication as vectors of West Nile and other arbo-viruses.

West Nile virus is currently very active in several southern European countries and in different ecological conditions, requiring specific attention (Gratz, 2004). Areas on which to focus surveillance activities are wetlands (i.e. Shkodra Lake, Lezha, Karavasta) known as resting sites for migrating birds during migration, and nesting sites for residential birds.

The aim of the human surveillance system is the early detection of infection in humans and the estimation of the affected area/s through the systematic analysis of newly emerging clinical cases, in order to manage specific interventions.

The surveillance must be performed during the period of vector activity defined on the basis of entomological surveillance, and throughout the national territory (indicatively June-October). Surveillance is based on case reporting by physicians of suspected cases of aseptic encephalitis and/or meningitis of unknown etiology (Gratz, 2004).

As soon as the Public Health Authorities receive a notification of a confirmed West Nile virus case, they must initiate a thorough and detailed epidemiological survey, in order to identify possible exposure to the infection, by tracing back the person’s movements, and to define the area where the case was detected, so that possible control measures might be undertaken.

Entomological surveillance must be organized on Cx. pipiens and other Culex species because of their potential implication as vectors of West Nile and other arboviruses (Gratz, 2004).

Anopheles spp

As in most of the Mediterranean countries, malaria was a hyper-endemic disease in Albania up until the Second World War, although the country was declared free from malaria in 1967. Since then only imported cases (Plasmodium vivax and Plasmodium falciparum) have been registered in the country, with no evidence of local transmission (J. Adhami, Murati, N., 1987).

In the neighboring countries like in Greece, malaria was eradicated in the beginning of the 1970s, and since then only sporadic autochthonous cases have been recorded (3 cases in 1991, one case in 1999 and 2 cases in 2000) (Gratz, 2004). More recently, a cluster of 8 cases of P. vivax infection was detected in the southern Peloponnese, between August and October 2009. Two cases were immigrants from Pakistan and Afghanistan, and the remaining six cases were due to indigenous transmission.

Reporting malaria cases is mandatory in Albania (National Mandatory Reporting System), and the National Public Health authorities are well aware of this problem. Nonetheless, it is necessary to:

1) reinforce the awareness of Local Public Health Structures in order to assure clinical sensitivity in the case of malaria;
2) strengthen regular exchanges of timely information with neighboring countries on the appearance of possible malaria foci.
While there is a continuous risk of local transmission following the introduction of malaria parasites by infected persons from endemic areas during the vector activity period (summer months), the occurrence of a large outbreak seems unlikely due to the good diagnostic capacity existing in the country and the vector population density being high enough only locally. The impact of climate change on the epidemiology of malaria in Albania remains to be ascertained with specific entomological/parasitological investigations focused on sites of greatest risk.

Entomological surveillance

The Anopheles species of Albania include the malaria vectors Anopheles maculipennis s.s., Anopheles sacharovi, and Anopheles superpictus (J. Adhami, Murati, N., 1987; J. Adhami, Reiter, P., 1998). The general picture is that Anopheles is no longer a main issue in the country.

The disappearance of rice fields, 30 years ago, greatly reduced the breeding habitat for large populations of Anopheles.

Nevertheless, it is important to identify possible areas/sites where the Anopheles vector populations are present, in order to focus on specific entomological surveillance activities designed to follow the dynamics in the years to come and to monitor the sensitivity level to the insecticides of use in the case of future need. This will ensure sufficient updating of the personnel dealing with this domain, as well as providing sufficient information for risk assessment purposes, critically important to support the national authorities (J. Adhami, Murati, N., 1987; J. Adhami, Reiter, P., 1998).

Considering the continued importation of malaria cases detected by the Public Health authorities, effective malaria case surveillance has to be maintained and possibly strengthened at local, national and inter-national levels.

Technical assistance in diagnostic capacities, coordination of malaria surveillance activities, and risk evaluation related to immigrants from endemic countries, must be organized yearly.

The impact of climate change on the epidemiology of malaria in Albania remains to be ascertained with specific entomological/parasitological investigations focused on sites of greatest risk. It is important to carry out specific entomological surveillance of the Anopheles vector populations which are present, in order:

- to update the information on Anopheles sp. fauna in the country;
- to follow the dynamics over the years;
- to monitor the sensitivity level of the recent biocides used in the country.
Sandflies

The information on sand flies (SF) dates back to the period 1958-1989. Updating started in 2000 and has confirmed that SF are distributed throughout the whole country. Phlebotomus simici, P.neglectus, P.perfiliewi, P.tobbi, P.similis, P.papatasi and Sergentomya minuta have been identified in the country and mapping of SF covers almost the entire national territory (Lazri, 2008).

Sand-fly related diseases are leishmaniosis, affecting humans and dogs, and phleboviruses, affecting humans only.

In Albania, leishmaniosis morbidity is 20-40 times higher than in other southern European countries and leishmaniosis cases in this country have almost doubled during the past 10 years (Lazri, 2008). During the period 1997-2001, 867 parasitologically confirmed VL cases were recorded in 35 out of 36 Albanian districts, with an average of 173 cases/year. During 2004-2008, 572 cases were reported among humans, with an incidence in 2004 of 4.3 cases/100,000 population and in 2007 of 3.4 cases/100,000 population. About 90% percent of the districts are infected with VL. The greatest number of cases is registered among children below the age of 10 (79.6%); and 67.6% of infected children are less than 5 years old (Lazri, 2008).

VL cases have almost doubled during the past 10 years and a high proportion of patients (67.6%) have been children under the age of five. P. neglectus is the suspected vector because of its great prevalence when compared to the other species (Myrseili, 2009). Leishmaniosis in dogs is also recorded very often, but no official data are available. Recently, a serological survey of 151 Albanian stray dogs showed a very low percentage of sero-positivity (3.3%), which is certainly underestimated; it is presumed that real percentages may reach 16-20% of positivity. Due to this expected high prevalence of leishmaniasis in humans and in dogs, there is a great risk that the disease persists all over the country (Lazri, 2008; Myrseili, 2009).

It should be underlined that although stray dogs are euthanized, this practice may enhance other animals acting as reservoirs, i.e. wild animals or synanthropic animals, such as mice and rats, whose wide diffusion in urban areas can increase the risks.

No cases of sand fly fever have been recorded in the country; however, due to the high density of these insects, the existence of the disease may be suspected. In fact, a preliminary unpublished survey has been carried out on sand fly fever in humans, revealing the presence of antibodies against Toscana virus.

Data available on sandfly prevalence shows that entomologists are skilled at field collection and identification at the species level. However, no temporal and longitudinal studies have been carried out, so that the information is fragmentary (presence or absence of SF), and no data on the pattern of infestations are available. Furthermore, the technicians’ knowledge of molecular analysis for the detection of pathogens needs addressing urgently, in view of the importance of this kind of data on vector/s competence. For this reason, LVDC groups should be trained in molecular techniques. Finally, Leishmaniosis is not considered a priority for veterinary institutions, and interest is restricted to the individual attention of scientists. This consideration does not guarantee close interaction between PHI and veterinary institutions; this is of paramount importance due to the role of dogs as reservoirs (Myrseili, 2009).
It is very important to underline the role of dogs as reservoirs of Leishmania spp. Although leishmaniosisis in dogs is recorded very often, no official data are available. More recent serological surveys carried out on 78 private and stray dogs in the district of Tirana showed a percentage of sero-positivity of about 18% and asymptomatic dogs were more frequently registered (60%). As to sand-fly fever, no cases have been recorded in the country, and this is probably due to the low level of awareness among physicians. Indeed, a sero-prevalence study carried out in 2008 in the areas with high prevalence of Leishmaniosis identified anti-Toscana virus antibodies in 12% of people, and the virus was also isolated in sand flies from Lezha town.

The knowledge about Phlebotominae fauna and distribution in Albania is up to date and includes relevant information on the main possible vector species i.e. *Phlebotomus neglectus, Phlebotomus perfiliewi,* and *Phlebotomus tobbi* (Depaquit, 2010).

However, starting from the area with the highest incidence of Leishmaniosis (pilot area) it is necessary to continue surveillance through the following actions: mapping and monitoring sand-fly distribution to determine the seasonal pattern identification of the sand-fly species responsible for maintenance and spread of leishmaniosis by molecular tools (Myrseili, 2009).

Veterinary surveillance can be adopted at first in a pilot area (i.e. those with the highest incidence of human leishmaniosis cases) and must necessarily involve public and private vets, Veterinary Faculty/ies, citizens associations, educational institutions (private and public schools), clubs, animal rights associations, and other related institutions (Myrseili, 2009).

It is important to underline that the surveillance plans against leishmaniosis (or any other dog-related zoonotic diseases) cannot exist without management of the stray dogs via national/regional laws providing for measures such as the capture of stray dogs, and their housing in proper buildings (kennels, shelters, etc.) (Myrseili, 2009).

**Entomological surveillance**

The knowledge about Phlebotominae fauna and distribution in Albania is dates back to 2003 and includes relevant information on the main possible vector species i.e. *Phlebotomus neglectus, Phlebotomus perfiliewi,* and *Phlebotomus tobbi.*

However, it is necessary to continue surveillance on the new VL foci for:

- Mapping and monitoring sand-fly distribution to determine the seasonal activity
- Identification of the sand-fly species responsible for transmission and spread of VL.
Ticks

In Albania, cases of several Tick Borne diseases are reported every year, such as Crimean Congo Haemorrhagic Fever (CCHF) and rickettsiosis (Papa, 2008).

Knowledge about Ixodidae family is patchy and discontinuous. Investigations have been carried out only on animals and in some restricted areas i.e. those where outbreaks of CCHF were registered allowed identification of the following species: Hyalomma marginatus, Haemaphysalis plumbeum, Haemaphysalis punctata, Rhipicephalus sanguineus, Rhipicephalus bursa, Dermacentor marginatus, and Boophilus calcaratus.

The first survey on Ixodofauna at the species level dates back to 1986, carried out mostly in the Tirana region, and more recent data are available from 2001 to 2006 (Papa, 2008).

Hyalomma marginatus, H. plumbeum, Haemaphysalis plumbeum, H.punctata, Rhipicephalus sanguineus, R.bursa, Dermacentor marginatus, and Boophilus calcaratus have been identified in the country (Papa, 2008).

In Albania, several TBDs are reported, such as Crimean Congo Hemorrhagic Fever (CCHF), Lyme disease and rickettsiosis. CCHF is an endemic disease first identified in 1986; from 2001 to 2006, thirty-two cases were confirmed. Ticks were responsible (only when discovered) in eight cases (17.3%) and the only fatal case was related to a tick bite. The most endemic CCHF regions in Albania are Kukes and Has districts, while few cases have been registered in other areas. During 2003 to 2006, CCHF virus was detected by serology and PCR-test in 38.2% of 34 Albanian patients with suspected CCHF. Concerning animal reservoirs, only goats bred in an affected family presented high titers of CCHFV antibodies (Depaquit, 2010; Papa, 2008).

As to Lyme disease, twenty autochthonous and seven imported cases have been reported since 1982, while cases of rickettsiosis are frequently registered in Albania in humans, as well as in animals in which also babesiosis is registered. Finally, the presence of Coxiella burnetii is documented by detection of antibodies in 9.1% of the animals investigated (sheep, goats, and cattle) housed on farms located in 20 different districts. The responsibility of ticks in the transmission of TBDs refers to detection in one pool of Hyalomma spp. - collected in 2003-2005 - of CCHFV - RNA with 99.2–100% homology; these sequences overlapped those detected in patients from the same region. No ticks infected by Borellia have been detected, while Anaplasma/Ehrlichia and Spotted Fever Group Rickettsia (SFGR) - DNAs (some of zoonotic interest) were detected in 9% of ticks collected in 2001 belonging to three species (H. plumbeum, R. sanguineus and R. bursa) (Christova, 2003).

In general, citizens are not well aware of the problems related to tick bites; they are ashamed if attacked and they do not consult physicians. However, tick control strategies have been applied where CCHF cases were identified (North- Eastern Albania); in humans, they have been directed towards prevention of tick bites through information campaigns and animal treatment. Tick control of animals is usually conducted on a voluntary basis and limited to some farmers, mainly those aware of the presence of TBDs (Depaquit, 2010; Papa, 2008).
Other outbreaks of CCHF (both in the same areas and in other districts) cannot be excluded. Furthermore, due to the documentation of other TBDs in humans and/or in animals, some of them of zoonotic interest, and the detection of tick specimens positive to the same pathogens, Albania needs to be more extensively investigated. In the very many green areas i.e. woods, forests, Lagoons, National Parks, there are a great number of wild and uncontrolled animals (mainly rodents, lagomorphs, mammals, birds); this allows high numbers of ticks together with the persistence and spread of the TBDs. For this reason, wildlife populations should be extensively tested, and also because the population of hares and other lagomorphs (common hosts of tick larvae) tend to increase during epidemic phases of the registered TBD (Depaquit, 2010; Papa, 2008).

Again, ticks and TBDs are not considered a priority for veterinary institutions and interest is restricted to individually skilled scientists. This situation limits the opportunity to broaden epidemiological knowledge in the country and does not guarantee close interaction between PHI and veterinary institutions.

Data available on Ticks and TBD diffusion are patchy and discontinuous; the most recent surveys in the country have mainly been directed at investigating some restricted areas i.e. those in which outbreaks of CCHF were registered.

It is necessary to implement competences and/or equipment of LVDC for:

- Tick collection methods in the environment (grass, pastures, sentinel animals, etc);
- Identification at species level, because even specialists present in the country have not transferred their knowledge;
- Specimen dissection;
- Molecular detection of pathogens.

However, it is necessary to continue and going deeply into the tick population surveillance on areas of highest incidence of human and animal TBD cases.

The surveillance it is needed to update information on:

- *Ixodidae* fauna species present in the country
- Tick seasonal distribution and the dynamics in the years
- Tick population densities
- Vector capacity of ticks species
Rodents

Surveys on rodent populations have been carried out by VLVC groups only very recently in 2006, rather unevenly in some rural areas and villages.

Several species of rodents have been identified, most of them asynanthropic. Among the synanthropic species Mus domesticus, Rattus norvegicus and Rattus rattus were identified (2009) (Papa, 2008).

Available data on rodent diffusion are fragmentary, because the surveys mainly aimed to investigate some restricted areas i.e. where outbreaks of rodent-related diseases were registered; clinical cases of Leptospirosis and Hantavirosis, directly connected to small rodents are registered in the country and the surveys on these animals were carried out near the homes of human cases. However, all aspects of the presence of commensally rodents in Albania are well known by the staff dealing with this (Lazri, 2008). The researcher demonstrated good knowledge of how to trap and identify species; their data and reports are good and useful for defining the prevalence of small rodents in rural areas, although it would be useful to enlarge area under observation. However, the work of LVDC group should mainly be focused on obtaining detailed knowledge of rodents in villages and towns in order to understand the distribution and density of species living in close contact with people, i.e. Rattus rattus, Rattus norvegicus, Mus domesticus. This knowledge is crucial for developing prevention plans in very urbanized areas like Tirana and other growing towns (Lazri, 2008).

Pest control: Rodent control management in Albania cannot currently be considered sufficient because it is carried out only in kindergartens and primary schools and even this activity does not seem to be systematic.

In addition, it is not clear how available products for rodent control are; we observed some discrepancies on this issue during the meetings. Rodent control in public areas is not performed regularly, probably because of insufficient resources, but also due to structural limitations.

Visits to specific areas of Tirana have highlighted aspects of land management favorable to colonization and proliferation of rats. Various critical issues have been observed along the streets; they are principally due to the fact that the sewerage system is underdeveloped, and in some places where it is present, there are visible signs of poor maintenance with pavements that are often broken, and uncovered wells for collecting water in large quantities from car washes. The refuse collection bins are often uncovered, and nearby there are often heaps of materials of various kinds. In some cases, uncontrolled landfills were also visible in the center of town. It is evident that these conditions have a significant impact on the development of colonies of rodents that can find food or protected shelter easily. Moreover, in smaller villages were found a lot of fly-tipping along the roads and next to villages, along with the presence of freely circulating animals (sheep, goats, chickens, dogs) (Lazri, 2008).

During 2003 to 2006, samples from 34 Albanian patients were tested by serology and PCR for CCHF virus, hanta-viruses, Leptospira spp. and Rickettsia spp. Hantaviruses were diagnosed in 11.7% of cases and leptospirosis in 29.4%. Furthermore, Leptospira was detected in 10% of samples from rodents of Apodemus spp, collected in rural villages. These findings make it necessary to obtain better knowledge of the rodent populations for the construction of risk maps.
The framework described above necessarily involves the activation of a multi-professional task force that will deal with the development of an action plan, and an investigation at multiple levels: “monitoring of species present in urban areas”, “education programs” (politicians, engineers, citizens, teachers, students), “training” (technicians, pest control operators, etc.), “management of waste collection sewerage”, “reclamation in urban areas land struggle” (rodent control, using molecules according to pest species), “number of companies involved in rodent control”, well-trained staff to perform these checks and availability of control equipment. (Lazri, 2008).

What are some of the strong aspects of the existing system? (Lazri, 2008)

- People are generally well motivated and aware of their needs and of the limits of their working conditions;
- Good general competence and skills of people;
- People are willing to be trained in skills they lack;
- Equipment available at PHI, although not adequate to guarantee autonomous VBD;
- Management, allows a good start of activity;
- Good basic quality data (websites) and human resources useful for planning;
- Epidemiological and control activities against VBDs;
- The good experience matured during the Bluetongue campaign provides an opportunity to improve the capacity of field and laboratory veterinarians to design and implement epizootical monitoring activities, thereby increasing preparedness for responding to future epizootics;
- If the relationship between Human and Vet Health Services is formally consolidated this will be successful and helpful for the country.

What are some of the weaknesses? (Lazri, 2008)

- No good link between different Institutions; lack of a common strategy and integration between different Institutions (i.e. MH, SVS, PHI, MAFCP, ME, Boundaries);
- Lack or poor maintenance of basic infrastructures VBD-related (roads, sewage and urban/rural waste management system, slaughterhouses, treatment plants, sidewalks, wells for collecting water; electricity systems, networking);
- Generally poor hygienic conditions in the countryside and towns and poor management of stray dogs;
- Poor water management and tyre stocking favours mosquito and rodent infestations;
- Poor quality of the current health surveillance system; notifications not delivered in a timely fashion or not delivered at all; probably no early (or no) detection of VBDs and linking processes;
- Lack of awareness of veterinary institutions to VBDs beside those related to Culicoides;
- Lack of awareness of population-based public health approach focused on VBD surveillance and control;
- Generally limited and ineffective actions for all VBD prevention, or only restricted to areas after an outbreak;
- Inadequate provision of pesticides and no autonomy from the central institutions (MH) in acquiring them;
- Role and responsibility in DDD not clearly assigned and no transparent and documented use of pesticides.
- On the whole, limited number of scientists/technicians;
- Poor competence in monitoring (mosquitoes and ticks), species identification (mosquitoes and ticks), GIS, molecular biology. Limited autonomy of research groups for epidemiological studies and scientific referred publication production on VBDs;
- Limited efficiency in working areas, labs and offices (i.e. networking, electricity, etc.).
What are some of the opportunities? (Lazri, 2008)

- Migration from rural villages to towns and related urbanization problems;
- As a developing country, projected climate changes in Albania include increases in CO2 emission (still low), due to future increases in economic pressure, temperature and decreases in precipitation especially during summer, reducing water quality and quantity;
- It is not to be excluded that in the future Albania will become a destination for migrants from Africa or Asia, and also that its trade market can grow;
- The large number of woods, forests, and uncultivated lands, allows the presence of wild animals, maintaining high the number of vectors and VBD reservoirs;
- Wetlands host numerous species of wild birds, and during the summer become ideal habitats for the development of mosquitoes;
- Their own natural features can lead to complications for the conduct of normal activities of pest control;
- Difficulties in setting up plans to combat these insects, due to the lack of clear guidelines about this aspect. Therefore it is difficult to envisage what strategies could be employed if emergency health issues should occur (outbreak of VBDs).

6.2. Water- and Foodborne Diseases

In the Report of 2002, WHO states that 2.4% of enteral infections are due to climate change (Weart, 2004). Epidemiological studies proved a significant relationship between ambient temperature and diarrheal diseases. Therefore the increase of the incidence of enteral diseases is a good indicator of the expected health impact of climate change. At least 70% of enteral infections are caused by *Salmonella* infection, which is transmitted mainly through consumption of contaminated food. *Salmonella* is one of the most frequent food-borne pathogen affecting humans worldwide, and in Europe alone 151,995 confirmed infections were reported in 2007.

Results from observational studies have found that the rate of *Salmonella* infection has a seasonal pattern, with the highest incidence of illness during the summer months. A number of scientific studies have shown that ambient temperature is important in explaining this seasonality. Circumstantial evidence from outbreaks suggests that warmer temperatures allow *Salmonellas* to grow in foods kept at ambient temperatures. Other possible reasons include the effects of climate related seasonal factors (e.g. increased temperature and humidity) on primary production, slaughtering and retail or at the consumer level during warmer periods (e.g. changes in consumption patterns or preparation behavior).

Changes in rate of confirmed human cases of food-borne salmonellosis will provide an indication of climate changes’ effect on the food-borne exposure of enteric pathogens to the population of Albania.
6.3. Adaptation: Surveillance System in Albania


The list of communicable diseases is stated in the Ministry of Health Regulation “Direction on communicable diseases” No.189 of 08.08.1995 and “The new reporting forms on initial notification of communicable diseases” (No. 38 of 09.02.1999).

The Law “On prevention and control of communicable diseases” with No.7761 of 19.10.1993, with the amendment No.8484 of 10.05.1999, applies to communicable diseases, infections and agents including microbes and their toxins, or parasites that can cause outbreaks and pose a threat to public health. Such law and the Ministry of Health decree on application of Alert system of epidemiological surveillance of communicable diseases (No.493 of 02.11.1999) applies also to unusual and unexpected events which may cause severe health consequences of national and international concern.

The integrated communicable diseases surveillance system in Albania consists of the following systems.

Major Disease-Based Surveillance System (MDBSS) which is mainly hospital based but includes also all general practitioner (GP) and specialty practices. The system in itself aimed at an active surveillance rather than a passive one, increasing therefore the active case finding and laboratory capabilities for communicable diseases (confirmed case). The actual notification system contains 73 communicable diseases (ICD-9 Code) presented in a standard official Form (referred to as 14/Sh).

The communicable diseases are divided into three groups (namely A, B, C) in that Form according to the degree of their public health importance, based on the respective measuring parameters such as the magnitude of the problem (occurrence frequency), indices of disease severity (rates of mortality, case-fatality, potential years of life lost), socio-economic impact (medical care, lost productivity, hospitalization rate), and preventability (primary, secondary, tertiary prevention). The Group A contains the communicable diseases of the highest public health importance. Therefore, they are subject to mandatory urgent (within 24 hours) notification from the basic level (data sources including all hospitals, GP and specialty practices, public or private ones) through the local level (District Epidemiological Service at Public Health Directorate) to the national one in the National Surveillance Office (NSO) at Department of Control of Communicable Diseases (DCCD) at the Institute of Public Health (IPH).

All other communicable diseases, listed in the Group B of the 14/Sh Form, are of a rapid notification (within 1-3 days) from data sources to the local level and of a monthly notification from local level to the national one if their occurrence is presented as sporadic cases. In the case of eventual outbreaks, the reporting timeliness is the same as for the Group A diseases (urgent, within 24 hours) from data sources to the IPH. The notification of the communicable diseases of either Group A or Group B is based on individual (case-patient) level (person characteristics), as well as on specific case definition (possible, probable or confirmed one). However, this is not a feature of the last 5 communicable diseases of the Group C, namely unspecified gastro-enteritis, seasonal influenza, common cold or flulike syndrome (in the frame of ongoing outbreaks), scabies, and pediculosis, where the monthly notification is not based on specific case definition but on a common one for each entity.
The reporting mechanism

A physician who discovers through his/her work that an individual is infected with a disease that is subject to registration by the provisions of the above mentioned laws and decrees, or has reason to believe this is so, shall notify the district epidemiological office in the district directorate of public health. Directors of laboratories, specialty practices and hospital departments and other health institutions are subject to the same obligation. The District Epidemiological Service at Public Health Directorate notifies according to A, B and C and to the national one in National Surveillance Office (NSO) at the Department of Control of Communicable Diseases (DCCD) in the National Institute of Public Health (IPH). The aggregated data in the monthly 14/Sh Form are presented for each communicable disease according to place (urban and rural), specific case definition (possible, probable and confirmed case), age-groups (16 ones in total, that is by a narrow division) and gender. Another column belongs to the number of hospital admissions and the last column to the number of deaths.

The 14/Sh monthly Form of the actual reporting system should be accompanied by Individual Forms 14-1/Sh (for each of the Group A diseases), 14-2/Sh (for most of the Group B diseases), 14-3/Sh (for the other entities included in the Group B), and 14-4/Sh (for the Sexually Transmitted Infections and HIV/AIDS included also in the Group B). The individual forms contain a highly detailed epidemiological information about the case-patient (protocol field investigation), thus increasing first of all the specificity of the surveillance system. Therefore, they serve as necessary complementary tool to the 14/Sh Form’s aggregated data.

NSO in IPH is responsible for maintaining a register of communicable diseases. This register includes diseases, agents causing diseases and events, immunizations, and is intended to be of use in preventive measures and in epidemiological research.

By the end of every month the NSO at DCCD, IPH prepares a national report for the Ministry of Health with data from 36 districts for each communicable disease according to place (urban and rural), specific case definition (possible, probable and confirmed case), age-groups and gender as well as hospital admissions and deaths.

Syndrome and weekly based ALERT system is established to increase the timelines and sensitivity of the system. There are 9 syndromes under ALERT system such as diarrhea without blood, diarrhea with blood, upper respiratory infection, lower respiratory infection, rash with fever, jaundice, hemorrhage with fever, suspected meningitis, and unexplained fever. Last year, two other syndromes were added such as Severe Acute Respiratory Disease including Acute Respiratory Failure and Unexpected Death.

Data flow structure of the Alert System implies the weekly mandatory notification from the basic level (data sources from GP offices, Emergency and Admission units at Hospitals) to the national one (NSO, DCCD of IPH) of the surveillance system through the local level (district epidemiological service). Reports (according to person characteristics and place for each of the above-mentioned syndromes) are presented in the Alert weekly Form. A weekly ALERT Bulletin is prepared by IPH and distributed to all data sources and local levels, as well as the MoH.
A strengthened case-based surveillance is established for certain diseases as a national priority including Acute Flaccid Paralysis, Measles and Rubella, Congenital Rubella Syndrome, Viral Hepatitis, Avian influenza in Humans, Pandemic Influenza A (H1N1), Bacterial meningitis and severe childhood bacterial diseases (sepsis and pneumonia) due to *S.Pneumoniae, H.Influenzae, N.Meningitidis, Aseptic Meningitis* and Encephalitis, HIV, AIDS, Syphilis, Brucellosis, etc. including several specific reporting forms and zero reporting.

Concerning data handling, the IPH represents the National Database Manager dealing at country (national) level with: data collection, data check and initial entry, data editing, data analysis, report generation (monthly Epidemiological Bulletin as well as Special Reports), and reports’ dissemination (feedback loop).

The alert and response system, risk assessment and risk management of public health emergencies of international concern in the field of communicable diseases

The foundation of the alert and response system is stated in the Law “On prevention and control of communicable diseases”, No.7761, date 19.10.1993, with the amendment No.8484 of date 10.05.1999 and Public Health Law of 2009 and was extended with “Application of Alert system of epidemiological surveillance of communicable diseases” (No.493 of 02.11.1999) and the Order of MoH, 2007, in order to cover not only communicable diseases but all unusual and unexpected events which may cause severe health consequences of international concern.

According to the Order of MoH, 2007 on implementation of IHR (International Health Regulation), health officers appointed for public health and health monitoring, veterinarians and employees of the Food and Veterinary Authority, the Environment Agency, Radiation Safety Authority, must inform the relevant local, regional epidemiologist, chief epidemiologist, head of DCCD, IPH director and the Head of sanitary inspectorate, immediately when they become aware of a risk of infection or health threat due to toxic chemicals or radio-nuclear substances. The head of sanitary inspectorate and director of IPH have to provide the necessary information and immediately inform the Minister of Health and inform and advice the relevant ministries and the emergency operation office and supervise the implementation of necessary measures. The prime minister office should be informed immediately about all operations.

The ALERT system monitors all important syndromes and their trend as well as the epidemic curve. Based on 2007 MoH order and Public Health Law of 2009, the IPH has been established as the national focal point to coordinate all responses for all public health threats. A public health inter-ministerial board is established at the MoH to gather all necessary information and supervise the adequate measures for assessment and eradication of the threat of infection, toxic chemicals or radio-nuclear substances, as well as monitor the situation and decision making.

IPH as the focal point to implement IHR (International Health Regulation) and the board should have access to all necessary information and to all locations that it considers necessary to inspect and should be assisted by emergency and police authorities if necessary. IPH and the board should instruct all those who have supervision of animals, food and environment to apply without delay all necessary measures to eradicate the risk of infection, toxic chemicals or radio-nuclear materials. In each prefecture there is an emergency operation unit that coordinates all evaluations and preventive measures with the regional public health directorate and surveillance unit.
Public measures against communicable diseases; measures with regard to risks of epidemics

According to the Law “On prevention and control of communicable diseases”, No.7761, date 19.10.1993, with the amendment, No.8484 date 10.05.1999 and the Law “On the sanitary state inspectorate” (No.7643 of 10.11.1992), it is stated that if notifications to the local chief epidemiologist and the local chief of sanitary inspectorate on communicable diseases indicate that an epidemic or outbreak is imminent, he/she should inform Chief Epidemiologist at IPH and the Chief Sanitary Inspector at MoH or immediately the Minister of Health. The local chief epidemiologist and local chief sanitary inspector based on further advice of Chief Epidemiologist and Chief of Sanitary Inspectorate should decide about the measures that should be implemented at local level such as immunization, isolation of infected persons, disinfections, quarantine of communities, by closing of schools or prohibition of local public gatherings. The Chief Epidemiologist and Chief of Inspectorate should immediately advice the Minister of Health to apply all the above mentioned measures at national level or if includes more than one prefecture as well, to close borders or other inter country measures. They may apply such emergency measures without seeking authority in advance, if they believe that any delay would entail a risk, but they must inform immediately the Minister of Health about all implemented actions. In the case of an outbreak or epidemic threatening national human health, the Chief Epidemiologist may carry out an epidemiological investigation on the source of infection with or without the notification of district epidemiologist and in such cases has the same right of access to information and to inspection.

ALERT system is an important tool to investigate in a timely fashion all communicable disease threats.

Preparedness action plans

Since 2000, national epidemic preparedness action plans are made on regular basis and for specific diseases such as Measles, Enteroviruses, Food borne diseases, Brucelosis etc. Since 2006, preparedness plans have been made on Avian Influenza and Pandemic Influenza. A national influenza response plan was prepared on 2007 and further was improved in 2008 and signed again in February 2009. The pandemic preparedness plan was coordinated with the emergency preparedness one and all activities were well coordinated with emergency operations. Table top exercises were performed for Avian Influenza and Pandemic Influenza with all involved actors such as public health, hospitals, veterinary service, local government and other ministries at national level but also evaluations and training were implemented at regional level where each region established its own hospital pandemic and emergency preparedness plan.

International cooperation and the National Focal Point according to the International Health Regulations

In accordance with the relevant order of the Minister in 2007 and the Law “On prevention and control of communicable diseases” No.7761 date 19.10.1993, with the amendment No.8484 of 10.05.1999 and the Law “On the sanitary state inspectorate” (No.7643 of 10.11.1992, it is stated that with regard to measures to be applied in the case of a risk of an epidemic coming from abroad or spreading from Albania to other countries, regulations should be drawn in consistency with the content of those international treaties to which Albania is a party, such as the International Health Regulations of the World Health Organization. The Institute of Public Health is the Albanian National Focal Point and a roster of experts , are part of it, including the Chief Sanitary inspectorate, Chief Epidemiologist, IPH director and heads of surveillances and are related to the corresponding WHO Focal Point according to the International Health Regulations. Also, parts of it are responsible persons for radioprotection safety, food safety, water safety and chemical safety.
6.4. Recommendations

- Ministry of Health should encourage the preparedness and the funding of relevant research projects, such as better knowledge of mosquitoes, ticks, sandflies (speciation, distribution, density, pattern of infestation, state of infection, vectorial role) and urban rats; to check for correct pesticide use, roles and rules.

- Institute of Public Health should improve their own entomological and pathogen detection capacity and efficiency.

- Food Safety and Veterinary Institute should ensure the necessary synergy and the activation of an integrated surveillance system.

- Public Health Department in every district should enhance awareness about the issue of vector-borne diseases.

- All these institutions should integrate all their competences and strategies better, to promote a more modern and efficient flow of information, to better address the Municipalities on the environmental, social and political choices by promoting the overcoming of the VBD-related infrastructural lacking or absence, enhancing coordinated efforts in furthering good citizen practices.

- The impact of climate change on the epidemiology of malaria in Albania remains to be ascertained with specific entomological/parasitological investigations focused on sites of greatest risk. It is important to carry out specific entomological surveillance.

- It is necessary to continue and to go deeply on the tick population surveillance on areas of highest incidence of human and animal TBD cases.

- In Albania, morbidity of Visceral Leishmaniosis, transmitted by sand flies vectors, is 20-40 times higher than in other southern European countries.

- It is fundamentally important to organize specific entomological surveillance activities to gather information on:
  - the distribution and abundance of this vector in different areas and seasons, and
  - to establish correlation with altitude, town districts, and village dimensions
  - to collect information on the population size, densities, seasonal dynamics, typology of Ae.albopictus breeding sites.

- First of all, it is important to provide adequate training to the personnel at PHI:
  - entomological staff must become able to use the main types of traps or other instruments to collect mosquitoes, sand flies and ticks and to identify collected specimens at species level;
  - laboratory staff must become able to use molecular equipment and to implement the main tests to identify pathogens.

- The capacity to conduct epidemiological investigation and to analyze collected data correctly using bio-statistical methodology should be improved at all levels.
• It would also be useful to organize some events, workshops and training courses, for different target groups in order to enhance awareness about the risks related to vectors and the actions to control them. This educational program could involve politicians, technicians in public administration, teachers, students, and ordinary citizens.

• A multidisciplinary “task force” could be activated to prepare and implement a plan for the surveillance and control of vector-borne diseases.

• The introduction of new vector species and pathogens, and increased case reports of endemic diseases, requires the development of several vector surveillance aimed at risk reduction.
7. Evidence Gaps and Research Recommendations

**Recommendations for Health Sector**
- Improve the legal framework in line with the country’s commitments in preparation for tackling climate change.
- Health Sector should have contingency plans for responding to any kind of extreme weather events.
- Capacity building for doctors and nurses to know the causes and consequences associated with climate change, and responding to them.

**Recommendations for Other Sectors**
- Measures taken by the health care sector should be combined with other measures from other sectors.
- Add to the education curricula information about climate change and health consequences.
- Encourage the use of renewable (alternative) energy

**Recommendations for Research**
- Invest in capacity building in research.
- Financially support research in tracking the health risks of Albanians derived from climate change.
- Provide scientific evidence for public awareness.
Extreme weather events

- Based on the number of emergencies in the past few years in our country, even though we have to admit that we have not faced major disasters, we can say that they have shown a growing trend while at the same time widening their reach.

- Climate changes have certainly had their impact in this regard and the number of local flooding, forest fires, landslides and erosions show that this impact is considerable.

- Population, government and policy makers need to become more aware of these phenomena and their public health consequences.

- Disasters, seasonal emergencies, accidents and various situations which cause civil emergencies have high costs on the community, private property, public infrastructure and the environment which amount to millions of dollars every year. If we take into consideration that at least once a month Albania faces an emergency situation of the average to high level, then these costs are very high. Theoretically costs go up not only in terms of the level of volatility but also in the regenerative capacities from damages caused by disasters.

- Viewed from the perspective of their impact, relatively poorer countries and peoples are prone to face higher costs in the case of disasters. The consequence bring about immediate impoverishment, increase in social difficulties, economic fluctuations and unknown periods of time leading to the return to normality.

- Based on the experience of these past years, the impact of emergency cases, their frequency as well as the need to increase the security level for the community, the private and public properties and the environment, then the need to make legislative, structural changes and intensify the prevention measures, is much more evident.

- Mitigation and adaptation measures need to be strengthened.

- A functional early warning system should be established for all major events.

- More robust sectorial policies should be developed.

- Assess health vulnerability and build capacity to reduce vulnerability.

- Revision of legal framework.

- Clear communication strategy on climate change and health.

- Awareness rising.

- Specific early warning systems for fires.
Floodings

Recommendations and proposed measures to improve the situation of soil erosion along river banks in Albania:

- Strict control over the irresponsible use of inert materials from riverbanks with harsh penalties for violators, and a complete stop to using materials from the lower parts of the rivers Vjosa, Osum, Shkumbin, and Mat.
- Forestation as quickly as possible and construction of various hydro-technical works to manage the flow of the water on the river channel.
- Elimination of mechanical interventions near the riverbeds for the purpose of plowing and other activities (it is proposed that specific legal decrees be adopted to define a protective area for this purpose, following examples from the western world).
- Maintaining and ensuring a normal and uniform regime of the flow of water and solids down rivers and maintaining a natural balance for controlling river mouths.
- Undertaking a whole series of engineering, hydro-technical, and other measures with the purpose of maintaining wet wildlife habitats and the channels of these rivers.
- Control and regulation of river banks (forestation of river banks, maintain normal flow, avoid mechanical interventions).
- Flood risk assessment every six years including flood risk/hazard maps, flood risk management plan.

Disaster preparation and response

- There is a need for more robust sectoral policies.
- Furthermore, there is a pressing need to assess health vulnerabilities and build the necessary capacities in order to reduce health vulnerability to climate change.
- Reviewing of the legal framework is similarly vital in order to take into consideration the health aspects of climate change.
- A clear communication strategy on global warming and health should be established.
- Long term research work is needed in order to link possible health impact to the changing of the climate.
Health systems’s function of Stewardship in DPR

Recommendations for improvement of the situation include the following:

- Assessment of health sector crisis management capacities;
- Preparation of health sector crisis management policy;
- Amendment of current crises management legislation;
- Setting up and strengthening of crises health sector institutional framework;
- Designing and approval by MoH of crises management programs for: risk reduction, crises preparedness, coordination and partnership, crises health education, public information, and monitoring & evaluation.

Health system’s function of research generation on DPR

Recommendations for improvement of the situation include the following:

- Preparations of training modules and accredited training programs on health crises planning and management;
- Preparation of procedures, guidelines, incentives to ensure the availability & security of staff, volunteers and community;
- Compiling of guidelines and procedures for emergency procurement, rapid mobilization, coordination and distribution of essential pharmaceuticals, equipments and medical supplies;
- Strengthening of early warning system with particular attention to outbreaks, influenza pandemic, extreme weather events, food scarcity, technological and industrial hazards;
- Preparation of protocols and guidelines for hazard & vulnerability assessment, damage & need assessment and reporting.

Health system’s function financing in DPR

Therefore, recommendations for improvement of the situation include the following points:

- Ensure preparedness funding for health crises planning process, vulnerability assessment, risk reduction of health facilities and simulation exercises;
- Ensure contingency funds.
Health system’s function of service delivery

Recommendations for improvement of the situation include the following:

• Preparation at all levels of health sector of:
  o crisis emergency plans (generic disaster plans);
  o risk reduction and mitigation plans;
  o contingency plans (based on hazard & vulnerability assessment);

• Preparation of protocols and guidelines for triage (at scene medical operational, pre-hospital & hospital services):
  o infection control;
  o organization/function of advance medical post;
  o management of health problems in mass gathering situations;
  o international cooperation and sharing of information;
  o management of the dead and the missing persons.

• Setting up of surge capacity system/network to activate in time all available assets (human resources, supplies, technical & medical expertise, transport) from various sources: other sector, private sector, NGOs

• Organization of coordination system/referral system for dispatching the patients among the receiving health care facilities, including international evacuation.

• Preparation of operational practices, procedures and protocols for the continuity of essential medical services:
  o Prevention and control of communicable diseases and immunization;
  o Mother and child health care and reproductive health;
  o Mental health and psycho-social support;
  o Environmental health;
  o treatment for chronic and non-communicable diseases;
  o diagnostic capacities;
  o blood donation and safety;
  o nutrition & food safety.

Recommendations against air pollution

• Master plan of landuse, urban development and transport/traffic

• Improved cleaning of urban roads

• Increase urban green space

• Better control of fuel quality

• Health sector: improve and increase collection of mortality data (respiratory and cardiovascular causes in particular)

• Monitoring of the environment needs has to be of national concern and should be regulated by law.
• Improved networking and cooperation between institutions, also formalized in MoE

• Education of general public and capacity building in the government

• Regular and frequent communication of pollution levels to the populations

• Set up of a single unit, within an existing agency or ministry, responsible for coordinating the data and information to monitor health effects of climate change through indicators such as number of days per year above comfort temperature, excess heat-related morbidity and mortality, ozone indicator, UV indicator, existence of flood risk management, pollen indicator, VBD indicator: CCHF, HFRS, V/S Leishmaniosis, WNF: WFD indicator: salmonellosis

• Further long-term research

Research recommendations related to pollens

• To keep monitor on continuous basis the aeroallergens as it is the only way to measure the effect of climate change to the airborne particles that cause allergy.

• To correlate the daily pollen data with the meteorological data.

• To establish an effective way to give information to the public for the pollen calendar for the spring season using thresholds values.

Recommendations for vector borne diseases

• Funding of research

• IPH should improve entomological and pathogen detection capacity and efficiency

• Integrated, and specific entomological surveillance system including IPH, food safety, vet. institute (surveillance of disease and surveillance of vector)

• Local awareness raising

• Improve integration and flow of information

• Good citizen practises

• Training and capacity building

• Multidisciplinary task force to develop and implement a plan for the surveillance and control of vectors and VBD.
Recommendations for health relevant climate change indicators

Some data useful for Indicators is being collected, although some of it is not collected frequently enough and some of it may be inaccurate (infant mortality data for example). Also, other data is being collected, but is not being made readily available, or is not made available in a form useable and capable of being analysed (such as data collected by the Institute of Statistics). Data from Tirana Hospital is not supplied to the Institute of Public Health, other than that on infectious disease, although it would be better if other data were supplied.

It is recommended that there is a single unit made responsible for co-ordinating the data and information needed for developing and maintaining the Indicators. This could be a unit within an existing agency or Ministry.

However, the most important point is that this unit should have the authority to ensure all relevant data is collected at the appropriate frequencies, in the appropriate useable form, and is made available for the Indicators.

It is suggested that:

• consideration is given to amending the ALERT (syndrome based weekly reporting) system to include useful data on other health conditions (such as those related to heat waves);

• consideration is given to making air pollution information available on-line;

• more use is made of the meteorological data, particularly in forecasting possible extreme weather events such as heavy precipitation and heat waves.

The Indicators recommended for development are given below. In terms of priority of development it is suggested that the Heat-Health Action Plan is developed first along with the other Heat related Indicators. The Pollen, Vector-borne Diseases and Enteral Infections Indicators should be developed at the same time, followed by the Ozone and Exposure to Flooding Indicators.

Although not proposed as an Indicator, it may be useful to consider a national assessment of the resilience of the water supply and of sanitation.

Recommendations for excess heat indicators

Four heat-related Indicators are recommended:

• Heat Exposure
• Heat-Health Action Plan
• Excess Heat Mortality
• Excess Heat Morbidity

The Heat Exposure Indicator can operate as the trigger to implement the Heat-Health Action Plan. The Excess Heat Mortality and Morbidity Indicators can be used to monitor the effectiveness of the Action and inform reviews of the Plan.

At first, the Heat Exposure Indicator should focus on Tirana, then introduced for the other cities.
Recommendations for air pollution indicators

In Albania two automatic ambient air quality monitoring stations are put in operation in the capital as of May 2010. The concept of population weighted average exposure may be considered in case when the number of the population is expressed in the rate of the total population.

Initially, this Ozone Indicator should focus on Tirana, and expanded to other cities later. This means that it should be population weighted for the specific areas.

Recommendations for flooding indicators

Direktiva e BE-së për Përmbytjet (2007/60/EC) është tashmë në fuqi dhe zbatohet për të gjitha The EU Flood Directive (2007/60/EC) is now in force and applies to all kinds of floods (river, lakes, flash floods, urban floods, coastal floods, including storm surges and tsunamis), in all of the EU territory.

It is concerned with all aspects of flood disasters, including economic and environmental effects as well as the effect on people.

The Directive requires Member States to approach flood risk management in a three stage process:

• Undertake a flood risk assessment to identify areas where potential significant flood risk exists.

• Where real risks of flood damage exist develop flood hazard maps and flood risk maps. These should identify areas with a medium likelihood of flooding (at least 1 in 100 year event) and those with a high and low likelihood. In the areas identified as being at risk the number of inhabitants potentially at risk should be given.

• Develop flood risk management plans, to include measures to reduce the probability of flooding and its potential consequences.

It is recommended that these steps should be reviewed every 6 years at least.

The impacts of floods on health depend on many factors, but mostly on the nature of the flood and the vulnerability of the populations. Floods are known to produce direct deaths from trauma and drowning, and injuries. Medium term effects are the potential increase of waterborne (i.e., Cholera, Hepatitis A, Leptospirosis, Giardia, Cryptosporidiosis), vector-borne (i.e., Malaria, Dengue fever) and rodent-borne transmission of diseases, also with important effects on mental health (common mental disorders and post-traumatic stress disorders).
Recommendations for pollen indicators

The 4th Assessment Report of IPCC (IPCC, 2007) states that climate change has caused an earlier onset of the spring pollen season in the Northern Hemisphere. It is reasonable to conclude that allergenic diseases caused by pollen, such as allergic rhinitis, have experienced some concomitant change in seasonality.

There is limited evidence that the length of the pollen season has also increased for some species. Although there are suggestions that the abundance of a few species of air-borne pollens has increased due to climate change, it is unclear whether the allergenic content of these pollen types has changed (pollen content remaining the same or increasing would imply increased exposure). Few studies show patterns of increasing exposure for allergenic mould spores. Changes in the spatial distribution of natural vegetation, such as the introduction of new aeroallergens into an area, increases sensitization.

The pollen map of Europe is changing also as a result of cultural factors (for example, importation of plants such as birch and cypress for urban parklands), greater international travel (e.g. colonization by ragweed in France, northern Italy, Austria, Hungary.

The appearance of new invasive plant species with highly allergenic pollen, in particular ragweed (*Ambrosia artemisiifolia*), presents important health risks. Ragweed is spreading in several parts of the world, it is of high importance in many parts of Europe, spreading from the Carpathian Basin in different directions.

In Albania there exists a pollen monitoring network, currently operating with two stations using standard methods. There is a series of years with daily pollen concentration data, reported also to the European Allergy Network. These circumstances allow suggesting pollen indicators elaborated by the EU/WHO CEHAPIS project with a hint of including two locally relevant groups of species, namely Cupressaceae/Taxaceae, respectively Urticaceae.

Recommendations for indicators related to vector borne diseases

Based on scientific evidence, the following diseases are recommended as indicators:

1. Viral Hemorrhagic fever, CCHF
2. Hemorrhagic fever with renal Syndrome
3. Visceral and cutaneous Leishmaniasis
4. West Nile virus infection
8. General Public Recommendations

- Raise the public awareness about individual contributions in the emission of greenhouse gases, for example: use of diesel cars, etc.

- Raise the public awareness in order to participate in the discussion of urban planning and industrial areas.

- Raise the public awareness in order to respect the rules for environmental protection.

- General population: everyday advice on air pollution levels, awareness raising. The Albanian population at large needs to become more aware of the climate change phenomena and their public health consequences.

- Include environmental education in the school curricula.

The measures envisaged by the Intersectorial Environmental Strategy to mitigate climate change include the following:

**Change of legal basis:**

- legal framework for energy efficiency in new buildings;
- legal framework for energy efficiency of household equipment

**Establishment of economic incentives:**

- setting the carbon tax;
- creation of a grant or subsidy scheme for energy efficiency.

**Reduce GHGs released by transport and energy:**

- review of the transport strategy in accordance with the provisions of the strategic environmental assessment for the improvement of road transport infrastructure;

- introduction of vehicles with low levels of emissions;

- review the strategy for the energy sector in accordance with the provisions of the strategic environmental assessment to enable the promotion of renewable energy sources.

**Awareness campaign to reduce the amount of greenhouse gases:**

- promotion of energy efficiency in industry;
- improvement of thermal insulation and reducing unnecessary use of power for heating or cooling systems in houses;
- promotion of solar heating systems.
9. References


PROTECTING HEALTH FROM CLIMATE CHANGE IN ALBANIA