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The Climate Change Impacts and Challenges: Implications for Environmental Health Practitioners on a Local Scale in the Developing Countries

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Abstract

There is no doubt that climate change is happening, humans are causing it and perhaps climate change is one of the biggest single challenges to the future of our civilization and risk to our countries. Climate change can jeopardize health more directly through heat-related morbidity and mortality; flooding and storms with associated trauma and mental health concerns; and infectious diseases, particularly those that are water or vector borne. Also, the economy is often one of another aspects that climate change can greatly impact populations through rises in the inflation rate in those countries affected by natural disasters. Whilst efforts have been undertaken to minimize the impacts of climate change on the local level, challenges and implications remain obvious. The implications include people's reliance on local environment; lack of local resources and knowledge; and lack of rural development surveillance and monitoring systems. On a local scale, enhancing local knowledge and capacity of environmental issues require integration of climate change into country plans, incorporating adaptation into decision making and sharing knowledge through training. In this conceptual paper, it is argued that the ability to respond to climate change is enabled by involving local knowledge in the development of a national environmental health policy. The ability of communities to respond to the impacts of climate change is central to the concept of sustainable development. This analytical observation seeks to provide recommendations for both global and local leaders to act accordingly in minimizing the impacts of climate change.

Key words: Climate challenge; national environmental policy; sustainable development.

Introduction

There is no doubt that climate change is happening, humans are causing it and perhaps climate change is one of the biggest single challenges to the future of our civilization and risk to our countries. Climate change has become an emerging issue because its impact is a tremendous risk to the security and well being of people across the globe. The definition of climate change varies among institutions. By most definitions, the term climate change implies a significant and distinct change in climate measure in which the changes occur for more than a decade[1]. Although climate change can be driven by both natural and man-made factors, according to the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) the greater contribution in the modern era is hypothesized to come from release of greenhouse gases (GHGs) through human activities such as burning fossil fuels, altering land through deforestation and industrial process[2].

As climate change is altering weather and climate patterns, it will increasingly bring frequent and severe heat waves and extreme weather events as well as increases in sea levels[2]. These changes have the potential to affect human lifespans through such indicators as health and economy in several direct and indirect ways. Increased temperature has been found to be associated with aggravation of chronic diseases like cardiovascular and respiratory diseases. According to the United States Environmental Protection Agency (EPA), this change in temperature can also increase ground-level ozone concentrations, causing direct lung injury and increasing the severity of respiratory infections such as asthma[1].

Indeed, scientists, clinicians and public health professionals have called for attention to climate change on both practical and ethical grounds. Several well-established principles have pointed to the necessity of a vigorous, proactive environmental health approach to climate change. In response to increasing worldwide concern over climate change, efforts have been undertaken to minimize its impacts. Mitigation is the primary approach to slow or reverse climate, for instance by reducing GHGs emissions. This effort tends to occur mainly in sectors other than health such as energy, and is likely to be initiated through global policy in order to reduce climate change impacts at global level. On the other hand, adaptation is an approach that tends to correspond more closely to environmental health practices on a local scale in order to anticipate and prepare for the effects of climate change and thereby to reduce the associated health and economic burdens.

In specific to a local scale, enhancing local knowledge and capacity of environmental issues require integration of climate change into country plans, incorporating adaptation into decision making and sharing knowledge through training. However, efforts to respond to the impacts of climate change remain challenging. One significant challenge is due to a lack of general consensus in integrating local knowledge into a National Environmental Health Policy (NEHP). For instance, in some local or indigenous communities such as in the Philippines, the environment is naturally considered in decision-making because of beliefs, norms, values and traditions[3]. Local knowledge does not perceive this as mainstreaming since there is no need to deliberately include environmental issues. Therefore, this conceptual paper argues that the ability to respond to climate change is enabled by involving local knowledge in the development of a NEHP. The ability of communities to respond to the impacts of climate change is central to the concept of sustainable development. This analytical observation paper seeks to analyze the climate change impacts and challenges, with particular emphasis on the engagement of environmental health practitioners (EHPs) in reducing the impacts of climate change on the quality of life at the local level. The first part of the paper briefly reviews potential impacts of climate change on health and economic. Then, it presents the global climate change policy and the constraints posed by climate change at local level. At the end of this paper, some recommendations for both global and local leaders to act accordingly in minimizing the impacts of climate change are presented.

Health and economic impacts of climate change

The impacts of climate change and environmental degradation are rarely highly visible, such as sudden onset disasters directly attributable in a cause and effect manner. Rather, they are most often insidious and slow growing, with impacts varying in scale, timing and severity between locations. Climate change impacts can be mutually reinforcing and often cost vulnerable countries substantial amounts. In addition, climate and environmental challenges must be framed and understood in the context of other macro-drivers of development

such as growing populations; industrialization; urbanization; and governance reforms[3]. Response should entail a range of interventions to reduce the scale of the problem on people's livelihoods, as well as devise interventions to reduce the negative consequences of the impacts that are now unavoidable. There is a great deal of literature that has discussed the impacts of climate change on every aspect of livelihoods, particularly health and economic.

The potential health effects of climate change have been extensively reviewed. Climate change can jeopardize health more directly through heat-related morbidity and mortality; flooding and storms with associated trauma and mental health concerns; and infectious diseases, particularly those that are water or vector borne[4]. Climate change has added complexity and uncertainty to human health issues such as newly emerging or highly resistant infectious diseases. An observational study of malaria surveillance data and average monthly temperature and rainfall data was carried out to investigate the correlation of climatic conditions and transmission of malaria in four counties of Yunnan Province in China[5]. The findings show that increases in both temperature and rainfall have resulted in increased malaria risk in at least four counties and perhaps more in Yunnan Province. The findings, therefore, highlight the need for local understanding of seasonal patterns of malaria and its climatic drivers. This underlying study can thereby signify a paramount shift in strategy that requires an interdisciplinary approach and an integrated, international surveillance to manage the potential future impacts of climate change on infectious diseases and other adverse health effects.

Besides generating health effects, the impact of climate change extends to the overall economic. Environmental disasters such as hurricanes, cyclones and flooding that have recently affected some developing countries can be seen as evidence of the linkage of climate change impacts and economic. For instance, Typhoon Haiyan that hit the Philippines a few months before the end of 2013 affected the livelihood of thousands of people[6]. Just at the beginning of the year of 2014, the devastating flooding in central Indonesia during the rainy season affected about 40,000 people who become homeless in the process[7]. A powerful category 5 storm known as the Ian Cyclone hit the archipelago of Tonga, a country that is part of Polynesia in the Southern Pacific Ocean, and caused damage to at least 400 homes and the loss of communications and power supply on the islands[8].

Clearly, these climate change impacts have caused suffering and disruption to thousands of people, including: loss of life; massive destruction of basic infrastructures such as schools and health clinics; and an increase in economic instability in those countries. The economy is often one of the aspects where climate change can greatly impact populations through rises in the inflation rate in those countries affected by flooding and cyclones. The loss of economic activity and assets, particularly income and livelihoods impacted by these extraordinary meteorological events can increase the level of poverty of those countries and strain their health systems. In response to this, the international community, particularly in the developed world, should continue to take careful notice of the stark reality of climate change. Special attention is required in terms of providing financial assistance and aid to the affected countries to recover from the impacts of events resulting from climate change. Based on recent climate data, it is reasonable to assume that the impact of climate change is increasing the intensity of disasters[2] and there must be a resulting expansion of adaptation and resilience interventions in the most vulnerable countries to protect those who are the most at risk.

Global climate change policy

An effective and equitable response to climate change impacts can be achieved by the international community through strengthening its commitment to mitigate, adapt, fund and innovate. The world's countries have taken significant steps to tackle the issue of global climatic change by developing some mitigation policies and regulations. Many solutions have been put in place according to an international basis and the principal focus has been on reducing carbon dioxide (CO_2) and other GHGs emissions. The Kyoto Protocol is one of the global regulatory tools developed to minimize the adverse impacts of climate change[9]. This is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC) that commits its Parties to reducing CO_2 emissions and other GHGs. This treaty has committed developed countries and emerging market economies to reduce their overall emissions of GHGs, by varying amount, averaging from 2.5% by 2012[10]. Almost all nations participating in this international binding agreement have ratified the treaty, with the notable exception of the United States.

However, enacting this global policy on climate change seems to be unworkable for both technical and political reasons. In one hand, some people argue that fossil fuels are essential for growth in practically all economies, which would raise living standards for citizens. This rationale has led to some developing countries to resist the mandatory of emission reductions. On the other hand, others claim that the resulting GHGs emissions have serious adverse global effects on the climatic system. These contradictory perspectives lead to a major question of whether this global policy can work with respect to its state objectives[9]. Therefore, it seems likely that a revision of this global policy should be taken into a consideration, and sustaining a good communication and full participation from all entities is extensively required to deal with this complexity.

Local climate change constraints

At a local scale, one of the implications in minimizing the impacts of climate change is due to local people's reliance on local environment as well as lack of local resources and knowledge. Without local environmental policies in place, some countries will ultimately continue to respond to the impacts of climate change in a reactive way[3]. However, while these challenges are daunting, they are not insurmountable. There is a growing consensus that effective environmental action at the local level need to adopt a multi-sectorial approach[11]. EHPs should take into account the impacts of climate change on multiple sectors including agriculture, health, economy, and society as well as consideration for strengthening capacity at the local level[11]. It is therefore necessary for countries to strengthen their policy frameworks and institutional capacities at national and sub-national levels for more inclusive and equitable social and environmental policies to ensure social cohesion and increase resilience to shocks.

Local knowledge and local solutions are vital to effective long-term responses to climate change. The knowledge should focus on building the ability of local communities to adjust to their existing practices such as agricultural practices and natural management to climate change[11]. For instance, with increasing climate variability, rainfall patterns seem to vary from time to time. Communities might have indigenous knowledge and traditional coping mechanisms to measure rainfall and maintain communal grain reserves that worked well in the past. Strengthening local knowledge by enhancing the community participation is an important factor in supporting the local government to scale up action on climate change through the development of national

strategies and plans of actions that focus on those most vulnerable to economic, social and environmental shocks.

In addition, the impacts of climate chance can be linked to some pillars of sustainable development including social and economic, which remain implications in some developing countries. Governments need a framework to craft a country-specific National Development Policy (NDP) to reduce environmental issues by balancing actions between a top-down and bottom-up approach[11]. This approach will keep vulnerable communities at the center of focus in the delivery of climate change adaptation and other environmental health programs. Therefore, it would be reasonable to assume that a NEHP needs to be aligned with a NDP because the objectives of both policies are to make populations and systems resilient enough to withstand the impacts of climate[12].

Another constrain in addressing climate change adaptation approaches at the local scale is lack of rural development surveillance and monitoring systems. EHPs in the field can easily observe that environmental issues continue to be a critical problem among communities in rural areas of the developing countries. For example, trees are still cut down for domestic fuels to cook daily[13]. Burning land and forests are still traditional practices to improve agriculture systems[14]. As a result, natural disasters such as land erosion and flooding are very frequent in rural areas, which lack basic infrastructure. Therefore, it would be beneficial for those EHPs who take the opportunity to have fieldwork experiences in rural development to draw the attention of international donors by allocating more investments to infrastructure and labor capacities at the local level. This will ultimately provide a menu of options of practical choices for local EHPs to support more sustainable growth, leading to an advanced global health agenda including environmental health in the post Millennium Development Goals (MDGs) era.

Conclusion

Climate change is one of the most environmental issues facing us. It refers to any significant variation in temperature, precipitation, wind or other type of weather that lasts for decades. There is widespread scientific consensus that the world's climate is changing. An increase in concentration of GHGs due to human activity can cause an increase in global surface temperature, leading to global warming. Global warming, which is one aspect of climate change that involves a huge geographical scale, has directed global attention in predicting the driving forces for climate change[15].

Meanwhile, the impacts of climate change have become malignant, particularly in the developing world. They threaten to blunt countries' growth and upend their development. Climate scientists are increasingly concerned that catastrophic weather events will become more frequent and intense[2]. Floods, droughts and extreme storms have been observed to be associated with increasing rates of morbidity and mortality. These natural disasters have claimed millions of lives during the past 20 years and have adversely affected the lives of many more millions of people and caused billions of dollars in property damage[16]. Mounting evidence suggests that the current and future effects of climate change on human livelihood will include increases in vector-borne diseases; injuries and illness from extreme weather events; and indirect consequences of massive economic loss[15].

Climate change presents new challenges to poor people all over the world, exacerbates current problems, and creates new ones. At the same time, strategies for sustainable development provide opportunities for people,

especially in developing countries, to become part of the global solution. It is clear that scientific knowledge alone is not sufficient to create political climate change solutions. Local knowledge is also required to bring together society wide transformations that effectively address climate change at the local level. One of the actions required to reduce the impacts of climate change at the local level is to enhance the human and institutional capacities in the government to effectively implement disaster and climate risk management measures and develop preparedness systems at both the national and local level. Hence, the information cycle and feedback are vital for the developing countries to develop and improve local environmental health system over time.

From this observation, some recommendations are proposed especially for global leaders and local EHPs to consider. Those recommendations include:

- Policy and decision-making on climate change should take into account the standard proportion for CO_2 and other GHGs emissions by reviewing the global policy on climate change such as the Kyoto Protocol.
- Global policy agendas need to integrate climate change adaptation and mitigation programs with sustainable development policy.
- Strengthening the policy frameworks and institutional capacities at the local levels is urgently recommended to deliver an effective community-based climate change adaptation program, hence reducing the impacts on the local area.
- The institutional strengthening approach should include rural development surveillance and monitoring systems and ensure social cohesion to increase resilience to environmental shocks.
- An inter-sectorial approach should be devised for the implementation of disaster and climate risk management measures and development of preparedness systems at the local level. This would have the main purpose of reducing the vulnerability of people living in areas threatened by climate change and environmental disaster.

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