

Impact of Climate Change and Lifestyle on Nutritional Adequacy and Sustainable Diets

Adila Naseem¹, Muhammad Waqas², and Usa Wannasingha Humphries^{3,*}

¹Department of Food Science and Technology, Bahauddin Zakariya University, Pakistan

²The Joint Graduate School of Energy and Environment (JGSEE), King Mongkut's University of Technology, Thailand

³Department of Mathematics, King Mongkut's University of Technology, Thailand

*usa.wan@kmutt.ac.th

(Received: 22 October 2024, Accepted: 27 October 2024)

(4th International Conference on Engineering, Natural and Social Sciences ICENSOS 2024, 22-23 October 2024)

ATIF/REFERENCE: Naseem, A., Waqas, M. & Humphries, U. W. (2024). Impact of Climate Change and Lifestyle on Nutritional Adequacy and Sustainable Diets, *International Journal of Advanced Natural Sciences and Engineering Researches*, 8(9), 353-357.

Abstract – Climate change poses significant challenges to human activities, societal issues, and dietary habits, leading to nutritional inadequacies and higher rates of non-communicable diseases. This study explores the complex relationship between climate change and several factors influencing food consumption patterns, such as socioeconomic status, cultural influences, environmental factors, and social support networks. It highlights the importance of adopting sustainable diets to ensure nutritional adequacy and mitigate adverse environmental effects. The role of political determination and civil society in promoting these diets is emphasized, along with the impact of environmental factors like market accessibility and local agricultural production. The review also discusses the indirect benefits of balanced food intake on health, economic prosperity, and environmental sustainability, advocating for a collaborative effort from individuals, governments, and civil society to address these multifaceted challenges. Food systems' interconnectedness and ecological determinants are examined, underscoring the necessity of maintaining environmental quality to support human health and well-being. This review aims to foster a comprehensive understanding of the factors influencing sustainable diets and the collective actions required to promote long-term health and environmental balance.

Keywords – Climate Change; Nutritional Adequacy; Sustainable Diets; Food Consumption Patterns; Environmental Impact.

I. INTRODUCTION

It is crucial to addressing societal challenges and fostering improvements in public health and environmental sustainability. Climate variation is one of our time's most pressing difficulties, impacting human activity and leading to societal issues such as heat waves, earthquakes, floods, droughts, and shifts in food and living habits. These environmental changes have diverse effects on people, directly linking climate change to health issues, fatalities, and food shortages. The innate relationship between humans and the natural environment is pivotal. Environmental conditions and societal behaviors drive human actions, and any changes in these conditions can detrimentally impact individual health and overall welfare. A wide range of factors influences health-related dietary and physical activity behaviors, and modifying these behaviors requires interventions and a strong commitment at multiple levels. Social and physical environments significantly affect individual and community health, making environmental quality a priority for the 21st century. Biological, sociological, chemical, physical, and locational hazards pose risks to human health and are influenced by biodiversity and ecosystem services.

The review explores the intricate relationship between climate change and its impact on human activities, societal issues, and dietary habits. It emphasizes the importance of adopting sustainable diets to address nutritional inadequacies and reduce non-communicable diseases. By examining the influence of diverse lifestyles, political determination, and environmental factors on food consumption patterns, the review highlights the necessity of collective efforts from individuals, governments, and civil society to promote nutritional adequacy and environmental sustainability in alignment with the United Nations Sustainable Development Goals (SDGs). Additionally, the review discusses the indirect role of food in health, economic prosperity, and environmental protection. It underscores the need for balanced food intake to ensure optimal growth and development while mitigating adverse environmental effects. This comprehensive approach aims to enhance our understanding of how beneficial societal impacts can be achieved and harmful impacts reduced, ultimately contributing to a healthier and more sustainable future for all.

Social and cultural norms significantly influence dietary patterns, with religious beliefs and traditional diets affecting the variety of food consumed and nutritional status. Traditional diets can lead to nutritional inadequacies, stunting, and non-communicable diseases. Awareness of the nutritional value of different foods can influence individuals to consume a more diverse diet. Seasonal food choices in rural areas and knowledge of creating a diverse range of meals can impact food intake[1]. Diverse lifestyles influence food consumption patterns, with excessive food consumption linked to activities like television viewing and stress. Women in certain nations experience higher rates of undernutrition, overweight, and obesity compared to men. Rising incomes lead to a higher demand for animal-based foods, while local and traditional foods like cassava or millet are stigmatized as lower quality or suitable only for the impoverished [2].

Public health initiatives have successfully impacted factors determining health behavior, such as tobacco use, alcohol abuse, high-fat diets, and sedentary lifestyles. The Healthy People initiative has started a risk reduction effort, focusing on lifestyle and dietary modifications to prevent chronic diseases. Political determination plays a crucial role in shaping a country's approach to public health, with industrialized countries having a higher prevalence of population health-focused policies. Civil society plays a vital role in shaping sustainable diets, as it helps policymakers understand the mechanisms, obstacles, and possibilities related to nutrient-dense diverse foods. The environment and ecosystems play a significant role in shaping human relationships and food choices, with ecosystems consisting of plants, soil, microbes, water, and humans. The location of one's residence, access to markets, local agricultural production, availability of wild foods, income levels, and marketing and packaging of items also influence the availability of diverse and healthy food options.

The production and use of food are exerting unprecedented pressures on the natural environment, causing significant changes to ecosystems worldwide. This has significantly impacted people's diets. A sustainable diet is healthy, environmentally friendly, economical, accessible, and culturally suitable, with any changes affecting other categories and modifying the overall level of diet sustainability. Health is another critical factor in sustainable diets. Adequate food intake ensures essential nutrients for human development, growth, and daily functioning. However, an imbalance of nutrients can result in sickness, and the rise in high-energy and low-nutrient foods exacerbates malnutrition, micronutrient insufficiency, obesity, and associated health complications. Agriculture indirectly impacts health, economic prosperity, and environmental sustainability but can also have detrimental impacts on ecosystems and environmental services [3].

II. MATERIALS AND METHOD

In this study on the intricate relationship between climate change, human activities, societal issues, and dietary habits, we employed a systematic literature search strategy. The objectives are to provide a comprehensive and nuanced understanding of the complex relationship between climate change, societal issues, dietary habits, and public health, offer insights into promoting sustainable diets for a healthier future, and advocate for inclusive policy integration to accomplish these goals[4].

We utilized multiple academic and scientific databases to ensure a wide-ranging collection of relevant literature. We developed a set of keywords and search terms based on the core themes of the review. These included "climate change," "public health," "environmental sustainability," "dietary habits," "non-communicable diseases," "sustainable diets," "food security," and "United Nations Sustainable Development Goals (SDGs)." We set specific criteria for the inclusion and exclusion of articles to ensure relevance and quality.

Extracted data were organized into crucial themes that aligned with the objectives. It included examining the direct and indirect effects of climate change on health, the importance of sustainable diets, and the influence of various factors on food consumption patterns. The synthesized data were integrated into a coherent narrative, highlighting the interconnections between climate change, societal behaviors, dietary habits, and health outcomes [5]. The discussion also encompassed the role of various stakeholders, including governments, civil society, and individuals, in promoting sustainable diets and achieving the SDGs. By exploring the influence of diverse lifestyles, political determination, and environmental factors on food consumption patterns, this review seeks to emphasize the necessity of collective efforts from individuals, governments, and civil society to promote nutritional adequacy and environmental sustainability (Table 1).

Table 1. Different factors that influence Lifestyle and Diet Choices

| Factors | Description | Impact on Lifestyle and Diet Choices |
|-------------------------------------|---|---|
| Socioeconomic Status | Includes income, education level, and occupation | Higher socioeconomic position frequently includes better access to healthy food, nutrition education, and physical activity resources. Lower socioeconomic levels may limit access to fresh produce, rely on cheaper but less nutritious diets, and increase sedentary behavior owing to economic restraints. |
| Cultural Influences | Cultural norms, traditions, and beliefs regarding food and eating habits. | Cultural influences can affect nutrition and lifestyle. Certain cultures value certain foods or eating behaviors, affecting diets and health. Cultural holidays and rituals may also affect eating choices. |
| Environmental Factors | Surrounding environment | Environmental variables significantly influence lifestyle and dietary decisions. Restricted availability of fresh and reasonably priced food choices and settings that discourage physical exercise might foster unhealthy behaviors. |
| Social Support Networks | Relationships with family, friends, and community members. | Strong social support networks may inspire, hold people accountable, and provide resources for healthier lifestyles and diets. Lack of social support or exposure to harmful behaviors in social circles may lead to unhealthy lifestyle choices, including poor diets. |
| Policy and Government Interventions | Government regulations, policies, and initiatives aimed at promoting health and wellness. | Food labeling, taxation, and incentives for healthy foods can affect diets. Improved access to healthful foods in marginalized regions and supportive physical activity environments can also change lifestyle patterns and health outcomes. |

III. RESULTS AND IMPLICATIONS

This study highlights the profound impact of climate change on human activities, societal issues, and dietary habits, emphasizing the necessity of sustainable diets for health and environmental balance. Religious beliefs and traditional practices shape food consumption, often leading to nutritional inadequacies and non-communicable diseases. Enhancing awareness of the nutritional value of diverse foods can promote healthier eating patterns. Lifestyle factors, such as excessive food consumption linked

to sedentary activities and stress, further influence dietary habits. Political will and civil society's engagement are crucial in fostering sustainable diets, supported by environmental factors like market access, local agriculture, and income levels. Adequate food intake is essential for optimal growth and development, while imbalances can lead to health issues [6]. The interplay between food, health, and the environment underscores the need for balanced diets to ensure economic prosperity and environmental sustainability. However, food production and consumption can also adversely affect ecosystems. Addressing these challenges requires coordinated efforts from individuals, governments, and civil society to adopt sustainable dietary practices, mitigate the negative impacts of climate change, and adapt to evolving lifestyle patterns. This comprehensive approach is vital for ensuring long-term health and environmental equilibrium in the face of global climate challenges[7].

Improving these interconnected factors requires a multifaceted approach considering social, cultural, behavioral, political, environmental, and health perspectives. Culturally sensitive education programs can raise awareness about the nutritional value of diverse foods, promoting healthier and more balanced diets[8]. Public health initiatives must continue to target lifestyle behaviors, encouraging physical activity and reducing the consumption of high-fat, low-nutrient foods. Politically, more substantial commitment and comprehensive policies prioritizing public health are crucial. It includes developing regulations that support sustainable agricultural practices, ensure food safety, and make healthy food options more accessible and affordable. Civil society organizations can play a significant role by advocating for these policies and fostering community engagement in sustainable dietary practices [9]. Environmental sustainability must be prioritized by promoting agricultural practices that preserve ecosystems and biodiversity and by encouraging the consumption of local, environmentally friendly food options. Enhancing agricultural productivity and food systems can support economic prosperity and reduce healthcare costs by preventing diet-related diseases [10]. Holistic, integrated strategies that address the root causes of nutritional inadequacies and environmental degradation can improve public health, economic stability, and ecological balance, creating a more sustainable future for all.

IV. CONCLUSION

This mini-review emphasizes the intricate connections between climate change, dietary habits, and societal issues, advocating for sustainable diets to address nutritional inadequacies and mitigate environmental impacts. The findings reveal that diverse factors, including socioeconomic status, cultural influences, and environmental conditions, shape food consumption patterns, often leading to disparities in nutritional status and the prevalence of non-communicable diseases. Political determination and civil society engagement are crucial for fostering sustainable dietary practices. Policies that improve market access support local agriculture, and enhance food diversity can facilitate healthier dietary choices and reduce climate-related vulnerabilities.

The review underscores that balanced food intake is essential for optimal growth, health, and development, while imbalanced diets can contribute to health issues like obesity, malnutrition, and chronic diseases. A sustainable diet, integrating cultural preferences and nutritional needs, also supports environmental conservation by reducing the ecological footprint of food production. However, achieving these goals requires a collaborative effort involving policymakers, communities, and individuals to create an environment conducive to healthy living.

Promoting public awareness of the nutritional value of diverse foods, alongside culturally sensitive educational programs, is vital for encouraging healthier food choices. Furthermore, comprehensive policies prioritizing public health and supporting sustainable agricultural practices are necessary for long-term health and environmental equilibrium. Ultimately, coordinated efforts in adopting sustainable diets can address the dual challenges of climate change and dietary imbalances, fostering a more resilient, healthy, and sustainable future for all.

ACKNOWLEDGMENT

The authors thank Bahauddin Zakariya University, Pakistan and the King Mongkut's University of Technology, Thonburi, Thailand.

AUTHOR CONTRIBUTIONS

Adila Naseem: Conceptualization, Formal analysis, Investigation, Methodology Software, Visualization, Writing –original draft. Muhammad Waqas: Conceptualization, Formal analysis, Investigation, Methodology, Validation, Writing –review & editing. Usa Wannasingha Humphries: Supervision

ETHICS STATEMENTS

This review involved analyzing existing literature, it did not require ethical approval. However, all sources were cited appropriately to maintain academic integrity and respect intellectual property rights.

DECLARATION OF COMPETING INTEREST

The authors affirm that they do not possess any identifiable conflicting financial interests or personal relationships that could have potentially influenced the findings reported in this paper

REFERENCES

1. Ebi, K.L., et al., *Extreme weather and climate change: population health and health system implications*. Annual review of public health, 2021. **42**(1): p. 293-315.
2. Niamir, L., et al., *Demand-side solutions for climate mitigation: Bottom-up drivers of household energy behavior change in the Netherlands and Spain*. Energy Research & Social Science, 2020. **62**: p. 101356.
3. Sinha, B.R.K., *Introduction: A Broad Perspective on the Concepts of Urban Dynamics, Environment, and Health*, in *Urban Dynamics, Environment and Health: An International Perspective*. 2024, Springer. p. 3-79.
4. Rapinski, M., et al., *Local food systems under global influence: the case of food, health and environment in five socio-ecosystems*. Sustainability, 2023. **15**(3): p. 2376.
5. Winchcombe, R., *Comfort Eating: Food, Drink and Emotional Health in Early Modern England*. The English Historical Review, 2023. **138**(590-591): p. 61-91.
6. Moscatelli, F., et al., *Assessment of lifestyle, eating habits and the effect of nutritional education among undergraduate students in southern Italy*. Nutrients, 2023. **15**(13): p. 2894.
7. Khomsi, K., et al., *Bridging research-policy gaps: An integrated approach*. Environmental Epidemiology, 2024. **8**(1): p. e281.
8. Whittall, B., et al., *Public understanding of sustainable diets and changes towards sustainability: A qualitative study in a UK population sample*. Appetite, 2023. **181**: p. 106388.
9. Khanjani, M.H., et al., *Biofloc: A sustainable dietary supplement, nutritional value and functional properties*. Aquaculture, 2023. **562**: p. 738757.
10. Kenny, T.A., et al., *Consumer attitudes and behaviors toward more sustainable diets: a scoping review*. Nutrition Reviews, 2023. **81**(12): p. 1665-1679.