

## Climate Change and Human Health in the Republic of Armenia

Over the ages, human societies have altered local ecosystems and modified regional climates. Today, the human influence has attained a global scale. This reflects the recent rapid increase in population size, energy consumption, intensity of land use, international trade and travel, and other human activities.

Climate and weather have always had a powerful impact on human health and well-being. But like other large natural systems, the global climate system is coming under pressure from human activities. Global climate change is, therefore, a newer challenge to ongoing efforts to protect human health. Health is a focus reflecting the combined impacts of climate change on the physical environment, ecosystems, the economic environment and society. Long-term changes in the world climate may affect human health and well being through a variety of mechanisms. Climate change can adversely impact the availability of safe and drinking water supplies, food security and secure dwelling.

Today, humankind's activities are altering the world's climate. We are increasing the atmospheric concentration of energy-trapping gases, thereby amplifying the natural "greenhouse effect" that makes the Earth habitable. These greenhouse gases (GHGs) comprise, principally, carbon dioxide (mostly from fossil fuel combustion and forest burning), plus other heat-trapping gases such as methane (from irrigated agriculture, animal husbandry and oil extraction), nitrous oxide and various human-made halocarbons.

To fulfill Armenia's commitments under the UN Framework Convention on Climate Change in 1996 Armenia received financing from the Global Environment Facility to prepare its First National Communication. The Communication includes: i) inventory of anthropogenic emissions and sinks of greenhouse gases according to the IPCC Guidelines; ii) possible consequences of climate change, vulnerability assessment and measures of adaptation; iii) enhancement of general awareness and knowledge among climate change related issues, ect.

Armenia is a landlocked and mountainous country that has small territory, high population density, and fragmented relief. The location of Armenia is on the crossways of three bio-geographical zones and this is a result of rich composition of flora and fauna. The climate varies from subtropical to continental; temperatures can range from  $-41^{\circ}\text{C}$  to  $+42^{\circ}\text{C}$ . In the southern plain regions the climate is arid and extremely continental. The climate of northern mountainous regions is milder and damper.

Global climate change and internal micro-climatic changes on the territory of Armenia might have the following consequences:

- ◆ Change of the borders of natural climatic zones;
- ◆ Significant change of the biota;
- ◆ Change of the mode of the rivers' runoff, significant infringement of water balance of Lake Sevan and quantitative indicators of water resources;
- ◆ Change of amount of precipitation and soil moisture content;
- ◆ Change of Agriculture potential of the Republic;
- ◆ Change in indicators of the sick rate of the population.

These consequences can essentially affect the climate-dependent branches of economy and children health in particular.

For the vulnerability estimation the IPCC scenario was accepted: increase of the air temperature in  $2^{\circ}\text{C}$  and reduction of atmospheric precipitation for 10 %.

As a result of studies we have revealed that in case of predicted climate change the following health problems will occur in Armenia: malaria, leishmaniasis, plague, cholera, diseases of cardio-vascular system, parasitic diseases and helminthes.

In the case of the expected climate change the weakening of adaptation mechanisms, as well as an increase of cardiovascular diseases, especially among the most vulnerable part of population is projected.

There is a possibility of outbreak of plague epidemic situation as a result of partial covering of areals of plague microbe carriers. Expansion of the areals of carriers and increase of epidemic danger of malaria is expected also. According to the forecast there could be an aggravation of epidemic situation for cholera. We have also predicted an increase of intestinal diseases as a result of the longer duration of the period with optimum temperatures for reproduction and development of causative agents in soil and water. The adaptation includes a complex of social, sanitary, preventive and administrative measures.

It worth to emphasize that the protection and improvement of population health is recognized as an element of environmentally sustainable development, which is clearly presented in the National Environment and Health Action Plan of Armenia, developed with the support of the WHO European Office and the UNDP Office in Armenia and approved in 2002 by the Government of Armenia.

The adaptation measures to reduce the health effect of climate change include a complex of social, sanitary, preventive and administrative measures.

During the Project implementation the following adaptation measures have been developed:

- Increase of social-economic living standards of the population;
- Increase of the sanitary-hygienic awareness level and household culture of the population of the republic;
- Use of house construction technologies, which enhance the creation of optimal temperature mode;
- Creation of zones with a sparing microclimate (parks, green zones, fountains, etc.) in the populated areas;
- Develop monitoring system for the risk group population (elder people and children) vulnerable to thermal load;
- The preliminary notification of the population and organization of preventive measures to facilitate emergency responses to extreme heat;
- The strict quarantine surveillance on borders, at the airports for prevention of infectious agents transmission;
- Develop up to date monitoring system of exposed territories for especially dangerous infections in order to take timely measures for revealing and treatment of the sick and parasite-vectors for the prevention of further spreading of the infection;
- Combating of infections agents and vectors;
- Monitoring and control of sanitary-hygienic condition of water-collecting and water-supply network, maintenance of water-pipes by modern installations and means for water purification and disinfection;
- Vaccination and chemical prevention measures for the population (in case of epidemic complications);
- Use of individual protection means.