



Language and Climate Change: The Role of Language in Climate Change Communication and Mitigation in Indonesia

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Abstract. The current research elaborates on how to assess and make language use more effective for communication on climate change in Indonesia. Indonesia makes up only 1.3% of the total global carbon emissions. The country is seriously threatened by climate change, which results from increasing sea levels, floods, droughts, and erratic weather. The challenges in dealing with these are compounded by the low public understanding and response towards climate change issues because of language use and ineffective communication. This research has thus adopted a Systematic Literature Review (SLR) to identify, evaluate, and interpret literature relevant to language and climate change. The results demonstrate that language plays a significant role in creating public awareness and understanding concerning climate change. In non-urban areas, using local languages increases public understanding and participation in activities that aim to mitigate and adapt to climate change. It is also a part where climate change affects the sustainability of local languages, especially minority language communities living in vulnerable areas. Therefore, the significance of this identification lies in the gap: the lack of depth of a study on how the use of local languages may be effective and the impact climate change has caused on minority language communities in Indonesia. This study is expected to fill the significant gap in improving climate change communication in Indonesia through appropriate and contextually based language use.

Keywords: Climate Change, Communication, Language, Linguistics.

1 Introduction

Climate change has been the most significant human predicament worldwide in the 21st century [1]–[5]. Its impacts are intensely felt locally but more so on a global scale, as in Indonesia. Although it contributes only 1.3% to the total global carbon emissions, Indonesia is threatened gravely by the rise of the sea level, flooding, droughts, and extreme weather that causes a slew of problems. It directly relates to agriculture, health, economy, and environmental sustainability. For example, the

Intergovernmental Panel on Climate Change report says that the regions of Asia and Africa, including Indonesia, have placed severe emphasis on these change-sensitive economic sectors [6].

However, although the threat to the livelihoods of the people and the country is urgent, public understanding of and response to climate change in Indonesia is low. Most people do not realize how important this issue is; therefore, they are not motivated to participate in mitigation and adaptation responses. One of the reasons is a language and communication problem relating to ineffective information delivery about climate change. The media, government, and environmental bodies use language and communication methods that strongly influence public perception and response towards this issue [7], [8].

Language influences public understanding and awareness [9], [10]. The message developed will help clarify and enhance the understanding of climate change if proper language is used. Wrong or weak language will create misunderstandings and worsen the situation. Further, using local languages presents massive potential for effectiveness in communication, especially outside urban areas of Indonesia. Most Indonesians reside in non-urban settings and use local languages as their primary means of communication. If local languages are used primarily in media, communication on climate change will gain much understanding and awareness among the public. For example, when the COVID-19 pandemic is about to come, the Language Agency, in coordination with the BNPB or National Disaster Management Agency, translated vital information and key messages into different local languages. It increased public awareness and mainstreaming [11].

Thirdly, the effect of climate change on language survival is also evident. Numerous minority language groups who live in environmentally vulnerable regions, such as islands or coastal areas, face pressure to migrate directly or indirectly due to climate change, which significantly threatens their languages' survival. Of the estimated 7,000 languages worldwide, UNESCO claims that only half will be able to survive this century [12]. Many consider the climate crisis intensifying this extinction process, making language communities move and adapt to new realities, often forced to give up their native languages. [11].

Previous studies have identified crucial aspects of language and climate change, such as how language is implicated in the construction of public perception and resolution to the issue. That study by Saab [7] focused on using suitable language and assertive communication to educate the public about climate change; that by Sisco et al. [8] demonstrated that technical terms hinder broader understanding. In addition, mass media also make a significant contribution to framing the issues of climate change, where intense and emotional language in news stories can profoundly affect public reaction, as demonstrated by Treen et al.[13]. Research has also shown that using local languages in environmental communications increased public understanding and engagement in non-urban areas, as identified by Kompas et al.[14]. However, regional languages and cultures are also influenced by climate change. An example of this is the research carried out by Granderson [15] and Kelly-Hope et al. [16], who pointed out that migration is a product of climate change and forces

communities speaking minority languages to relocate, hence leading to language fragmentation and loss.

While these studies may be relevant and provide good insights, there are still significant gaps in the study area. Little detailed research is done on the effectiveness of local language use in Indonesia to help increase public participation in climate change. In addition, the impacts of climate change on minority languages are identified in various parts of the globe, including Indonesia. At the same time, the specific study is not conducted on minority language communities in Indonesia. There is a pressing need for an inclusive and context-based communication development framework in government and environmental organization programs within Indonesia. However, evaluation of the quality of such environmental campaigns regarding the acceptance within the community and their impact on ecological behavior when using local languages is minimal. This study hopes to overcome such gaps and significantly advance the effectiveness of climate change communication in Indonesia through appropriate and context-specific language use.

The paper aims to explore the strategic role of language in shaping climate change awareness, comprehension, and action in Indonesia. The research tries to identify effective linguistic strategies for enhancing public understanding of climate change issues and changing behavior toward sustainability. This paper seeks to create a realization of developing strong communication structures that will serve the purpose of policymakers and environmental advocates through explorations between language, culture, and environmental consciousness.

2 Methods

This paper has adopted the Systematic Literature Review methodology for systematic and structured identification, assessment, and interpretation of all relevant research results on 'Language and Climate Change.' The choice was made based on the necessity to ensure a critical and comprehensive view of the existing literature and, therefore, focus on the areas where more attention should be paid. The study data are mainly taken from scientific articles, books, reports, and other documents relevant to the topic under consideration. Data were collected from the sources: academic databases and other internationally recognized scientific databases. The inclusion criteria used in selecting the literature were articles published in peer-reviewed journals, books, and official reports relevant to the topic of language and climate change; publications in the year range 2000–2023; articles written in English and Bahasa Indonesia; and studies that directly address the relationship between language, communication, and climate change.

Data collection happened in various orderly stages. The first stage is identifying keywords relevant to the research topic, for example, 'language and climate change,' 'communication and climate change,' 'Indigenous languages and climate change,' and 'climate change adaptation.' Second is searching for the literature by the selected academic databases using the identified keywords, including cross-referencing the articles found. Finally, a title and abstract screening was performed, after which the

relevancy of the article was decided. The articles that were irrelevant or did not meet the inclusion criteria were excluded in this step. In the 3rd stage, each of the selected articles was subjected to quality evaluation based on the research methodology, validity, and reliability of the results obtained. At this stage, tools for quality assessment, like the Critical Appraisal Skills Program (CASP) and PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses), were used. The last step was data extraction, which entailed collecting crucial information in the articles that met the inclusion criteria; this involved the study's objectives, the methods used to carry it out, its main findings, and its conclusions.

The first step in data analysis was classification, where all articles were classified based on themes, research methods, and critical findings. This classification is being done to help pinpoint patterns, trends, and gaps in the literature. The second step is synthesis, and here, I synthesize findings from the classified articles; such synthesis includes thematic analysis that could identify key themes and subthemes emerging from the literature. Interpretation follows the interpretation of the synthesis results and brings together the significant findings with the research questions posed. The interpretation of the results considered the local Indonesian context regarding climate change and language. The last step is to prepare the report that includes the research's main findings, discussion, and implications. Also, it contains recommendations for further research and policy practice.

3 Results and Discussion

3.1 Climate Change Threatens Indonesia and The World

Climate change has emerged as one of the most problematic global environmental challenges. Even though Indonesia only contributes about 1.3% of carbon to the atmosphere, it will be the country most affected by the consequences of global warming: rising sea levels, floods, and droughts. Therefore, how people in Indonesia react to the issues of climate change is very significant in the process of mitigation and adaptation to the impact.

Climate change is one of the significant challenges facing humanity [17], [18]. It has affected millions over the last two decades. It has also impacted ecosystems and could get worse in the future. Former US President Obama said that climate change is no longer a problem of the future; rather, it is unfolding already today. The Intergovernmental Panel on Climate Change (IPCC) said in 2007 that Asia and Africa are two vulnerable continents to climate change and its variations [6]. This is because of the strong dependence on economic sectors that are sensitive to climate variability and environmental and mental degradation, among others. This implies that this kind of vulnerability will negatively impact agriculture, health, and other economic sectors enormously [14], [19]–[21].

Yet, to the present time, most people in Indonesia are still oblivious of how vital climate change issues are and do not have a significant motivation to engage them in mitigation and adaptation efforts towards climate change. It may be because of the

language and communication have not been able to deliver messages properly concerning information on climate change and how to address the issue.

These words and languages are significant and helpful, as they help shape public views and responses regarding issues on climate change [7], [8], [13], [22]. The relevant literature about this issue alone proves the proper and effective use of language to clarify messages for a better understanding of climate change. If this goes the other way around with inappropriate or ineffective use of language, there will be many resulting misunderstandings, worsening the situation. Communication mechanisms of the media, governments, environmental organizations, and other public can also define public perception and response to climate change issues.

Local languages will be practical in conveying messages, particularly in non-urban areas. This is because the majority of the people of Indonesia are still living in regions where local languages are their primary way of communication. The use of regional languages in communication will bring several advantages. First, local languages will readily be understood by non-urban communities with deficient levels of education. Using local languages brings a message closer to the given community and is more acceptable and memorable. The message is thus accepted readily and remembered. Another effect is that messages in the community's local language will impact the emotion and closeness felt for the community so that they feel personal and touching.

It means an example of the use of local languages in delivering compelling messages is during COVID-19: The Language Agency collaborated with BNPP and the COVID-19 Task Force in translating the transmission of prevention and preventive messages into various regional languages. Various other materials for the prevention and precautionary campaign are also delivered in regional languages with the help of multiple media such as radio, television, social media, etc. These efforts have proven effective since they created awareness among the public on the dangers of COVID-19 and provoked them to implement health protocols. It indicates that local languages can be very practical in delivering information or changing people's behaviors, especially in areas where urban settings are not the majority.

3.2 The Silent Death of The World's Languages due to Climate Change

There are currently about 7,000 languages globally; unfortunately, it is projected that only half will have survived by the end of this century [12]. Several factors are influencing and causing this alarming trend, including globalization, which has motivated countries and societies to embrace monolingualism in speaking their languages as most people in those particular societies and nations switch to the national or international language with more dominant tendencies for such reasons as economic or political reasons, among others. It is further compounded by the suppression of regional languages in the education system and mass media and the general finalization of minority linguistic groups. In addition, war and migration also disrupt the speech communities using regional languages, further hastening the loss of a language.

Nor is the loss of local languages something that can be attributed to 'internal' factors — like continuity in intergenerational transmission, political conflict, or legal standing. The climate crisis adds an extra layer to this case. Most cultural groups stay on islands or coasts prone to storm surges or increasing sea levels; others remain in areas where increasing heat and erratic precipitation endanger set ways of agriculture and fishing. Language communities are forced to move, increasing the number of people displaced by climate change. Natural disasters displaced 23.7 million people in 2021, mainly triggered by meteorological phenomena [16]. This further fragmented language communities and increased the conflict with other languages. These changes had massive impacts on minority languages that were and still are struggling to survive.

The recent decade has seen the most significant population displacement in the Asia Pacific region due to climate change. Island nations in the Pacific are the most affected since there is a relatively small number of people in the most affected countries. For example, in 12,189 km², Vanuatu islands have the highest language density in the world: 110 languages. It means that the average is one language per 111 Km². Vanuatu also lies in the South Pacific, another rising sea-level-affected place. According to Ware and McElwee, many minority language communities, if not the majority, inhabit storm-vulnerable islands or coastal areas affected by rising sea levels [15].

Their communities are forced out of their localities: changing weather patterns related to climate change, which means increments in temperature and erratic rainfalls in some regions; farming and fishing, their means of livelihood, are put to a halt, among other factors. That would impact the speech community of a language much more if climate change were to come into play. It is just like a domino effect worsening the community.

It means losing a language and damaging aspects of identity and knowledge attached to it. For example, in Canada, the Indigenous communities are still struggling with forms of oppression and past trauma, struggling all the time to reinstate their languages. Language is a communication tool and an invaluable mirror representing local identity and knowledge. It allows us to understand the world individually and distinctly. But it also means there will be the loss of important data that might be a fact important enough to make human cognition make better sense. It might not seem like languages are lost or that the devastating effects of climate change are at first sight. That is important because an IPCC report highlights the necessity of acting across the globe in efforts to mitigate climate change. These are material losses in the form of land and resources and abstract and mental losses, such as the cultural diversity reflected in the diversity of languages spoken worldwide.

3.3 Community Engagement in Climate Change Communication

Effective communication about climate change is critical but remains an unresolved challenge. Many public campaigns, such as the Government of India's National Greening Program and the Ecomark Scheme in India, have been designed to convey messages about climate change to the public. However, it still seems that most

government and organizations are not entirely convinced of the issue's urgency, leading to the public becoming less concerned and thinking climate change is not an urgent problem.

Therefore, it is important to understand the public's views on climate change to deliver messages more effectively. The distinction between public participation and understanding of the issue must be carefully considered. The distinction reflects a shift from a lack of scientific understanding to a more contextual understanding, which recognizes the state of public understanding of science and policy processes. In practice, approaches to understanding people's views and engagement with them are inseparable, as they are interconnected. One of the main challenges in science communication is how the general public understands scientific concepts. The perceived lack of scientific knowledge is at the root of public debate about climate change issues, and this is one of the problems that must be addressed.

However, it is also essential to consider that the primary goal of climate change communication is not to provide scientific understanding to the public but rather to motivate them to become actively involved in understanding, responding to, and taking action on climate change. Therefore, the messages should inspire the public's hearts, minds, and souls. Public engagement bridges the gap between the scientific community and the general public. Active participation of various groups, especially the younger generation, in technical initiatives and discussions on climate change issues can help improve understanding and response.

In addition, rural communities and Indigenous peoples who have indigenous knowledge of climate challenges in their areas need to be actively involved to achieve more effective communication. By actively involving them, solutions will be more sustainable and relevant to local needs. While there are still many challenges in communicating climate change to the public, the steps taken today are an essential step towards greater awareness and action on climate change issues around the world, including in Indonesia.

3.4 The Role of Language and Media in Discussions Around Climate Change

It is widely recognized that media and language have a vital role in mobilizing the public response to issues on climate change. Mass media, including newspapers, television, and the internet, have an enormous potential to significantly contribute to shaping the public's knowledge and awareness of scientific issues, such as climate change. Nevertheless, media strategies for problems like this differ from one context to the other. The media's approach to climate change is influenced by framing, among other factors. The media, with different frames covering the issue, can affect the public's understanding and response. In some countries, such as Sweden and Germany, the media coverage with frames points out the society's impact on climate change and the very severe consequences of climate change. In countries such as the United States, however, there is also evidence of using frames that emphasize aspects related to scientific uncertainty, which could reduce the issue's urgency.

Another big area where media can influence the public's thoughts and opinions is framing issues on climate change. Language, among other things, also plays a vital role in the media's framing of such problems. Robust and emotional language can capture public attention and, conversely, produce social tensions. In contrast, neutral and scientific language is often lost in an overextended public, unable to incite the requisite anxiety or emotion that compels action.

Further, language barriers between the scientific and media communities may also exist, which would instigate an understanding gap between the two. The general public sometimes uses scientific terms differently, hence misunderstanding climate change issues in most cases. In this regard, it becomes vital to have robust and creative language in communication on climate change so that it can touch the hearts and minds of the general public. Using local languages can also help bridge the gap between understanding and active engagement of the public on the climate change issue. Equally important are programs, such as compiling a glossary of climate change terms in local languages. Hence, effective communication on climate change may be the key to concretely mobilizing actions to face challenges.

3.5 Addressing Climate Change Through Language and Literacy Education

Literacy and language education for climate change activism in Indonesia equips students with knowledge, skills, and attitudes for being effective agents of change. Here is how language and literacy education can contribute to the efforts to combat climate change in Indonesia.

Increase Awareness and Understanding. Such a language and literacy education will help the students understand the complexity of climate change with relevant and accurate texts and information sources. Various texts, such as news, scientific articles, fiction, and poetry, can help teachers and educators touch on different aspects of climate change, such as its effects on the environment, society, and the economy.

Developing Critical Thinking Skills. Language and literacy education will then enable the students to use critical thinking to analyze information on climate change, which is available from different sources. The role of a teacher is to make students explore the credibility of the source's bias and help them derive logical conclusions.

Improve Communication Skills. In this way, the students can be trained in language and literacy, enabling them to articulate their views regarding the crisis. Teachers can give the students occasion to write letters to stakeholders and present or discuss issues affecting climate change in Indonesia.

Fostering an Attitude of Care and Responsibility. Language and literacy education offers a platform on which students build an attitude of caring for and being responsible for the environment. Teachers can motivate and sway their students to take posi-

tive actions toward climate change, such as saving energy, recycling waste, and planting trees.

3.6 Linguistic Strategies in Climate Change Campaigns in Indonesia

Framing The Statement Positively. It is now that some terms regarding climate change are starting to get more negative connotations, and therefore, there is a severe need for the action to be framed in a positive light. The framing effect is one of the most substantial biases in driving the decision-making process among several cognitive biases. It is the case when a decision on information will depend on how the information is framed, that is, whether it is framed in favorable or unfavorable terms. In general, a person will be more likely to change his behavior if the problem he faces is framed positively rather than negatively. A rhetorical shift is needed to describe climate change from such hostile rhetoric as 'war' on carbon, 'reducing' emissions, and 'combating' global warming. Through these metaphors, climate change is often being told as a sly force or something that happens to us that we cannot control, leaving humans with no choice no responsibility, and bounds us into a 'victim role.' We must reverse this and regard the climate crisis not as a problem but as a realm of opportunity to innovate and re-imagine our response.

Emphasize The Importance of Togetherness. It pertains to the principle of solidarity in communication and considers behavioral principles in social control. This principle works very successfully when we tend to follow standard sets of behaviors, considering the behaviors of others before setting our course of action. Using terms like 'the majority,' 'most people,' and 'people like us' can enhance the likelihood of a response to the invitation by emphasizing behaviors common or adopted by the majority.

Focus on The Current Problem. One of the biggest challenges in tackling climate change is human nature's tendency to focus on present needs and gratifications without regard for future implications. This phenomenon is referred to as present bias. Basically, we tend to overestimate the benefits or advantages that can be accrued at present and simultaneously often dismiss the far more significant long-term benefits. For instance, while deciding whether to use a private vehicle or walk down to the nearest store, we generally opt for the most convenient and fulfilling, although less eco-friendly. If they are emotionally engaged in the issue, people will tend to be driven to make decisions that affect future change.

Pay Attention to The Party Sending The Message. The messenger-effect principle is based on the premise that a message coming through a trusted person will be more persuasive because it comes from a source with both authority and credibility. When making decisions, people tend to consider their level of trust in the source of information. These include how well we know the person, to what extent we like the

person, and how much we respect the person. Trust is central to persuasion. Here, therefore, the communicator is as essential as the language. Furthermore, pay attention to who the most influential messenger is — whether it is an influential figure like Nicolas Saputra, Prilly Latuconsina, Nadine Chandradinata, Dian Sastrowardoyo, and Erna Witoelar (who is known for being one of the founders of WALHI); Loir Botor Dingit, Yosepha Alomang, Arie Yannur as well as professional environmental activists, celebrities interested in ecological issues, or even scientists and academics.

3.7 Good Practices in Addressing Climate Change in Indonesia

Different initiatives to help spread awareness about climate change have been to provide accommodations in information that will easily reach the public. Among them is done by the Language Development and Development Agency by compiling reading materials about climate change efforts and impacts. Through this quality and relevant reading material, the general public begins to have a closer understanding of the very phenomenon of climatic change and the response mechanisms. The revealed reading material is, thus, an essential source for changing the knowledge paradigm within the minds of the general public and also helpful in expanding their horizons concerning environmental issues.

Not only the preparation of reading materials but festivals such as Language Ambassador, Handai Festival, and Festivals of Mother Tongue Tunas Bahasa Ibu (FTBI) are directed at discussing themes of climate change. The message about the need for environmental protection and climate change mitigation measures has been carried by using a creative and attractive way to use the platform in the festival. These festivals, with the participation of cross-cutting communities, could serve as a means to establish a feeling of collective consciousness and stimulate activities toward environmental conservation. Other efforts must be accentuated to assist local language speakers in communicating information about climate change in their regional languages. Training and technical support may more widely and equitably herald messages about the need for concrete action on climate change across the archipelago. This focus not only strengthens the use of local languages alone as practical tools in communication but also increases the scope and scale of mitigation efforts to curb climate change.

In the long run, all these steps indicate that communication regarding climate change is not all about language. Still, it involves passing across vital messages and prompting actions meant to save the environment. These efforts will build awareness and address complex environmental challenges in the Indonesian context with a comprehensive and collaborative approach.

4 Conclusion

From this study, it was clear that language is a critical success factor in any attempt to sensitize the public for their active engagement in dealing with climate change problems in Indonesia. Good use of language can help clarify messages and further public understanding of the issue, even if local languages are used. The findings of

this study confirms that good communication has a salubrious effect on public perception and response. In contrast, lousy communication further leads to misunderstanding and reduces mitigation and adaptive efforts. In another study that my organization sponsored, climate change significantly affects the survival of local languages and cultures, especially minority language communities living in threatened areas. Climate-induced migration will fragment language communities and make local languages disappear, leading to a loss of cultural diversity.

However, a research gap exists in the need to enhance the efficacy of communication regarding climate change in Indonesia. An in-depth analysis is required on the effectiveness of local languages within the climate change framework for enhancing public participation. Moreover, there is a need for specific research to study the impact of climate change on minority language communities in Indonesia and to develop inclusive and contextual communication frameworks in government programs and environmental organizations. In the same vein, hardly any studies have been made on the quality of ecological campaigns conducted using local languages; therefore, this research intends to plug this gap. The study would thereby assist in developing more effective and relevant communication strategies to combat the challenges of climate change in Indonesia, ensuring concrete action in the preservation of the environment and cultural diversity.

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