

Chapter 3

CLIMATE CHANGE AND CHALLENGES THAT ARE BEING CREATED

Nenad Taneski, PhD*

Military academy „General Mihailo Apostolski“, Skopje

Sasha Smileski, MSc*

Military academy „General Mihailo Apostolski“, Skopje

Andrej Iliev, PhD*

Military academy, General Mihailo Apostolski“, Skopje

*

* Corresponding Author address
Email: nenoreal@yahoo.com

* Corresponding Author address
Email: ssmileski@gmail.com

* Corresponding Author address
Email: andrej220578@gmail.com

ABSTRACT

This study provides a common starting point for understanding and discussing disasters, disaster management and disaster preparedness as part of every society's mission, and discusses the potential scope of disaster preparedness measures.

The following text is appropriate for anyone who has general responsibilities for disaster management and programme implementation. Benefit from reading this study can have non-technical personnel interested in acquiring a better understanding of disaster preparedness and the strategies and measures that may be implemented as well. The most essential but difficult part in the management of disaster is identifying the risk and vulnerabilities of the local communities.

The biggest motivation for this study comes from the two important professional challenges confronting emergency managers in the coming years. There are the professionalization of emergency management, involvement in hazard mitigation, involvement in preimpact disaster recovery planning, expansion of the professional domain and regional collaboration.

One of the most important goals is involving youth in disaster preparedness and recovery efforts. Youth-serving agencies can help to not only increase youths' awareness of particular hazards, but can also enhance the chance that they openly discuss how to adequately protect their families and loved ones and understand how to seek help.

Keywords: disaster, management, preparedness, climate change.

INTRODUCTION

Climate change is a planetary crisis that is leaving no corner of the world untouched. Failure to aggressively address this crisis will have dire consequences for us all. Conversely, responding to the climate crisis helps avoid these dangerous consequences, and incentivizes economic, technological, ecological, and socio-political innovations in the every systems it threatens.

Vital signs of climate change affects the frequency, intensity, and duration of extreme weather events, attars precipitation patterns, disrupts ecological systems, and causes temperatures and sea levels to rise. These changes in turn exacerbate economic, socio-cultural, and ecological inequities, and contribute to hunger, poverty, malnutrition, displacement, fragility, and increased mortality.

Climate change impacts go beyond just environmental sector to affect human health, nutrition, and food security, ecosystems and biodiversity, peace and stability, and access to essential services, such as health care, water, sanitation and hygiene, and education.

Causes of climate change threatens to drive increases in maternal and child malnutrition, is an increasing threat to national security, and contributes to migration, displacement and increased pressure on scarce government resources.

Climate change also exacerbates inequalities, increasing the vulnerability of marginalized and underrepresented populations to gender-based violence, dispossession and disembowelment. The climate crisis is occurring concurrently with other global crises, including the COVID-19 pandemic, food and water insecurity, accelerated extinctions and increasing violence and conflict.

DEFINING DISASTER AND RESILIENCE

There are many different definitions of disaster. Most such definitions tend to reflect the following characteristics¹ :

- Disruption to normal patterns of life. Such disruption is usually severe and may also be sudden, unexpected, and widespread.
- Human effects such as loss of life, injury, hardship, and adverse effect on health.
- Effects on social structure such as destruction of or damage to government systems, buildings, communications, and essential services.
- Community needs such as shelter, food, clothing, medical assistance, and social care.

Two dictionary definitions are:

- Concise Oxford Dictionary

Sudden or great misfortune, calamity.

- Webster's Dictionary

A sudden calamitous event producing great material damage, loss, and distress.

¹ Carter, W.Nick, Disaster management: a disaster manager's handbook, Mandaluyong City, Phil: Asian Development Bank, 2008.

We can define the disaster as an event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community has to respond by taking exceptional measures.

In relation to the definition of disaster, it has also been taken into account that disaster management is essentially a dynamic process. The process is consisted of the classical management functions of planning, organizing, staffing, leading, and controlling. It also involves many organizations which must work together to prevent, mitigate, prepare for, respond to, and recover from the effects of disaster. Disaster management is defined as² :

An applied science which seeks, by the systematic observation and analysis of disasters, to improve measures relating to prevention, mitigation, preparedness, emergency response and recovery.

There is an important practical application of the definition of disaster in disaster management. Such definition helps provide a common concept and theme throughout disaster management activities. Thus, the chosen definition is valuable for purposes of policy, organization, planning, and legislation.

It is suggested that individual nations and organizations should choose a definition that the most suitable for their purposes and apply it accordingly.

Additionally, resilience is the focus of a large and growing body of research. This work has sought to understand what the properties are that make a country, community or household resilient, to establish the principles and processes which strengthen resilience and to build the evidence for what projects and programmes really make people better able to withstand and recover from disasters. As a result of the research and its applications, the term resilience has acquired a range of definitions:

- “The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner.” – United Nations International Strategy for Disaster Reduction

- “The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.” – Intergovernmental Panel on Climate Change

- “The capacity of a system to absorb disturbance and reorganize while undergoing change.” – The Resilience Alliance.

² Climate change: Impacts, Vulnerabilities and adaptation in developing countries, United Nations Framework Convention on Climate Change, 2007.

CLIMATE CHANGE

Rising fossil fuel burning and land use changes have emitted, and continuing to emit, increasing quantities of greenhouse gases into the Earth's atmosphere. The greenhouse gases include carbon dioxide (CO₂), methane (CH₄) and nitrogen dioxide (N₂O), and a rise in these gases has caused a rise in the amount of heat from the sun withheld in the Earth's atmosphere, heat that would normally be radiated back into space. This increase in heat has led to the greenhouse effect, resulting in climate change. The main characteristics of climate change are increases in average global temperature (global warming), changes in cloud cover and precipitation particularly over land, melting of ice caps and glaciers and reduced snow cover, and increases in ocean temperatures and ocean acidity – due to seawater absorbing heat and carbon dioxide from the atmosphere.

The major impacts and threats of global warming are widespread. Increasing ocean temperatures cause thermal expansion of the ocean and in combination with melt water from land-based ice this is causing sea level rise. Sea levels rose during the 20th century by 0.17 meters. By 2100, sea level is expected to rise between 0.18 and 0.59 meters. There are uncertainties in this estimate mostly due to uncertainty about how much water will be lost from ice sheets³, for example Greenland is showing wising loss of mass in recent years (UNEP 2007).⁴ Increased melting of sea ice and freshwater influx from melting glaciers and ice sheets also has potential to influence global patterns of ocean circulation. As a result of global warming, the type, frequency and intensity of extreme events, such as tropical cyclones (including hurricanes and typhoons), floods, droughts and heavy precipitation events, are expected to rise even with relatively small average temperature increases. Changes in some types of extreme events have already been observed, for example, increases in the frequency and intensity of heat waves and heavy precipitation events.⁵

³ Bindoff, N.L., J. Willebrand, V. Artale, A. Cazenave, J. Gregory, S. Gulev, K. Hanawa, C. Le Quere, S. Levitus, Y. Nojiri, C. K. Shum, L.D. Talley and A. Unnikrishan, 2007: Observations: Oceanic Climate Change and Sea Level. In: *Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

⁴ *Climate change: Impacts, Vulnerabilities and adaptation in developing countries*, United Nations Framework Convention on Climate Change, 2007.

⁵ Meehl, G.A., et al. (2007) *Global Climate Projections*. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge.

Climate change will have wide-ranging effects on the environment, and on socio-economic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity and coastal zones. Changes in rainfall pattern are likely to lead to severe water shortages and/or flooding. Melting of glaciers can cause flooding and soil erosion. Rising temperatures will cause shifts in crop growing seasons which affects food security and changes in the distribution of disease vectors putting more people at risk from diseases such as malaria and dengue fever. Temperature increases will potentially severely increase rates of extinction for many habitats and species (up to 30 per cent with a 2°C rise in temperature). Particularly affected will be coral reefs, boreal forests, and Mediterranean and mountain habitats. Increasing sea levels mean greater risk of storm surge, inundation and wave damage to coastlines, particularly in small Island States and countries with lying deltas. A rise in extreme events will have effects on health and lives as well as associated environmental and economic impacts.

Adaptation is process through which societies make themselves better able to cope with an uncertain future. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes. There are many options and opportunities to adapt. These ranges from technological options such as increased sea defenses or flood-proof houses on stilts, to behavior change at the individual level, such as reducing water use in times of drought and using insecticide-sprayed mosquito nets. Other strategies include early warning systems for extreme events, better water management, and improved risk management, various insurance options and biodiversity conservation.

Because of the speed at which change is happening due to global temperature rise, it is urgent that the vulnerability of developing countries to climate change is reduced and their capacity to adapt is increased and national adaptation plans are implemented.

Adaptation to climate change in developing countries is vital and has been highlighted by them as having a high or urgent priority. Although uncertainty remains about the extent of climate change impacts, in many developing countries there is sufficient information and knowledge available on strategies and plans to implement adaptation activities now.

However, developing countries have limitations in capacity making adaptation difficult. Limitations include both human capacity and financial resources. Strategies and programmes that are more likely to succeed need to ling with coordinated efforts aimed at poverty alleviation, enhancing food security and

water availability, combating land degradation and reducing loss of biological diversity and ecosystem service, as well as improving adaptive capacity.

Adapting to climate change will entail adjustments and changes at every level – from community to national and international. Communities must build their resilience, including adopting appropriate technologies while making the most of traditional knowledge, and diversifying their livelihoods to cope with current and future climate stress. Local coping strategies and traditional knowledge need to be used in synergy with government and local interventions. The choice of adaption interventions depends on national circumstances. To enable workable and effective adaptation measures, ministries and governments, as well as institutions and non-government organizations, must consider integrating climate change in their planning and budgeting in all levels of decision making.⁶

BUILD A CLEANER AND MORE RESILIENT TRANSPORTATION SECTOR

The transportation sector—including cars, trucks, buses, airplanes, rail, and other modes—is the largest source of energy-related carbon dioxide emissions. Across modes, the story is similar: emissions are a function of the vehicle’s fuel efficiency, the fuel’s carbon intensity, and the number of miles traveled each year. Each part of the transportation sector, however, is at a different stage of zero-emission technological innovation and faces unique challenges to decarbonization and, as a result, may require a tailored policy approach. Well-designed policy should lead to new manufacturing and supply chain innovations that create good-paying jobs at home and bolster competitiveness.

In addition to contributing to the climate problem, transportation infrastructure is heavily exposed to extreme weather and climate impacts, from floods that wash out bridges and roads to heat waves that ground airplanes. Without proactive action to build resilience, climate change will compromise the reliability and capacity of even the cleanest transportation systems.

Congress should expedite deployment of zero-emission technologies in the sectors where they are already available while making new gasoline- and diesel-powered vehicles as clean as possible. This should include setting strong greenhouse gas emissions standards for cars, heavy-duty trucks, and aviation; enacting a national sales standard to achieve 100% sales of zeroemission cars by 2035 and heavy-duty trucks by 2040; and providing incentives to build out

⁶ Army Emergency Management Program, Army Regulation 525-27, 29 March 2019.

zeroemission fueling infrastructure across the country. Ambitious initiatives to ensure more domestic manufacturing of cleaner vehicles and their components must accompany these policies. At the same time, Congress should establish a Low Carbon Fuel Standard to reduce emissions from remaining gasoline-powered vehicles and transportation modes for which electrification may not be an option in the short to medium term, such as aviation, long-haul trucking, and shipping. Congress also should invest in aggressive research to develop and demonstrate new zero-emission technologies and fuels for these harder-to-decarbonize parts of the transportation sector. Cutting pollution from passenger vehicles becomes a more challenging task if drivers must travel farther each year to access jobs and services. Congress needs to work with local communities and states to make housing, businesses, and critical services more accessible and double federal spending on public transit and other zero-carbon modes to provide households with more lower-carbon, convenient, and affordable transportation options. Federal policy should ensure that all transportation systems are designed, maintained, and repaired to withstand climate impacts.⁷

CONCLUSION

This paperwork draws the direct connection between the warming world and the resulting threats to people lives and livelihoods. Solving the climate crisis provides the opportunity to acknowledge and commit to correcting the systemic economic and racial inequalities that plague our communities today and exacerbate the impacts of climate change. That is why justice and equity are at the core of the solutions put forward. Confronting the climate crisis requires action across sectors and at all levels of government. The climate crisis is inextricably linked to the social, economic, and environmental challenges that afflict the nation and world today. But by working together, we can avert the worst impacts of climate change and build a stronger, healthier, and fairer environment for everyone. What we choose to do now shapes the future for young people on the front lines of the climate crisis.

REFERENCES

⁷ Paul A. Philips and Luiz Moutinho, *The Strategic Planning Index: A Tool for Measuring Strategic Planning Effectiveness*, *Journal of Travel Research* 2000.

1. Army Emergency Management Program, Army Regulation 525-27, 29 March 2019.
2. Climate Crisis Action Plan.pdf (house.gov)
3. Carter W. Nick. 2008. Disaster management, A Disaster manager's handbook, 1550 Metro Manila, Philippines.
4. Ma Chang, Rogers John, and Zhou Sili. 2020. Modern Pandemics : Recession and Recovery, International Finance Discussion Papers, Number 1295.
5. Climate change : Impacts, Vulnerabilities and adaptation in developing countries, United Nations Framework Convention on Climate Change, 2007.
6. Dege Martin, Strasser Irene. 2021. Global Pandemics and Epistemic Crises in Psychology, A Socio-Philosophical Approach.
7. Philips Paul A. and Moutinho Luiz. 2000. The Strategic Planning Index : A Tool for Measuring Strategic Planning Effectiveness, Journal of Travel Research.