Climate Communication Channels, AI, and Indigenous Wisdom: A Triad Approach for Adaptation in the Era of Global Boiling

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Abstract

This article centers on the formulation of a unified strategy for climate change resilience and adaptation, specifically focusing on the holistic integration of climate communication channels, artificial intelligence (AI), and indigenous knowledge systems. The author emphasizes the critical need for precise and timely climate information, pivotal to decision-making processes both at the grassroots level and on a global scale. The article delves into the significance of indigenous knowledge systems in climate change adaptation, illustrated with effective case studies. It further explores the role of AI in improving climate modeling, assessing risks, and crafting adaptive strategies. Concluding on a note of optimism, the author highlights the necessity for continued research and cooperation, crucial to harnessing this potential fully, thereby contributing to holistic nature based climate adaptation strategies.

Keywords: Climate Communication Channels, Climate Change Adaptation, Global Boiling, Indigenous Knowledge Systems, Artificial Intelligence

Introduction

Climate change, a pressing global issue, poses significant threats to our society, economy, and environment. Rising temperatures, extreme weather events, and sea-level rise are just a few manifestations of this crisis. The UN General Secretary has rephrased the term global warming to *Global Boiling* due to extreme heatwave events faced by several continents in 2023. Addressing these challenges

requires innovative and collaborative approaches. The 6th IPCC Assessment Report, released on 20th March 2023, paints a grim image of our planet's current climate status. It unequivocally states that human activities have led to a 1.1°C increase in global temperature since the pre-industrial period (1850-1900). The report warns that if we continue on our current trajectory, we are likely to exceed a 1.5°C increase, leading to severe impacts on humans and biodiversity. The carbon budget, which is the amount of CO2 we can still emit while limiting global warming to 1.5°C, is rapidly depleting. If emissions remain at 2019 levels, this budget will be exhausted by 2030. Therefore, the report calls for urgent and deep greenhouse gas emission reductions across all sectors within this decade. Despite the gloomy outlook, the report also highlights feasible and cost-effective mitigation and adaptation options, such as renewable energy, urban system electrification, energy efficiency, and forest conservation and restoration. However, these solutions require political commitment, equity, and a redirection of finance towards climate action. In this context, this article explores a unified strategy for climate change resilience and adaptation, utilizing *climate communication channels* , artificial intelligence (AI), and indigenous knowledge insights.

Climate Communication Channels for Climate Change Adaptation and Resilience

The devastating impacts of climate change calls for increased demand for accurate climate information. This information must be pertinent and actionable, catering to real-time decision-making processes at local community levels, while also addressing global scale considerations over extended time periods (Kirchoff et al., 2019). Effective communication is a crucial component in the fight against climate change. It bridges the gap between scientific research and public understanding, influencing perceptions, attitudes, and behaviors towards climate change (Moser, 2010). Various channels, including traditional media, social media, and educational programs, have been used to disseminate climate information and promote sustainable practices. Involvement of local communities and their Traditional Knowledge Systems (TKS) and combining these valuable knowledge nuggets with scientific research involving innovative AI technologies, and with a final goal to utilize the outcomes through resource managers by implementation of effective strategies for climate adaptation and resilience (Bamzai-Dodson et al., 2021). For instance, the Climate Reality Project, founded by former US Vice President Al Gore, uses digital media and grassroots organizations to educate the public about the realities of climate change and advocate for solutions. Similarly, the Yale Program on Climate Change Communication conducts scientific research on public

climate change knowledge, attitudes, policy preferences, and behavior, and disseminates its findings to decision-makers, the media, and the public. In the field of education and environment CIRES (Cooperative Institute for Research in Environmental Sciences) a motivated group of more than 500 scientists and researchers associated with University of Colorado, USA have created resources for K12 level teachers across USA including pertinent environment and climate related scientific research based topics, for use in classroom learning. The goal is to train educators through workshops and webinars on how to create interactive research based curriculum for topics such as climate change, pollution, arctic and antarctic environments, forest health, wildfires and global warming (Griffith et al., 2021). Such open educational resources help build a basic understanding of the current status of climate and environment, and create a solid foundation of the climate communication channel at the grass root level adapted to suit K12 learners. This forms a pivotal part of the climate communication channel that links diverse stakeholders, ranging from indigenous/native communities and scientific researchers to educators and learners. Thus facilitates the effective dissemination of vital climate information. Hence, climate communication networks can operate effectively when indigenous knowledge systems are merged with scientific understanding. This integration forms the basis of climate adaptation strategies that are designed for every level of climate stakeholders. These stakeholders encompass local communities, researchers, resource managers, and policy makers. The loop is completed when these adaptive strategies circle back to create climate resilience in the local communities that were instrumental in formulating initial climate adaptation approaches.

Traditional Indigenous Knowledge for Climate Change Adaptation

Indigenous communities, having lived in harmony with nature for millennia, possess a wealth of knowledge about their local environments and climate patterns. This knowledge, passed down through generations, has guided their adaptation strategies to environmental changes (Berkes, 2009). In the Amazon forests of Peru, the community preserves and protects the Iwirati Natural Paradise forest and its habitants as it is a cultural practice passed down through generations and as a way of living (Jabiel, 2023). In this region the women and men of indigenous communities lead conservation practices to protect natural resources and climate without any prompts or facilities from the local government. In India, indigenous communities in the Northeast, Eastern and Southeast parts have a cultural practice of maintaining *sacred groves*, that are forests guarded by idols of local deities and

communities (Parthasarthy & Babu, 2019). These preserved forests have numerous benefits in terms of ecological services and provide additional benefits such as medicinal value, food and fodder source, etc. Certain plants like *Tulsi* (Holy Basil), known for their medicinal properties, and *Peepal* (*Ficus religiosa*), recognized for their high oxygen-releasing capacity, carry significant religious importance in India. Customs and norms prohibiting harm to these plants have been established, illustrating a fascinating blend of ecological wisdom and spiritual reverence.

The Sundarbans, home to the world's largest mangrove forests and a significant delta region, holds both cultural and ecological importance for the people of India and Bangladesh. The mangrove region which hosts the world's maximum number of royal Bengal tigers is said to be protected by the local Goddess of Forest, *Bonbibi*. The presence of the *Bonbibi* provides the dual role of protecting the villagers who are dependent on the forest resources for a living from attacks of tigers, while protecting over exploitation of forest resources by locals due to cultural beliefs (Bimrah et al., 2022). Similarly in the Pacific Islands, indigenous communities have developed unique agricultural and fishing practices based on their understanding of seasonal and climatic variations. These practices have allowed them to sustain their livelihoods in the face of changing environmental conditions. Ecosystem based Adaptation (EbA) strategies were also observed in the iTaukei (Indigenous Fijian), Fiji island communities in the Pacific ocean (Pearson et al., 2020). As most of these TKS are not methodically recorded in writing and exist only within communities, these invaluable knowledge nuggets are important to be preserved and incorporated in our current climate change adaptation strategies.

Case Study: Combating Megafires through Researcher and Educator Participation

Megafires, are wildfires characterized by their intensity, speed, duration, impact, and size, pose significant challenges to our society and environment (Coen et al., 2018). Indigenous fire management practices, such as cultural burning, have proven effective in mitigating these fires by reducing fuel loads and promoting ecosystem health in the US. The CIRES Data Puzzle Virtual Teacher Workshop on Megafires, led by Jonathan Griffith from the University of Colorado, provides details of the research carried out by Natasha Stravos on the megafire occurrences in the US. Their research shows that when cultural or prescribed fires (small fires started on purposes to remove extra undergrowth of fuel wood) which were a part of native American culture were prohibited due to past wildfire incidents, resulted in overburden of dry fuel wood as undergrowth and underbrush over the past few decades. These dry flammable fuel wood ignited easily when exposed to dry

and hot weather conditions and caused megafires. The research suggests if the small-scale cultural or prescribed fires of the indigenous community norms persisted, the extra flammable forest undergrowth would be burnt and thus it would avoid *Megafires*. This type of scientific research is relevant for climate adaptation strategies as it integrates the indigenous knowledge of the past with scientific evidence, and provides a simple solution based strategy. The Megafire Data Puzzle workshop, with its diverse array of educators from the US and beyond, ensures that vital information about US megafires will be integrated into numerous classes in an engaging and interactive manner. This is an exciting shift from conventional teaching environments that may not have accommodated such topics. The incorporation of AI tools in this context can amplify these practices, providing instantaneous data on factors such as weather conditions, vegetation, and fire behavior, thereby facilitating more accurate and efficient fire management. Moreover, climate communication channels play a crucial role in spreading awareness about these beneficial practices, encouraging broader implementation.

The Role of AI in Climate Change Adaptation and Resilience

AI, with its ability to analyze large datasets and predict trends, holds great promise in climate change adaptation. It can enhance climate modeling, risk assessment, and the development of adaptive strategies (Rolnick et al., 2019). For instance, Google's AI-powered flood forecasting system provides early warnings to communities at risk, enabling them to take necessary precautions. Similarly, IBM's Green Horizon project uses AI to predict air quality, providing valuable information for environmental planning and policy-making.

Integration of Climate Communication Channels, AI, and Indigenous Knowledge

The integration of climate communication channels, AI, and indigenous knowledge can create a powerful approach to climate change adaptation. Climate communication can disseminate indigenous knowledge and AI-driven solutions, fostering understanding and action. AI can enhance the application of indigenous knowledge by providing data-driven insights. Meanwhile, indigenous knowledge can guide the development of AI models and strategies, ensuring they are grounded in local contexts and sustainable practices.However, this integration is not without challenges. It requires respect for indigenous rights and knowledge, ethical AI practices, and

effective communication strategies. Collaborative efforts among climate communicators, AI developers, and indigenous communities are needed to address these challenges and realize the potential of this triad approach.

Conclusion

Climate change is a complex issue that requires diverse and innovative solutions. The integration of climate communication channels, AI, and indigenous knowledge offers a promising approach to climate change adaptation. The case of combating megafires illustrates the potential of this approach. However, further research and collaboration are needed to fully harness this potential and contribute to a sustainable and resilient future.

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