

KEY CHALLENGES IN MANAGING HEALTH EFFECTS OF CLIMATE CHANGE IN CYPRUS

1. Climate change is the biggest global health threat of the 21st century

The final report of the [U.S. Environmental Protection Agency](#) titled as “[Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems \(SAP 4.6\)](#)” emphasized the human health, welfare and human settlements in the context of harmful effects of the global climate change. By the change in the Earth’s global climate people will tend to change the place where they used to live and work. Extreme weather events, such as intense and frequent precipitations as well as extreme droughts causing shortage of water will affect directly and indirectly health and quality of life of the humans. The sea level rise will affect some of the most developed areas in the world, which are in almost all cases located in the coastal zones. Coastal zones are also known as the densest populated areas in the world. Although the report meant to assess the effect of the climate change on the U.S. population, warning conclusions of this report can and should be applied to the other areas of the world equally.

Billions of people on the Earth will be at an increased hazardous health effect of the global climate change during the following decades. The preindustrial average temperature of the Earth’s surface is likely to be increased for more than 2°C, which is a recommended safe threshold. It is predicted that regions at the higher altitude will be experiencing a higher temperature rise while a medium-risk predictions of 2–3°C rises by 2090 and 4–5°C rises are expected in northern Canada, Greenland, and Siberia. The outlined major threats considering both, direct and indirect effects of climate change on global health in this paper are the following: changing patterns of disease, water and food insecurity, vulnerable shelter and human settlements, extreme climatic events, and population growth and migration. These areas were pointed out in the [Managing the Health Effects of Climate Change](#) paper published in [The Lancet](#) journal in 2009. The vector-borne diseases are expected to expand, particularly among elderly people due to the heat waves, while the indirect effects of climate change on water, food security, and extreme climatic events are likely to have the biggest effect on global health.

From both reports it can be concluded that global human health is being threatened by the climate change in a complex way. On one side there is an increase of diseases that favor flooded areas or an increase of infectious diseases occurring in shortage of water due to the long lasting droughts, which cause an urgent need for an intervention from health professionals. From the other side a flooded or dry area force people to migrate thus creating issues containing social dimension that significantly affects the quality of life and consequentially health of the humans.

This global threat requires a complex intervention gathering experts from different scientific and policy areas to work jointly on the combating the hazardous health effect of the climate change on humans. Aiming to achieving an effective cooperation between these two areas there are many challenges that are left to be overcome around the globe. In this paper I am going to cover the key challenges in managing health effect of climate change emphasized at the Lancet's article in regard to the Cyprus circumstances.

2. Key challenges in managing health effects of climate change in Cyprus

2.1. Changing patterns of disease influenced by the change in climate

As the global climate of the Earth changes, consequentially knowledge on the geographical distribution of the vectors, vector-host relationship, and transmission of food-borne pathogens as well as new or re-emerging pathogens has to be gathered. The study "[Climate change and infection disease in Europe](#)" pointed out different disease whose pattern is closely related to the climate conditions. Vector born diseases are transmitted by infected arthropod species. These species are known to be cold blooded (ectothermic), hence they are very sensitive to on the effects of climate. In the contest of Cyprus there is a specific interest on the sendfly-born disease that is called leishmaniasis. It was published in February 2009 in the paper called "[Leishmania donovani leishmaniasis in Cyprus](#)" that this leishmaniasis is not is not placed under public health surveillance in Europe. It is certain that there will be an increased number of the diseases that has to be under more control in the Mediterranean region due to the increased temperatures and prolonged droughts that favors some diseases that were previously not so common. Therefore there is an informational gap that requires an extended and continuously up to date research on the patterns of diseases under new climate conditions.

2.2 Water and food insecurity

Lack of the drinking water is one of the compelling issues in Cyprus. Scarcity of water coming from the precipitation events imposes a serious concern since the capacity of desalination water treatment plants cannot always met the need of the population. Therefore the [Cyprus Ministry of Agriculture, Natural resources & Environment](#) has established a well organized web page [Water Development Department](#) that has a possibility for sending an online enquiry form with questions related to the water supply, water processing and transport, as well as the questions related to the water pollution. As the main health issues in Cyprus coming from a water supply are the one coming from imported water from Greece that is needed in the periods of extreme droughts. Water that is being transported can be contaminated on the way to Cyprus or while being distributed, due to the long distance. Cyprus population therefore tends to drink bottled water which is shown to be toxic due to the softeners added to the plastic bottles that can be released in the water.

The available and good quality food is one of the core components that determine health of a population. In general the prediction on that how the climate change will affect the agriculture is not sufficient. Change in climate in agriculture may be overcome by increasing the abilities of the irrigation system or by increased production and use of genetically modified crops. This

may induce a higher use of pesticides so the agriculture can remain financially viable. In regard to the region different decision can be done. The [“World development report 2008: Agriculture for development”](#) states that there is no evidence that genetically modified plants will increase food security in a context of changing climate. It also indicates some dangers related to an over-reliance on such plants. Cyprus as a member of the European Union follows the [„Rural Development Programme 2007-2013“](#) approved by the European Commission. At the same time extreme droughts that turn the land in to the deserts should be additionally explored. It seems that the major is directed toward the industrial innovations and developing a genetically modified crops. The issue of steadily progressing desertification in Cyprus is the challenge that will have to be considered more. [Report](#), dealing with the desertification issue in Cyprus, that I could access dates from 2002.

It could be said that a cross-sectional challenge in managing health issues caused by climate change is an informational gap. Since the change in Earth’s global climate is phenomenon that the human kind is experiencing for the first time there are many aspects that should be additionally clarified and any prediction is not completely certain.

2.3 *Vulnerable shelter and human settlements*

The human settlements, both rural and urban, will be greatly affected by the irreversible outcomes of climate change, even in the most optimistic scenarios. There is growing evidence, through simulations and empirical studies, proving this conclusion.¹ There is an urgent need on the researches that should focus on how settlements will be affected and how to best adapt to climate change.² On the climate change prediction the social and economic effects of climate change will drastically increase inequalities around the globe. In the developing countries most vulnerable people live in urban settlements in developing countries that have limited resources to adapt to climate change and are already affected by several natural-related risks, such as floods and landslides.^{106,107} Paradoxically, urban areas in high-income nations, which are the greatest contributors to greenhouse gas emissions, have much more resource capacity to adapt. In regard to Cyprus, the location of the very important infrastructure, such as airport is located just by the coast line. Also the biggest cities in Cyprus such as Larnaka, Paphos and Lemossos are located by the sea and thus at the front line to the harmful effect of the eventual sea level rise. As closer to the sea, more vulnerable the settlements are. In case there will be an urgent need to move the population living in the coastal zone, there is no any measure that can be introduced then. As a main threat to the general public health is actually the safe and healthy home. In this regard the challenge remains to estimate the eventual consequences and device a backup plan for this case.

¹ Hales S, Baker M, Howden-Chapman P, Menne B, Woodruff R, Woodward A. Implications of global climate change for housing, human settlements and public health. *Rev Environ Health* 2007; 22: 295–302.

² Stern N. *The economics of climate change*. Cambridge: Cambridge University Press, 2007

2.4 Extreme climatic events

Severe floods, windstorms, heat-waves and cold-waves have caused dramatic political, social, environmental and health consequences in Europe over the past few years. In response to these events, ministries of health and other public health authorities, along with national and international meteorological services and organizations, are focusing increased attention on developing appropriate strategies and measures to prevent health effects from extreme weather and climate events in the future. Efforts are being made to understand the lessons learnt from recent events, to evaluate the effectiveness of the measures taken and early warning systems in place, and to use the knowledge gained to target future activities. The recent events have also increased interest in whether the intensity and frequency of future extreme weather and climate events could be expected to change as one result of a changing climate.

Since the Cyprus is an island it could be assumed that the effect of any extreme climate event will cause more serious consequences to the population. There are not enough data on the extreme weather events in Cyprus, therefore this lack of important information should be solved. This information should be used for the simulation and creating an assessment of the action in case that an extreme climate event affects Cyprus. Cooperation with the [„International Strategy for Disaster Reducation“](#) should be enhanced.

The affected are in a position of risk as a consequence of a portfolio of economic, social, and political institutional factors that can and should be addressed by decision makers.³ Control of climate-change-related extreme events has to be achieved through developmental and humanitarian responses, and through increased preparedness and response that come from integrating the disaster risk reduction paradigm defined by [„International Strategy for Disaster Reducation“](#).

2.5 Population growth and migration

*„Migration-related health policies and practices require constant review and development in order to respond to new and complicated challenges. Complex challenges are presented, for example, by globalization, re-emerging diseases, rapid changes in migration patterns, and advancement of technology.“*⁴ The association between climate change and migration is complex, and environ-mentally induced migration should be viewed as a consequence of a multicausal system that includes political, social, and economic factors.⁵ For example, the effect of rising sea levels on migration is uncertain, as sea level rise does not only depend on the rate of global temperature rise but also on the rate of natural processes such as subsidence.

³ Wisner B, Blaikie P, Cannon T, Davis I. At risk: natural hazards, people's vulnerability and disasters. London: Routledge, 2004

⁴ <http://www.iom.int/jahia/Jahia/pid/275>

⁵ Castles S. Environmental change and forced migration: making sense of the debate. UNHCR Issues in Refugee Research, Working Paper 70, 2002

Cyprus is the third largest island in the Mediterranean Sea, having a coastline of 735 km long. As an island, the vulnerability of the coastal strip is extremely high, since all land-based activities have a direct impact on the coastal areas and the largest part of the island's territory can practically be considered as coastal zone. Beach materials vary from loose sand and gravel to cemented sandstone and rock formations in small sandy beaches. The former type of beach, composed of "soft" material, is usually narrow and erodible. A considerable length (about 30%) of the Cyprus coastline is currently subjected to beach erosion. The phenomenon of beach erosion has been steadily increasing during the last three decades, as both development pressure on coastal areas and the degree of urbanization have intensified. A characteristic indication of this pressure is that the 90% of the tourist industry, which is the major economic activity of Cyprus, are concentrated in coastal areas.⁶

There are not enough data on the magnitude and likelihood of the sea level rise for Cyprus. This issue should be approached with more emphasis since the entire population of the island and its industrialization could be affected without having exact measures for combating the consequences.

3. Conclusion

A policy response framework for dealing with the issue of climate change mitigation and adaptation are essential elements to overall development policy. Health systems must not act only as a platform for the delivery of clinical services but also provide the foundation for an effective public health response to the many climate-induced threats to health. This action will require more attention being paid to the organizational and management deficiencies of ministries of health, including sub national health governance and management structures. Informational challenge as a cross-sectional issue has to be addressed by joint efforts of the Cyprus governmental authorities, National and International organization targeting the issue of climate change. There must be more research on win-win solutions, which are equally important in rich and poor countries.

This paper raises many challenging and urgent questions for politicians, civil servants, academics, health professionals, NGOs, pressure groups, and local communities. Climate change is potentially the biggest global health threat in the 21st century. The response requires a new public health movement that is multidisciplinary and multi-sectorial, and that leads to coordinated thinking and action across governments, international agencies, NGOs, and academic institutions. Any adaptation interventions must sit alongside the need for primary mitigation: reduction in greenhouse gas emissions. Indeed, recognition by governments and electorates that climate change has enormous health implications should assist the advocacy and political change to tackle mitigation and adaptation.

⁶ „Coastline Management and Erosion Control in Cyprus“ ; Proceeding of SURVAS Expert Workshop on European Vulnerability and Adaptation to impacts of Accelerated Sea-Level Rise (ASLR) Hamburg, Germany, 19th-21st June 2000,
<http://www.survas.mdx.ac.uk/pdfs/1volcypr.pdf>

Authorities, academic departments and civil society organizations currently
working on managing the health effect of the climate change in Cyprus

UCL Institute for Global Health
30 Guilford Street, London WC1N 1EH, UK
Telephone: +44 (0)20 7905 2122
Professor Anthony Costello
a.costello@ich.ucl.ac.uk

Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
(202) 272-0167
<http://www.epa.gov/epahome/postal.htm>

Linda Tuxen : Public Affairs
National Center for Environmental
Assessments
1200 Pennsylvania Avenue, N.W.
(MD-8601D) Washington,
DC 20460 703-347-8609,
Fax: 703-347-8699
e-mail to tuxen.linda@epa.gov
ncea.webmaster@epa.gov

International Organization for Migration
(IOM)
17, Route des Morillons
CH-1211 Geneva 19
Switzerland
Tel: +41.22.717 9111
Fax: +41.22.798 6150
Email: hq@iom.int

Prof. Jan C. Semenza, PhD, MPH,
MS, Senior Expert, Unit of Scientific Advice,
European Centre for Disease Prevention and
Control (ECDC),
Tomtebodavägen 11A, S-171 83 Stockholm,
Sweden,
Tel: +46 (0)8-586-01-217,
Fax: +46 (0)8-58-60-1001,
E-mail: Jan.Semenza@ecdc.europa.eu

Dr Apostolos MAZERIS
Veterinary Services
1417 Athalassa, Nicosia 1417, Cyprus
Tel/Fax: +357-228-05203 / +357-223-32803
e-mail: amazeris@vs.moa.gov.cy

Ministry of Agriculture, Natural Resources and
Environment
1411 Nicosia, Cyprus
Tel. 22408307
Fax. 22781156
Email registry@moa.gov.cy

Director: Mr Sofoclis Aletraris
Water Development Department
100 - 110 Kennenty Avenue,
1047 Pallouriotissa, Lefkosia
Fax : 22609271
Email: telemetry@wdd.moa.gov.cy

Mr. Robert B. Zoellick
1818 H Street, NW
Washington, DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
E-mail: feedback@worldbank.org

European Commission
DG Agriculture and Rural Development
130, Rue de la Loi
B – 1049 Brussels
Belgium
Fax: +32 (0) 2-295.01.30.
http://ec.europa.eu/agriculture/contact/index_en.htm

FAO HEADQUARTERS
Viale delle Terme di Caracalla
00153 Rome, Italy
Telephone:
+39-06-57051
Fax: +39-06-57053152
Email: FAO-HQ@fao.org

Authorities, academic departments and civil society organizations that should be working on managing the health effect of the climate change in Cyprus

Cyprus Agricultural Payments Organization
10 Michael Koutsofta
(Esperidon & Michael Koutsofta)
2000 Nicosia
P.O.Box 16102, 2086 Λευκωσία
Tel no.: 00357 22 557777
Fax no.: 00357 22 557755
E-mail: info@capo.gov.cy

Ministry of Communications and Works
Acheon 28, 1424, Nicosia
Tel. No. : 22800288
Fax no.: 22776266

EUMETNET
The network of European Meteorological Services
„Metoalarm“, Alerting Europe for Extreme Weather
Web page: www.meteoalarm.eu
E-mail: meteoalarm@zamg.ac.at

Statistical Service of the Republic of Cyprus
Michalakis Karaolis Str.
1444 Nicosia CYPRUS
Fax: +357 22661313
E-mail: enquiries@cystat.mof.gov.cy
Website: <http://www.mof.gov.cy/cystat>

Ministry of Health of the Republic of Cyprus
On Line Contact Form:
http://www.moh.gov.cy/moh/moh.nsf/contactus_en?OpenForm

Ministry of Finance of the Republic of Cyprus
Address: Michael Karaoli & Gregori Afxentiou
1439 Nicosia, Cyprus
Tel. : +357 22602722
On Line Contact Form:
http://www.mof.gov.cy/mof/mof.nsf/DMLcontactus_en?OpenForm

The Cyprus Environmental Stakeholder Forum – CESF
On Line Contact Form:
<http://www.cyef.net/en/contact>