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## THE INTERRELATION OF SOCIAL CONSEQUENCES OF CLIMATE CHANGE IMPACT ON SOCIETIES: THE ROLE OF SOIL

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**Abstract.** Climate change as the most important global issue of the world demonstrates its social consequences on societies. This impact affects not only the social life of people but the economy and health, agricultural system. The article studies the interrelation of social consequences of climate change impact in societies and gives the overview of preventing adverse effects of climate change. The findings show that social dimensions are interrelated to each other and their solution should be implemented in whole pattern. Only through complex approach the solution seems possible for preventing unpredictable adverse effects. The discussion of how governments and scientists can build teamwork to prevent the damages of possible effects of social consequences of climate change and protect their population, and the analysis of the data from the international sources such as UNFCCC, WHO, IPCC, and national governments statistical data comprise the methodology of this study. Thereby, this research will contribute to shed light on social aspects of climate change impact on societies and propose solutions to adapting policies of governments, international organizations, regional or local communities in combating with predictable adverse effects of social dimensions of climate change impact on societies as well as the countries' development goals.

**Keywords:** climate change, social dimensions, adapting policies, food and nutrition, soil.

### Introduction

In the last three decades, there has been growing interest to investigate the social consequences of the accelerated climate change on societies (e.g. Dietz, et al. 2020; Verner, 2010; Pielke, et al., 2005; Stehr, et al., 1995). Climate change as one of the most important global issues of the world, according to the Article 1 of United Nations Framework Convention on Climate Change (UNFCCC), can be defined as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time period” (UNFCCC, 2015). Since the dawn of the Industrial Revolution, humans have been producing increasing amounts of carbon dioxide and other powerful heat-trapping gases. As these greenhouse gases build up in the atmosphere, they essentially wrap an artificial blanket around the planet, trapping more and more of the Earth's heat. Since pre-industrial age the planet's average temperature has increased approximately 1.2 degree and based on current policies, the Intergovernmental Panel on Climate Change (IPCC) estimates that global warming will probably reach 3.2 degree by 2100 (Hayhoe 2022). As a result of global warming communities are vulnerable to dramatic changes in temperature and precipitation, rising sea levels, melting glaciers, etc. Yet it is difficult and challenging to count the overall damage caused by global warming, its consequences on societies could be estimated. These consequences encompass social challenges such as poverty and well-being, mental and physical health problems, climate change-induced migration, increased gender inequality caused by weather extremes, the impacts on life expectancy and quality of life, food insecurity and nutrition that are considered only small parts of climate impacts on societies and serious threats to the future of mankind.

A great deal of previous studies have reported factors influencing the social life of people as a result of social consequences of climate change that will be threat to mankind if the measures be

unimplemented until 2030. One of these social consequences is related to health and well-being that influences the other consequences as well. As a common determinant of climate change the heat affects the health of all populations in the world and those "climate-sensitive health risks" create environment for hundreds of diseases. One study indicating the social consequences of malaria has found that climate change influences the spread of malaria by creating environment conducive to mosquitoes, making it difficult to combat the disease (Ghebreyesus, 2022). According to the study of World Health Organization (WHO) at least 5 percent of global malaria cases (21 million cases) would be demonstrated as consequences of climate change in 2030. This fact gives a view that increase in temperature, precipitation, migration, disbalance between urbanization and rural areas creates natural environment for infectious diseases and one of the recent examples Covid-19 pandemic has revealed clear deficiencies in our public health systems. Another study focusing on social consequences of climate change has found that rising inequality, disbalance between urbanization and rural areas and the depletion of natural resources are the factors related closely with climate change that would be considered influencing the people's health directly or indirectly and it makes the countries to prepare comprehensive interventions towards it (Vicedo-Cabrera, 2022). These factors make the governments, scientists and all the people rethink the relation of health and well-being with other social factors such as inequality, poverty, clean water and sanitation, etc. and how climate change encompasses all these fields. One of the interesting studies relating social consequences of climate change has revealed that besides the factors that make large impact on public health, the factors such as inadequate health infrastructure, migration, lack of safe water and sanitation, and poor water storage practices increase the health risks as well and give us the reason to rethink on interrelation of social consequences of climate change (Verner, (2010). In order to understand the social consequences of climate change and counter adverse health effects from climate change Verner (2010) considers education very effective policy and to reduce climate-induced health risks he suggests policies to focus on measures like improving capacity to monitor and predict disease patterns, building asset base of the poor, and decreasing vulnerability of groups. There is another notable study which indicates that the climate change impact on societies depends on time scales like "slow" and "fast" time periods (Stehr & Hans von Storch 1995). While slow variations seem to have little social and economic impact on societies, fast variations appear to make irreversible changes like social, economic, cultural changes such as desertification, emerging values, agricultural yields that seem to be multi-year anomalies (Stehr & Hans von Storch 1995). However, in the view of Beniston (2010), since the changes in extreme weather patterns and climate put vital resources at risk, humans are affected by the changes in ecosystems, spread of opportunistic species which prove the fact that human beings are not only receptors of environmental changes but also drivers of this change. All of this research emphasizes the increasing and significant effects of climate change has had on the social aspects of societies.

Despite of the increasing and significant effects of climate change, there is still lack of comprehensive research in revealing the complex analysis and interrelation of social consequences of climate change impact on societies though previous studies (e.g Ghebreyesus, 2022; Vicedo-Cabrera, 2022; Dietz, et. al 2020) investigated social aspects of climate change such as human health challenges (infectious disease exposure, non-communicable diseases and mental health), food and nutrition challenges, emerging climate refugees challenges, etc.

To address the abovementioned research gap, this paper focuses on the interrelation and complex analysis of social consequences of climate change and formulates recommendations for preventing possible adverse effects of social consequences of climate change impact on societies.

The discussion of how governments and scientists can build teamwork to prevent the damages of possible effects of social consequences of climate change and protect their population, and the analysis of the data from the international sources such as UNFCCC, WHO, IPCC, and national governments statistical data comprise the methodology of this study as well.

This study aims to provide answers to the following questions: *a)how can we find solution to prevent possible adverse effects of social consequences of climate change on societies in the context of interrelation of social consequences, b)which methods could be used to identify the interrelation*

*of social consequences of climate change, c) can social consequences of climate change be considered as driving forces of negative effects of economic and ecological impacts of climate change on societies?* All these questions will help us to review the interrelation and possible effects of climate change on societies and suggest solutions to protect it from catastrophic damages it can cause. Protecting the Earth-home to all humanity is no longer only an environmental priority but also has become central to securing a liveable future for all people. Considering all these facts, this research will contribute to shed light on social aspects of climate change impact on societies and propose solutions to adapting policies of governments, international organizations, regional or local communities in combating with predictable adverse effects of social dimensions of climate change impact on societies as well as the countries' development goals.

### **Food and nutrition security**

The Food and Agriculture Organization of the United Nations (FAO) estimates that more than one billion people are undernourished worldwide in 2009; this is about 100 million people more than in 2008, around one-sixth of all humanity (FAO, 2009a). Three major challenges have arisen that threaten to drastically complicate efforts to overcome food insecurity and malnutrition: climate change, the growing use of food crops as a source of biofuel and soaring food prices. As a result of climate and global environmental changes such as land degradation and changes in hydrological resources, essential ecosystems' services, agricultural production systems and access to food are likely to decline drastically particularly in Sub-Saharan Africa and South Asia (Easterling et al., 2007). Furthermore, climate change is expected to exacerbate undernutrition through its effects on illnesses, such as diarrhoea and other infectious diseases (Confalonieri et al., 2007). Projected increases in the frequency and intensity of droughts and floods and their potential impact on crops and livestock losses are especially worrisome (FAO, 2008b).

The analysis of the impacts of climate change on food and nutrition security follows the four-dimensional food security framework defined by FAO: (1) food availability which includes food production and trade; (2) stability of food supply; (3) access to adequate quantities and varieties of safe, good quality food and (4) food utilization which refers to food safety and nutrition (FAO, 2000; Schmidhuber & Tubiello, 2007). Food security is a key factor in good nutrition, along with health, sanitation and care practices.

Malnutrition can be defined as an abnormal physiological condition caused by deficiencies, excesses or imbalances in energy, protein and/or other nutrients (FIVIMS, 2010). Appropriate intake of calories does not guarantee adequate intake of essential micronutrients. Micronutrient malnutrition, sometimes referred to as “hidden hunger”, has serious public health consequences. For example, over one billion people consume diets deficient in iron. Iron deficiency is responsible for roughly half of the global prevalence of anaemia. Iron deficiency anaemia causes 20% of global maternal mortality, can impair children's health and development and has been shown to reduce adult work performance and labour productivity (Trowbridge & Martorell, 2002).

All these consequences are interrelated to each other and should be solved via complex approach which encompasses the detailed analysis of the consequences caused by climate change.

### **Soil and its dependence on climate change**

Among the social consequences of climate change soil and its productivity takes a vital place which in itself needs detailed and complex research. The soil that contains over 3000 gigatonnes of carbon, regulates the global carbon cycle, while contributing to food production, biodiversity, drought and flood resilience and ecosystem functioning. Today our dependence on this crucial carbon pool as a reliable net sink of atmospheric carbon dioxide-lessening the impacts of anthropogenic carbon dioxide emissions- is threatened by climate change. Most of the carbon in the soil today originated from the atmosphere. Soil organic carbon forms as plants use photosynthesis to suck in carbon dioxide to build their tissues while drawing in nutrients from the soil as fuel (L. Soong, 2022). Over time, the amount of carbon deposited in the soil by plants has outweighed the amount of carbon lost through decomposition. This has created the massive bank of soil carbon that we depend on to maintain the global greenhouse gas balance. The natural cycling of carbon between the atmosphere and land is critical to regulate Earth's climate- even a small change could have an enormous impact on the

climate, tipping the balance of the global carbon cycle. As temperatures rise, the activity of microorganisms speeds up and soil begins to emit more carbon dioxide to the atmosphere. As a natural cycling it increases global warming.

First and foremost goal should be to reduce greenhouse gas emissions. We should also grow more trees and forests and protect them. Unfortunately, the wildfires destroyed many forests across the world. Therefore, the utmost goal should be to enrich and protect fauna and flora. It is not also coincidence that when the content of the soil changes it predicts wild fires beforehand. Long-term climate trends, local weather conditions and land-use management practices have led to changes in fire activity around the world. According to thorough monitoring of the soil we can avoid the wildfires which is also caused by climate change. Last wildfires in Australia, Canada, Türkiye, Siberia, etc. taught us to monitor the soil in the forests in order we could be able to predict the wildfires. The experts in Siberia monitored the changes in the soil in Siberian forests, but they did not take preventive measures. As a result wildfires burnt fauna and flora in Siberian forests. (nasa.gov)

Taking into consideration all these factors we have to approve that soil plays a vital role in preventing catastrophic events caused by climate change. There is still need to bring out all experts from different fields to establish new approaches and strategies towards climate change and its social consequences.

### **Conclusion**

Throughout history there have been many major societal changes. Some of them have been quite dramatic. When we call for unpredictable changes in all aspects of our societies, we should know that educating ourselves, our societies is a key in solving our challenges. The Earth is home for all mankind. If there is flood or wildfire, or storms in one part of the world, the other parts will see the result of those effects as well. All the scientists, experts, policymakers should gather to make new policies and strategies towards solving the challenges caused by climate change. The social consequences of climate change are interrelated to each other and their solution cannot be implemented separately but in whole pattern. If we connect all the goals of sustainable development goals we can see a big scenery to achieve our goals. If we implement preventive measures to protect soil and water resources, we can diminish the adverse effects of climate change. Today climate change brings out the worse consequences to people's life. By monitoring soil and keeping our forests, we can protect not only fauna and flora, ecosystem, but also people's life. Health system depends on our preventive measures and efforts as well. What we learnt is that even small changes in the climate can have catastrophic consequences. Above all these factors we have to educate and inform people about climate change and its consequences. Therefore, each action towards preventing the adverse effects of climate change is a way to sustainable future.

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## ВЗАИМОСВЯЗЬ СОЦИАЛЬНЫХ ПОСЛЕДСТВИЙ ИЗМЕНЕНИЯ КЛИМАТА НА ОБЩЕСТВО: РОЛЬ ПОЧВЫ

Хафиза Иманова

**Резюме.** Изменение климата, как самая важная глобальная проблема мира, демонстрирует свои социальные последствия для общества. Это воздействие затрагивает не только социальную жизнь людей, но и экономику, здоровье, сельскохозяйственный строй. В статье исследуется взаимосвязь социальных последствий воздействия изменения климата в обществе и дается обзор предотвращения неблагоприятных последствий изменения климата. Полученные данные показывают, что социальные измерения взаимосвязаны друг с другом и только при комплексном подходе возможно решение проблемы предотвращения непредсказуемых побочных эффектов. Для предотвращения ущерба от возможных социальных последствий (изменения климата, защиты населения), а также для анализа статистических данных и данных из международных источников (таких как РКИК ООН, ВОЗ, МГЭИК), необходимо выстроить совместную работу правительства и ученых. Таким образом, данное исследование будет способствовать прояснению социальных аспектов воздействия изменения

климата на общество и рассмотрение решений по адаптации политики правительств, международных организаций и сообществ в борьбе с предсказуемыми неблагоприятными последствиями социальных аспектов воздействия изменения климата на общество.

**Ключевые слова:** изменение климата, социальные аспекты, адаптация политики, продовольствие и питание, почва

## **İQLİM DƏYİŞİKLİYİNİN CƏMİYYƏTƏ TƏSİRİNİN SOSIAL NƏTİCƏLƏRLƏ QARŞILIQLI ƏLAQƏSİNDƏ TORPAĞIN ROLU**

**Hafizə İmanova**

**Xülasə.** İqlim dəyişikliyi dünyanın ən mühüm qlobal problemi kimi cəmiyyətlər üzərində sosial nəticələrini nümayiş etdirir. Bu dəyişiklik təkcə insanların sosial həyatına deyil, iqtisadiyata, torpağa, səhiyyəyə, kənd təsərrüfatı sisteminə təsir göstərir. Araşdırmalara görə, sosial ölçülər bir-biri ilə əlaqəlidir və onlar bütöv şəkildə həyata keçirilməlidir. Yalnız kompleks yanaşma ilə həll gözlənilməz mənfi təsirlərin qarşısını almağa kömək edir. Dövlətlər və elm adamları iqlim dəyişikliyinə mümkün sosial nəticələrinin zərərinin qarşısını almaq və əhalini qorumaq üçün UNFCCC, ÜST, IPCC kimi beynəlxalq mənbələrdən və milli hökumətlərdən alınan məlumatları ətraflı təhlil edirlər. Məqalədə iqlim dəyişikliyinə cəmiyyətlərə, torpağa təsirinin proqnozlaşdırıla bilən mənfi nəticələri ilə mübarizədə hökumətlərin, beynəlxalq təşkilatların, regional və yerli icmaların müvafiq siyasətlərinin uyğunlaşdırılması və eləcə də ölkələrin inkişaf məqsədləri üçün həll yolları təklif edilir. Bu tədqiqat iqlim dəyişikliyinə cəmiyyətlərə, torpağa təsirinin sosial aspektlərinin işıqlandırılmasına töhfə verəcəkdir.

**Açar sözlər:** iqlim dəyişikliyi, sosial təsirlər, siyasətə uyğunlaşma, ərzaq və qidalanma, torpaq.

**Rəyçi: f.e.d., prof. Sakit Hüseynov**