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## Climate change: health policies implications in Jordan

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### Introduction:

Climate change is widely recognized as the major environmental problem facing the globe mainly as a result of fossil fuel combustion and generation of greenhouse gases which includes carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbon. As solar radiation enters the atmosphere, some of it is absorbed by the earth's surface and reemitted as infrared radiation, which is then absorbed and trapped by greenhouse gases and results in increasing earth's temperature. As a result water cycle will be altered, some geographical areas will have more rainfall, and some more droughts and severe weather events including heat waves and storms are expected to become more common<sup>1</sup>

Heat waves are expected to have an impact on all causes of death, and are also associated with heat cramps, heat syncope, heat exhaustion, heat stroke and dehydration. Population that are vulnerable to the adverse effects of heat waves are those groups with pre-existing illness, children, elderly and those living in crowded areas<sup>2</sup>.

Developing countries have tight economical, human and financial resources, so that they are nominated to suffer more from the negative impacts of climate change, the limitation in resources will lead to many challenges in anticipating and responding to the climate change which will be reflected in a situation of dropping in economical, health and agricultural indicators.

There is an increasing awareness of such an impact at the local level in Jordan, but at the same time limited studies conducted at the local level to evaluate and estimate the health implications accompanying that global phenomena. Climate change studies conducted

are limited on the impacts of climate change on water resources, agriculture and livestock. None of these studies addressed any suggestion to the impact of climate change on human health<sup>3</sup>.

This article will provide a brief literature review about climate change in terms of health impact, the most vulnerable areas in the world and Jordan's preparedness strategies to the potential impact.

### Literature review:

The modest climate change that occurred between the mid 1970s and the year 2000 is estimated to have caused the loss of over 150000 lives and 5500000 disability adjusted life years per year. Intergovernmental Panel on Climate Change (IPCC) estimated current global warming to be almost 0.8°C above pre-industrial levels and projected a further rise of 1.9–4.6°C by 2100<sup>4</sup>.

McMichael et al., have conducted a quantitative study that generated estimates for the disease burden attributable to climate change for a range of health outcomes, and found that climate change attributable impacts of diseases are projected to approximately double by 2020. The majority of this increased burden of disease will be due to diarrheal disease and malnutrition. This is due to the high underlying (baseline) incidence of these diseases at the global level<sup>5</sup>.

Vector borne diseases, waterborne infectious diseases are strongly affected by climate. During times of drought, water scarcity results in poor sanitation and much of the population can be exposed to potentially contaminated water. For example, there is currently an epidemic of cholera in northern Kenya in the wake of a severe drought<sup>1</sup>.

Vector borne diseases such as malaria which make a huge contribution to world burden of disease may change its transmission pattern in response to global warming. Another example mentioned by Cailen Henry<sup>2</sup> is that: in the Canadian prairie region, Lyme disease, Rocky Mountain spotted fever, Hantavirus Pulmonary Syndrome (HVP), and Western equine encephalitis (WEE) are vector borne diseases that pose a threat to population health, under conditions of climate change, the tick species for harboring Lyme disease could eventually extend their range into the Canadian Prairies. The incidence of HVP and WEE, rodent and mosquito-borne diseases, are expected to change because of increased temperatures<sup>2</sup>.

Tsai and Liu conducted epidemiological study about the effects of global climate change on disease epidemics and social instability around the world, the results implied that: in developing countries, increasing prevalence of and mortality from these infectious diseases has had several negative consequences: decreasing economic productivity, increasing medical costs, and taxing already tenuous health care systems in poor countries<sup>6</sup>. Groups particularly at risk include poorer countries and communities, those geographically vulnerable to extreme weather events, and those highly dependent on agriculture for their livelihood<sup>7</sup>.

The United Nations Development Program (UNDP, 2003) has linked Climate change and the threats to the achievement of the Millennium Development Goals especially those related to eliminating poverty and hunger and promoting environmental sustainability<sup>8</sup>.

Strategies to combat climate change negative impacts have been implied in research to support policy making<sup>2</sup>. Most of the strategies suggested extra attention to vulnerable groups when addressing climate change and health issues by public health policy makers, in order to incorporate human health into climate change discussions in an effective way. Epstein addressed the need for changing the human patterns of energy consumption and production in order to mitigate climate change generating factors<sup>9</sup>.

In 2000, leaders of 189 nations agreed on the Millennium Declaration that outlined eight fundamental goals, environmental goals including climate change are facing many challenges due to the urgent need of global collaboration, political decisions, industrial countries domination, emerging of conflicts and wars. unless the world will work as one hand in facing the impact of climate change it will be an escalating problem that will lead to many others and will threaten any kind of development.

### **Jordan`s preparedness to climate change:**

The Initial National Communication (INC) and the United Nations Framework Convention to Climate Change (UNFCCC) found that over the next three decades, Jordan will witness a rise in temperature, drop in rainfall, reduced ground cover, reduced water availability, heat-waves, and more frequent dust storms. Studies funded by the UNDP addressed Jordan high need for adapting strategies in response to climate change especially with increased water scarcity and related threats to health, food security, productivity, and human security.

Ministry of environment in Jordan dedicated some efforts to climate change through setting restrictions on greenhouse gases emissions, analyzing the potential impacts of climate change, studying the potential appropriate solutions, and increasing population awareness regarding climate change, all of that as a part of Jordan`s commitment to the international protocols and agreements.

Ministry of environment has developed a partnership between the public and the private sectors to accomplish a clear mechanism for funding environmental projects, especially in the field of renewable energy use.

The national environmental strategy in Jordan focused on the development of renewable and sustainable energy sources and linkages between environmental protection and transition to sustainable energy. The strategy did not include issues of climate change and the opportunities for both environmental protection and sustainable energy through the Kyoto protocol. But the strategy is considered to be a suitable planning road map for sustainable energy production and consumption, as the strategy identified a target of 2% contribution of renewable energy of the total energy mix in Jordan and increasing the share of renewable energy in electricity to 8%<sup>10</sup>.

In the field of industry, most of the factories especially in the field of freezing and sponge manufacturing have had substituted the harmful greenhouse gases with friendly alternatives to the environment.

Ministry of health considered climate change as a priority research area in the National Health Research Priorities in Jordan (2009-2012), which illustrates the significance of the problem for the health sector, and the need for initiating comparative risks research to assess the impact of climate change in relation to Jordan specific living conditions and for setting appropriate adaptive public health polices including disaster preparedness plans<sup>11</sup>.

Regarding the water sector, Jordan's National MDG Report in 2004 identifies Zarqa for focused development attention. Water resources in the Zarqa river basin suffer from pollution and studies indicated that climate change will negatively impact the situation in the basin.

A joint program is submitted by Helena Naber in 2007 and approved under the Millennium Development Goal Fund (MDG-F). This program will develop Jordan's key government and civil society capacity to adapt to climate change threats to health, food security, productivity, and human security under the conditions of severe water scarcity that is expected to accelerate due to climate change. Moreover, the capacity of vulnerable communities within the Zarqa governorate, including women and the poor and other rural and urban areas to adapt to climate change will be strengthened. This joint programme seeks to enhance capacity to adapt to climate change by addressing Jordan's long term adaptation needs<sup>12</sup>.

There are several barriers for all the sectors in Jordan in adaptation to climate change, mainly because climate change risks were not sufficiently taken into account within sectoral policies and investment frameworks; existing climate information, knowledge and tools are not directly relevant for supporting adaptation decisions and actions; and weak national capacity to develop adaptation responses.

#### **Recommendations and conclusion:**

According to the broad range of potential health impacts attributable to climate change, responses from the health professionals will be required. The main important approach is to strengthen policies demanding green house gases emissions reduction.

Public health policy makers should be involved more in research projects addressing disease burden associated with climate change in Jordan, the research findings should be integrated into the existing infrastructures and policies. Different approaches and strategies could be adopted such as: disease surveillance, early detection and treatment, health promotion campaigns that target behavioral changes in energy consumption and training of appropriate personnel from different sectors.

Community has to be more involved in strategies implementation and improving; so there is an urgent need to raise up public awareness, mainly by reducing the consumable patterns of environmental harmful agents such as plastic bags, water bottles, air sprays...etc.

Economical, educational, media and health sectors have crucial part in raising awareness to reduce any potential risks to health. Different stakeholders should be brought together in order to develop collaborative approach to address and build up comprehensive strategies.

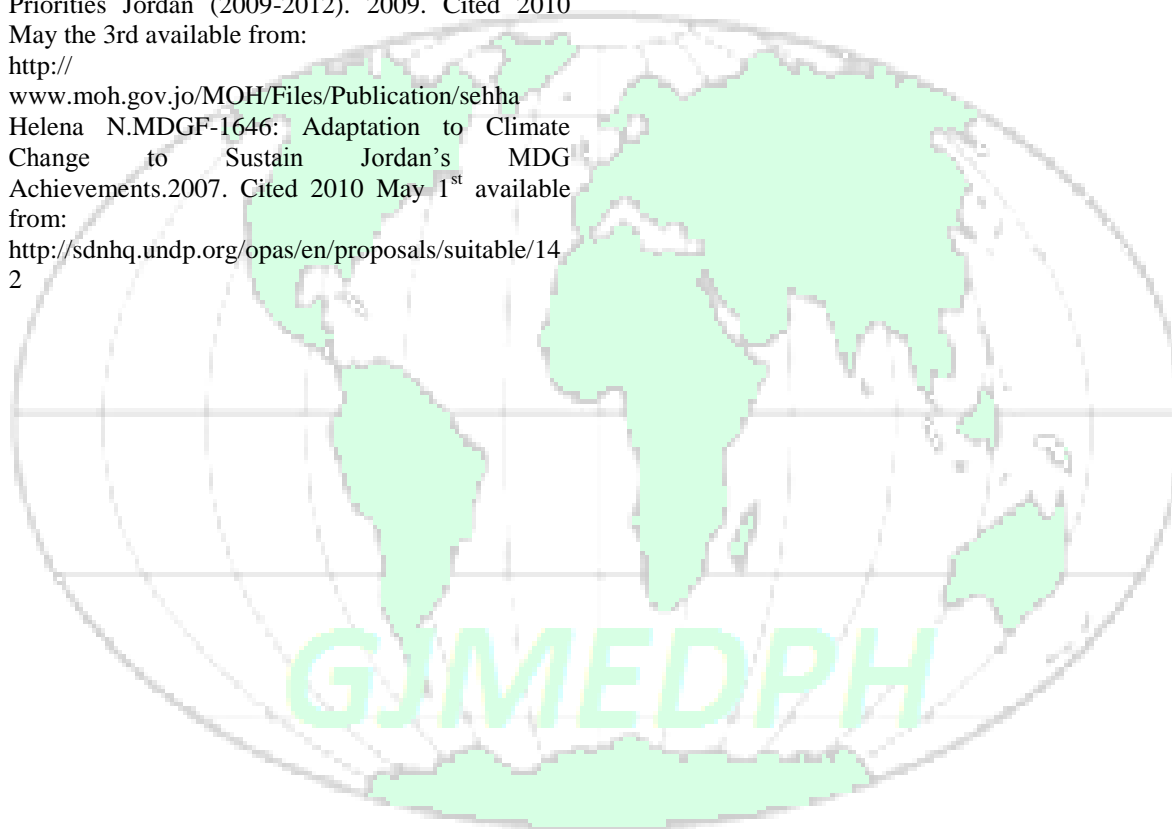
In conclusion, Climate change is a global public health problem that will increase disease burden and change the distribution of some diseases. It will present significant threats to the achievement of eliminating poverty and hunger and promoting environmental sustainability especially in developing countries.

The potential consequences must be addressed, public and preventive health strategies that consider environmental health interventions can be very important to reduce the potential harmful impacts of climate change.

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