**CINEFORUM**
ISSN: 0009-7039
Vol. 66. No. 1, 2026

# CLIMATE CHANGE LITERACY: THE ROLE OF LANGUAGE AND MEDIA IN CLIMATE CHANGE ADAPTATION AND MITIGATION AMONGST FARMERS IN IMO STATE, NIGERIA

**[1]Nwulu, Felicia Nina; [1]Agama, Christian Sunday; [1]Obinna Obiagwu; [1]Olekaibe, Chinenye C; [1]Iroagba, Chioma; [1]Opara, Chika Glory; [1]George, O. Mbarah; [1]Onuoha, Ebere N; [1]Anigbogu, Ngozi; [1]Uchenna, Uwakwe; [1]Amadi, Appolonia Ifenyinwa; [1]Obumneke, Chinonso Faith; and [2]Chikaire, Jonadab Ubochioma**

[1]Directorate of General Studies, Federal University of Technology, Owerri;
[2]Department of Agricultural Extension, Federal University of Technology, Owerri, Imo State, Nigeria.
Corresponding Email: akjamin2010@gmail.com

## Abstract

This paper investigates the roles language and media play on how people understand and respond to climate change issues. The study focuses on how language choice (English and local languages such as Igbo) and media channels (radio, community meetings, mobile phones and social media) influence farmers' understanding of climate change, as well as their capacity to adopt appropriate adaptation and mitigation practices. The emphasis on language and media is important because effective communication is central to improving climate change literacy and enabling behavioural change among rural farmers. Using questionnaire and oral discussion, a total of 120 farmers were interviewed. Descriptive tools of analysis were used to analyze data collected. It was observed that the respondents were fully aware of climate change menace, such as decreased crop yield (97.5%), loss of animals (90.8%), prolonged dry spell (98.3%), frequent flooding (94.1%) among other signs. Several media tools are used such as; newspaper (97.5%), radio (100%), television (90%), magazines (83.3%) and many more. Language and media raise awareness (M=2.80), shapes attitudes/beliefs (M=2.65), education and youth empowerment (M=2.54), communication risk/impacts (m=2.85) encourages preparedness (M=2.83), supporting early warning systems (m=2.64), developing critical thinking skills (M=2.50). The following adaptation and mitigation strategies were employed; agro-forestry practices (96.6%), contour/bonding/terrace (98.3%), mulching/cover cropping (96.6%), crop rotation (96.6%), planting early maturing (97.5%) and use of resistant crop varieties (98.3%) among others. However, there are challenges to media dissemination of climate information to farmers. They include misinformation/disinformation (96.6%), language barrier (98.3%), poor communication infrastructure (99.1%), trust issues (95%), limited feedback mechanism (92.5%), among others. To address these challenges, fact-checking and network verifications, bridging the digital divide, rebuilding trust, enhancing feedback mechanism among others need be done.

**Key words:** climate change, language, media, adaptation, mitigation, farmers

## Introduction

The world today faces numerous crises, including challenges related to food, energy, finance, and climate. Climate variation is a natural occurrence, but it has significant implications. Anijah-Obi (2001) defines climate change as a long-term shift in Earth's climate. Ofem et al.

(2013) emphasize that climate change is largely linked to global warming, which can be partly attributed to greenhouse gases resulting from human activities. Climate itself refers to the average weather conditions in a specific area, encompassing factors like temperature, precipitation, and cloud cover. Ivuerah (2007) highlights that the issue of climate change is closely tied to a group of six greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These gases primarily stem from human actions, such as carbon dioxide emissions from fossil fuel combustion, cement production, bush burning, agriculture, and other land-use practices, including deforestation.

Nigeria, located in the tropics, is already feeling the harsh impacts of climate change, which are affecting its economy significantly. Approximately 65% of the population relies on agriculture, primarily in rural areas (Ofem e t al.,2013). As the country grapples with challenges related to increasing food production and combating hunger and poverty, climate change looms as a serious threat to agricultural progress. Numerous government bodies, including the Ministries of Agriculture and Agricultural Development Programmes (ADPs), along with Meteorological Stations, Emergency Response Centres, scientists, and farmers, are actively addressing this pressing issue. Unfortunately, developing countries like Nigeria are predicted to experience even more severe effects of climate change, characterized by already lower agricultural yields and more frequent extreme weather events (Wilson, 2001). While global food security may not be completely jeopardized, the consequences of climate change could lead to increased hunger and displacement for many communities around the world.

Agriculture is responsible for approximately 18 to 24% of the greenhouse gas emissions contributing to global warming, as reported by Wilson in 2001. In turn, climate change poses serious challenges to agricultural practices. According to Machhi (2008), rural communities residing in marginal areas who rely heavily on natural resources are particularly vulnerable to the impacts of climate change. Despite the ongoing effects of climate change on these rural farmers—who provide three-quarters of the food consumed in our country—there has been insufficient analysis of how they perceive the situation and adapt their response strategies. Furthermore, Darwin (2001) observed that, although there have been notable advancements in understanding the economic impacts of global warming, the integration of climate change information management into adaptation and mitigation efforts remains limited. Effectively managing climate change information is crucial for developing responsive measures. It is surprising that the existing literature on climate change largely neglects the aspect of information management within rural farming communities. As highlighted by Ofem et al., (2013), many assessments focus solely on the effects of climate change on agricultural production, often overlooking the essential role of development communication and extension services. It is here that the issue of climate literacy and information comes in.

Climate literacy is the capacity of individuals and communities to comprehend the causes and effects of climate change as well as the strategies available to address them. This understanding is crucial for making informed decisions in personal, social, and professional contexts. As stated by UNESCO, it is a vital element of education aimed at fostering sustainable development because it encourages people to respond wisely to environmental issues and engage meaningfully in climate action (UNESCO, 2017). Being climate literate extends well

beyond just knowing that climate change exists. It involves grasping the fundamentals of climate science, recognizing how human activities contribute to global warming, pinpointing local climate risks, and understanding how social, economic, and cultural dynamics can affect vulnerability and resilience. The Intergovernmental Panel on Climate Change (IPCC) highlights that human actions, particularly the burning of fossil fuels and changes in land use, have led to a notable increase in greenhouse gas levels, resulting in more extreme weather events, such as floods, droughts, and heat waves (IPCC, 2023). A population that is well-versed in climate issues is better equipped to interpret climate information, evaluate risks, and implement effective adaptation and mitigation strategies. This is particularly crucial in developing nations like Nigeria, where rural and farming communities rely heavily on resources affected by climate conditions. Farmers who are aware of seasonal changes, varying rainfall patterns, and rising temperatures are more likely to adjust their planting schedules, choose climate-resilient crops, and adopt improved methods for managing soil and water (World Bank, 2021). Furthermore, climate literacy aids in the optimal use of early warning systems, weather forecasts, and agricultural support services, helping farmers minimize losses from climate-related disasters. Effective communication is another essential aspect of climate literacy. Climate change information can often be complex and technical, but for it to truly matter, it needs to be conveyed in straightforward, culturally relevant, and locally applicable formats. Research indicates that people are more inclined to trust and utilize climate information when it is presented in their native languages and connected to their daily lives (UNESCO, 2017). This is especially vital in multilingual environments, where reliance solely on technical jargon may alienate many rural residents. Additionally, climate literacy enhances community engagement in climate governance. Citizens who understand climate risks and available policy options are more empowered to interact with local authorities, seek accountability, and contribute to the development of community-based adaptation strategies.
According to the IPCC (2023), fostering inclusive and participatory approaches increases the efficacy and sustainability of climate interventions, especially when local knowledge is combined with scientific data. Climate-literate communities take on a proactive role, engaging as active partners in climate programs instead of just being passive recipients. This understanding of climate issues fosters behavioral changes and promotes low-carbon development. When individuals grasp the connections between their daily choices—like how they use energy, the way they travel, and how they manage waste—and their impact on greenhouse gas emissions, they are more inclined to advocate for responsible environmental practices and policies (World Bank, 2021). Additionally, incorporating climate literacy into school curricula empowers young people to cultivate critical thinking skills and a deeper sense of responsibility toward environmental conservation and sustainable development.

Climate change information has not been effectively integrated into many development projects and decision-making frameworks, as highlighted by Hellmuth et al. (2007). Consequently, communication channels such as ICTs, radio, and local extension services remain significantly underutilized for sharing crucial information. While various sources provide climate change data, there is a notable scarcity of information that is directly relevant to farmers and can be effectively applied to their agricultural practices. Awuor (2008) pointed out that although traditional sources of weather information are generally trusted and used by

rural communities, they fall short in providing the comprehensive data necessary for farmers to plan their activities over the long term. Moreover, access to scientific weather information is often inadequate for farmers. Even when this information is available, the impacts of climate change on agricultural activities in vulnerable rural communities have not been thoroughly documented. While agricultural climate change information is essential, challenges remain in generating, collecting, processing, and disseminating this information to farmers effectively. Specifically, this study ascertains respondents' awareness of climate change; identified media tools in communicating climate change matters; examined perceived roles of language and media in adapting to climate change, and identifying climate change mitigation and adaptation strategies employed by respondents; challenges in media dissemination of agricultural and climate information, and means of addressing them.

**Theoretical Foundation and Considerations of the Research Work**

To strengthen the theoretical foundation of the paper, it is important to elaborate on established communication theories that explain how media and language shape knowledge, attitudes, and behavioral change regarding climate issues. Integrating key theoretical models provides a clearer framework for interpreting how farmers receive, understand, and act on climate information. Language and media are key in how rural farmers grasp climate change and respond to its effects. Climate literacy is essentially the skill of understanding climate-related information, recognizing what causes and results from climate variability, and making informed choices about how to adapt. For farmers, whose livelihoods are closely tied to the environment, it's vital that climate information is communicated effectively to inspire behavioral changes and enhance resilience. However, the success of this communication hinges on how clear the language is and how accessible the media channels are that deliver this information. Theories of communication offer insights into how language and media shape climate literacy and influence behavioral changes among rural farmers.

**One significant framework here is Framing Theory**, created by Robert M. Entman. This theory posits that the way information is shared affects how people interpret and react to it. Climate change is a complex issue laden with scientific jargon and abstract ideas, which can be daunting for rural farmers to grasp. If climate messages rely on technical language, farmers might struggle to connect this information to their everyday farming realities. However, when climate communication is presented in straightforward, culturally relevant terms and tied to farmers' daily experiences—like erratic rainfall, droughts, floods, or dropping crop yields—farmers are more likely to comprehend and accept the information. This approach enhances climate literacy because it makes the information more relatable and interpretable within their socio-economic framework. For instance, discussing climate change in relation to its immediate impacts on planting seasons, crop yields, and soil moisture can empower farmers to understand the risks tied to changing climate conditions better. Thus, how we frame our language significantly influences farmers' perceptions of climate information and their willingness to embrace adaptive farming methods (Entman, 1993).

Media channels play a crucial role in sharing climate information with rural communities. **The Diffusion of Innovations Theory, introduced** by Everett M. Rogers, outlines how new ideas, technologies, and practices spread within social systems through communication over time.

According to this theory, farmers' adoption of new practices hinges on factors like access to information, communication networks, and perceived benefits of innovations. Platforms such as radio, television, agricultural extension bulletins, and mobile services are key avenues through which climate information and adaptive strategies can reach rural farmers. In many areas, radio stands out as an effective communication tool due to its affordability, accessibility, and ability to broadcast in local languages. Agricultural radio programs deliver essential goods like weather forecasts, seasonal climate predictions, and insights into climate-smart farming practices, including water conservation, crop diversification, and improved seed varieties. When farmers repeatedly hear this vital information from trusted media channels, they become accustomed to climate-related innovations. Over time, those who see the benefits of adopting new practices often influence their peers, speeding up the diffusion process. Early adopters in the community tend to act as opinion leaders, encouraging fellow farmers to embrace similar adaptive strategies. Thus, media not only transmits information but also fosters social learning and drives community-wide behavior change (Rogers, 2003).

**An additional perspective that sheds light on behavior change among rural farmers is Social Cognitive Theory,** developed by Albert Bandura. This theory highlights the importance of observational learning, modeling, and self-efficacy in shaping human behavior. Individuals learn new behaviors by watching others and assessing the outcomes of their actions. Consequently, media platforms can effectively demonstrate climate adaptation strategies, inspiring farmers to follow suit. For example, radio or television programs showcasing successful farmers who implement drought-resistant crops, improved irrigation methods, or soil conservation practices can motivate others to replicate these behaviors. When farmers see their fellow farmers, thriving while tackling climate challenges, their own confidence in adopting similar strategies grows (Bandura, 2001). This increase in confidence, referred to as self-efficacy, is a key driver in promoting behavioral change. Social cognitive theory emphasizes how reinforcement plays a crucial role in shaping behavior. For instance, when farmers receive positive feedback or see tangible benefits from using climate-smart practices—like higher crop yields or better soil quality—they are more inclined to stick with those methods. The media can further support these behaviors by sharing success stories and providing ongoing updates on the advantages of climate adaptation strategies. This continuous dialogue not only enhances climate literacy but also encourages farmers to incorporate climate-resilient practices into their farming systems.

Additionally**, the Agenda-Setting Theory**, developed by Maxwell McCombs and Donald Shaw, sheds light on how the media influences the significance that people assign to certain issues. The theory posits that the frequency and visibility of media coverage shape perceptions of importance. When content related to climate change and agricultural adaptation is consistently featured in news stories, agricultural programs, and community conversations, farmers become more attuned to the critical nature of climate-related challenges. This heightened awareness compels them to engage with climate information and explore solutions to navigate environmental changes. For rural farmers, whose livelihoods are intertwined with environmental stability, the media's role in prioritizing climate-related discussions is particularly vital. When media outlets routinely cover topics such as drought management, flood control, and sustainable land use, these issues become ingrained in everyday

conversations within farming communities. Consequently, farmers grow more aware of climate risks and are more likely to adopt practices that bolster resilience and sustainability. Thus, agenda-setting plays a significant role in promoting climate literacy by raising public awareness and emphasizing climate adaptation within the framework of rural development (McCombs & Shaw, 1972). Language is deeply intertwined with cultural and social contexts, playing a significant role in shaping climate literacy. For many rural farmers, making informed decisions about their practices often hinges on indigenous knowledge systems and traditional environmental observations. When climate communication weaves in local expressions, cultural metaphors, and indigenous wisdom, it becomes much easier for these farmers to connect scientific climate data with their existing knowledge. This blend of scientific and local insights not only enhances understanding but also fosters greater trust in the information being shared. On the flip side, using unfamiliar terms or foreign languages can create barriers, making climate messages less effective. Moreover, access to media technologies greatly impacts how farmers engage with climate communication. Many rural communities struggle with limited internet connectivity, low literacy rates, and insufficient communication infrastructure. Consequently, strategies that depend solely on digital platforms might leave a significant number of farmers out of the loop. In contrast, utilizing community radio, broadcasts in local languages, and participatory approaches like farmer field schools and community gatherings can significantly improve access to vital climate information. These methods allow farmers to ask questions, exchange experiences, and collaboratively find solutions to climate-related issues. In summary, language and media work hand in hand in shaping climate literacy and encouraging behavioral change among rural farmers. Language influences how clearly climate information can be understood, while media dictates how broadly and effectively that information reaches its audience. By delivering climate messages in straightforward, culturally resonant language through accessible media platforms, communication strategies can empower rural farmers to better comprehend climate risks and embrace adaptive agricultural practices. The application of communication theories such as Framing Theory, Diffusion of Innovations Theory, Social Cognitive Theory, and Agenda-Setting Theory offers a solid theoretical framework for understanding how climate communication impacts farmers' knowledge, attitudes, and behaviors. These theoretical lenses thus enhance the interpretation of research findings and underscore the importance of effective communication strategies in fostering climate resilience and sustainable agricultural development within rural farming communities.

## Methodology

Imo State, located in the southeastern part of Nigeria, lies between the upper and middle stretches of the Imo River and the lower Niger River. To the north, it shares borders with Anambra State, while Rivers State lies to the south. The west is adjacent to the Niger River and Delta State, and Abia State forms the eastern boundary. Spanning about 5,100 square kilometers, Imo State is situated within latitudes 4°45'N to 7°15'N and longitudes 6°50'E to 7°25'E. As of 2024, the estimated population is around 5.8 million, based on figures from the 2006 census, reflecting a density that ranges from 230 to 1,400 people per square kilometer (NBS, 2019; NBS, 2006). The state is endowed with a wealth of natural resources, including lead, zinc, natural gas, and crude oil. The vegetation is economically valuable, comprising

species like iroko, mahogany, obeche, bamboo, rubber trees, and oil palm, alongside significant deposits of limestone, fine sand, and white clay. The rainy season typically spans from April to October, with rainfall amounts fluctuating between 1,500 mm and 2,200 mm (about 60 to 80 inches) (GAI, 2007). Average annual temperatures exceed 20 °C (68.0 °F) and are accompanied by a relative humidity of 75%, which can reach 90% during the rainy months. The Harmattan winds blow for two months during the dry season from late December to late February, with January through March marking the warmest months (IMSG, 2010a; IMSG, 2010b).

The research adopts a descriptive survey design that blends quantitative and qualitative methods. It leverages quantitative data to assess the climate change literacy levels among farmers, the sources they rely on for information, and their preferred communication languages. Meanwhile, qualitative data captures in-depth insights into farmers' perceptions regarding language use and the effectiveness of various media channels. This approach allows for an exploration of how language practices and media platforms enhance farmers' comprehension of climate risks and influence their willingness to implement climate adaptation and mitigation strategies (FAO, 2017; IPCC, 2021). The study focuses on registered smallholder farmers in Imo State. A multi-stage sampling method was utilized: first, three agricultural zones—Orlu, Owerri, and Okigwe—were purposefully chosen to reflect ecological and farming diversity. Next, two Local Government Areas were randomly selected from each zone. Finally, farming communities within those Local Government Areas were chosen at random. The study involved 120 farmers, chosen using a simple random sampling method from the local agricultural community. This technique ensures that every farmer had an equal chance of being selected, which helps minimize any biases and strengthens the reliability of our results (Babbie, 2013). To start, we created a sampling frame by compiling a list of registered farmers (1,200 in all) from resources like local agricultural extension offices, cooperatives, and community associations. Each farmer was issued a unique identification number. We then used a random selection process, such as a random number table, to pick 120 farmers from this list, ensuring that the selection process remained impartial. While simple random sampling fosters fairness, it does not guarantee that the sample will capture the full diversity of the farming population. To enhance the representativeness of our sample, we included and had oral interview with farmers from various demographic and socioeconomic backgrounds. This helps us assess whether our sample mirrors the broader farming community and provides insights into how these characteristics influence climate literacy and media engagement. Data were gathered through two primary instruments: a structured questionnaire distributed to farmers to gather information regarding their climate change awareness, language and media exposure, and adaptation practices; focus group discussions with selected farmers to share experiences and local interpretations of climate change information. The instruments were validated by experts in agricultural extension and communication Department of Federal University, Owerri, and a pilot study was conducted to ensure reliability (Aker, 2011; FAO, 2017). Quantitative data were analyzed using descriptive statistics, including frequencies, percentages, and mean scores. Qualitative data from interviews and focus group discussions underwent thematic analysis, concentrating on key themes such as the accessibility of information, trust in media sources, clarity of language, and cultural relevance of climate messages (IPCC, 2021; UNESCO, 2018).

Objectives 1, 2, 3,5 and 6 were accomplished using percentages presented in frequency tables. Objective 4 (perceived roles of Language and media in climate change literacy) was evaluated using a 4-point Likert scale consisting of strongly agree, agree, disagree, and strongly disagree, assigned weights of 4, 3, 2, and 1, respectively. The resulting values were summed and divided by 4 to establish a discriminating mean value of 2.50. Any mean value that equaled or exceeded 2.50 was deemed acceptable on the roles of language/media in climate change topics
This is mathematically represented as

$$\frac{4+3+2+1}{4} = \frac{10}{4} = 2.50$$

## Results and Discussion

### Awareness of Climate Change Impacts on Food Systems

Table 1 showed that the respondents are fully aware of climate change impacts on food systems in their locality. They have observed the following signs: decrease crop yield (97.5%), loss of farm animal (90.8%), damage to fisheries and forests (99.1%), shortage of water (86.6%), prolonged dry spells (98.3%). Other major effects identified were increased evapo-transpiration (95.0%), frequent flooding during the rainy season (94.1%), increased animal diseases (93.3%), and drying of rivers and streams (86.6%), reduced pasture quality (81.6%), and low milk, meat, and egg production (70.0%).

The above agrees with recent research which indicates that climate change can lead to significant reductions in crop yields. For instance, a study by Schlenker and Roberts (2009) highlights that a 1°C rise in global average temperature results in an approximate 6% decrease in global maize yields. Similarly, research by Lobell et al. (2011) suggests that by 2050, climate change might contribute to a 3% to 4% decline in global wheat production for each degree of warming. Such declines in crop yields have serious implications for food availability and affordability, potentially raising food prices and making access more difficult for vulnerable populations. Additionally, the World Health Organization (WHO) outlines three dimensions of food security: food availability, food access, and food use (WHO 2018). Beyond direct impacts on crop production, climate change also influences various aspects of the food system. Alterations in temperature and precipitation can disrupt pest and disease dynamics, affecting the distribution and prevalence of agricultural pests and pathogens (Bebber et al., 2013). Extreme weather events, including droughts and floods, can lead to crop failures, livestock losses, and damage to infrastructure, further jeopardizing food security (Ismail, Musa & Magaji, 2019). Furthermore, climate change can also affect the nutritional value of crops, risking a decline in quality and worsening malnutrition. In a study by Verschuur et al. (2021), an extreme event attribution (EEA) approach was adopted alongside an explanatory framework to assess how climate change exacerbates food production shocks in Lesotho. They found that crops are highly sensitive to climate change, with the 2007 findings indicating that climate change was a critical driver of food production shocks in the region. This situation also highlights the fragile state of the agricultural sector, which increases their reliance on trade, ultimately impacting the country's ability to build resilience against the effects of climate change now and in the future. Ayo et al. (2014) conducted a study on the effects of climate change on food security in Nigeria, identifying several major impacts, including reduced

agricultural output, shifts in land suitability for crops, changing precipitation patterns, and rising temperatures leading to longer growing seasons.

Therefore, Climate literacy is not just about noticing that temperatures are rising; it involves a deeper grasp of climate processes, the link between our actions and climate change, local climate risks, and how to adapt (Sterman, 2011). For farmers, this means understanding how changes in rainfall, temperature extremes, and pest pressures can impact crop production, along with the ability to adapt their farming practices accordingly (Lemos et al., 2012). While formal climate literacy frameworks often come from education or policy fields (Abbott, 2016), local ecological knowledge is crucial for farmers in understanding climate risks (Roncoli, Ingram & Kirshen, 2001). Research shows that many rural farmers are aware of changing climate patterns. In East Africa, for instance, smallholder farmers have observed rising temperatures, postponed rains, and more frequent droughts (Deressa, Hassan & Ringler, 2011). Similarly, studies in West Africa highlight that farmers can identify variations in the timing and length of seasons and link these changes to crop failures (Nielsen & Reenberg, 2010). However, this awareness doesn't always equate to a scientific understanding. Farmers might accurately detect local climate trends, yet their reasoning often stems from cultural or spiritual beliefs rather than scientific concepts like greenhouse gas emissions and large-scale climate systems (Nkomwa et al., 2014). For example, in some Southern African regions, farmers frequently attribute changes in climate to ancestral displeasure, divine will, or moral misalignment, which can lead to responses that differ from scientifically-backed adaptation strategies (Moeletsi & Walker, 2012).

**Table 1: Awareness of Climate Change Impacts on Food Systems**

| Climate Change Impacts | Frequency | Percentage (%) |
|---|---|---|
| Decrease in crop yield | 117 | 97.5 |
| Loss of farm animals | 109 | 90.8 |
| Damage to fisheries and forests | 119 | 99.1 |
| Shortage of water | 104 | 86.6 |
| Increased evapotranspiration | 114 | 95.0 |
| Loss of forest products | 101 | 84.1 |
| Stalinization of water sources | 97 | 80.8 |
| Increased wildfire outbreaks | 108 | 90.0 |
| Frequent flooding during rainy season | 113 | 94.1 |
| Prolonged dry spells | 118 | 98.3 |
| Rivers and streams drying up | 104 | 86.6 |
| Increased animal diseases | 112 | 93.3 |
| Reduced pasture quality | 98 | 81.6 |
| Low milk, meat and egg production | 84 | 70.0 |

***Multiple response**

**Media /Languages tools for communicating climate change issues.**

Table 2 showed the media tools used for communicating climate change issues to farmers. These tools include radio (100%), recognized as the most widely used medium, followed by newspapers (97.5%), magazine (83.3%), bulletins/pamphlets (93.3%), journals (76.6%), films (70%), and television (90.0%). Social media platforms such as Facebook (80.8%) and websites/blogs (80%), Instagram (65%), YouTube (66.68%), Google Meet/Zoom/Conferences conferencing tools (65.8%). This aligns with the findings of Thatchinamoorthy and Meenambigai (2020), who noted that new media tools such as WhatsApp, Facebook, Twitter, blogs, wikis, and professional networking sites are consuming significant amounts of people's time as they share information and connect with others. These tools can enhance every aspect of the agricultural value chain, from planning and inputs to on-farm production, postharvest processes, and market access. Today, new media holds immense potential to elevate students' knowledge and future opportunities.

Again, Ofem, Elemi and Agube (2013) in a study on the role of communication media in mitigating climate change effects on agricultural production in Cross River State, Nigeria showed the diverse methods used to relay climate information to farmers in the study area. According to them, radio emerged as the primary source at 62.5%. This indicates that most farmers rely on the radio for weather updates. The survey highlights that the broadcast frequency is low, generally occurring during the network news segments on the Federal Radio Broadcasting stations and the Nigeria Television Authority (NTA) at 7:00 AM and 9:00 PM. While this information is not specifically aimed at farming communities, those interviewed noted that it still plays a key role in helping them plan their agricultural activities.

Additionally, television serves as a significant source of weather information, accounting for approximately 68.9%; although this information is not directly targeted, it still aids in farm planning. Respondents also mentioned that newspapers contribute only 32.8% to the dissemination channels, while video documentaries represent around 29.4%. Agricultural Extension Officers (37.5%) are also vital in sharing climate information. Neighbors are identified as a substantial source, with 49.4% mentioning them as useful for disseminating information in rural farming communities. The survey also reveals that village meetings (61.5%) play a crucial role in spreading information, with town criers being the most significant source at 73.1%, as reported by respondents. Other methods such as drama plays (4.4%) and script writing (7.5%) account for only a small fraction of the media utilized by the communities surveyed for weather updates.

**Table 2: Media and Language Tools for Climate Literacy**

| Media tools | Frequency | Percentage (%) |
|---|---|---|
| Newspapers | 117 | 97.5 |
| Magazines | 100 | 83.3 |
| Television | 108 | 90.0 |
| Radio | 120 | 100.0 |
| Bulletins/Pamphlets | 112 | 93.3 |
| Journals | 92 | 76.6 |
| Films/Cinema/Videos | 84 | 70.0 |

| | | |
|---|---|---|
| Websites/Blogs | 96 | 80.0 |
| Instagram | 78 | 65.0 |
| Facebook | 97 | 80.8 |
| YouTube | 80 | 66.6 |
| Google Meet/Zoom/Conferences | 79 | 65.8 |

*Multiple responses allowed

**Language and Media Roles in Climate Change Adaptation and mitigation.**

With a discriminating mean of (M) index of 2.50, all items in Table 3 were accepted. This indicates that language and media play important roles in climate change literacy for adaptation and mitigation. The highest-rated roles were communicating risks and impacts (M = 2.85), encouraging preparedness among farmers (M = 2.83), and raising awareness and understanding (M = 2.80). These results confirm that effective communication through language and media significantly supports climate change response. Shaping attitudes and beliefs (M = 2.65), Motivating action and behaviour change (M = 2.74), Education and youth engagement (2.54), Preserving indigenous and local knowledge (M=2.61), Communicating risks and impacts (M=2.85) , Supporting early warning systems (M=2.64), Developing critical thinking skills (2.59), Building trust and credibility (M=2.62), Reaching diverse audiences(M=2.58), Influencing policy and leadership (M=2.51), Encouraging community cooperation (M=2.67) Encouraging preparedness among farmers (M=2.83), Addressing emotions and perceptions (M=2.54).

It is well-established that media and language are essential in rallying public engagement on climate change issues. Platforms such as newspapers, television, and the internet wield significant influence in shaping how the public understands and acknowledges scientific topics, including climate change. However, the strategies employed by media in addressing these problems can vary widely depending on the context (Nasrullah, Kisyani Inayatillah Prayogi, 2024) The framing of climate change by the media can profoundly impact public perception and reaction. A well-rounded education in language and literacy can equip students with the skills to navigate the complexities of climate change through relevant and accurate texts and resources. Different materials—ranging from news articles and scientific research to fiction and poetry—can enable educators to discuss various facets of climate change, including its repercussions on the environment, society, and economy.

This education allows students to engage in critical thinking, analyzing climate change information from diverse sources. Teachers play a pivotal role in guiding students to scrutinize the credibility of different sources and discern biases, helping them arrive at reasoned conclusions. By doing so, students can develop their language and literacy skills, allowing them to express their views on the climate crisis. Educators can encourage students to write letters to stakeholders or engage in discussions about climate-related issues (RMS, 2025). Through language and literacy education, students can cultivate a mindset of environmental responsibility and care. Teachers can inspire their students to take proactive steps against climate change, such as conserving energy, recycling, and planting trees. The media significantly shapes how the public perceives and understands weather and climate-related

matters. Whether through daily weather updates or news articles, media acts as a vital connector between scientific authorities and everyday people.

As extreme weather events related to climate change become more frequent and severe, the necessity for clear and effective communication is more crucial than ever. At the same time, meteorologists in broadcasting hold a unique role as trusted sources of weather and climate information. Their expertise allows them to make complex meteorological data understandable and relatable. Their responsibilities extend beyond simply providing forecasts; they play a key role in linking climate science to public comprehension. One of the media's main roles is to deliver timely and accurate weather forecasts.

Daily weather updates are essential for helping people organize their activities, from choosing what to wear to managing travel plans. Most crucially, during severe weather events like storms, floods, and heatwaves, prompt and accurate information can save lives. While weather pertains to immediate atmospheric conditions, climate refers to long-term trends. The media plays a vital role in educating the public about climate change, including its causes and effects. Given the complexity and often politically charged nature of climate change, effective communication is both challenging and essential.

The media can enhance awareness of climate change in several key ways: a) Clarifying Scientific Concepts: Many individuals might struggle to distinguish between weather and climate, or understand how a warming planet contributes to more extreme weather patterns. Weather presenters can break down complicated scientific concepts, making them easier for everyone to understand. b) Showcasing Impacts: The media can highlight real-life consequences of climate change, from strengthening storms to extended droughts. This connection helps the public link abstract climate science to concrete effects experienced in their communities. c) Reporting on Climate Policies: Addressing climate change requires shifts in policy at various levels—local, national, and international. Media coverage can track government actions, international climate agreements, and corporate sustainability efforts, ensuring the public stays informed. An informed public can affect policy-making (RMS, 2025).

When the media delivers clear and persuasive coverage of climate-related topics, it can inspire community involvement and, ultimately, lead to policy reform. For instance, following a severe flood, media reporting frequently emphasizes the need for improved infrastructure, tougher environmental regulations, and enhanced emergency response strategies. Public pressure, fueled by comprehensive media coverage, can urge policymakers to prioritize climate resilience and adaptation efforts. These situations garner attention as people seek to understand the cause and effect involved. Broadcast meteorologists are often trusted sources for establishing facts, contributing to informed public and political discussions. Additionally, media platforms can facilitate discussions among experts, activists, and policymakers to explore climate solutions. Debates, interviews, and panels inform the public about policy alternatives and motivate proactive strategies. Unfortunately, misinformation surrounding climate change can spread quickly, especially on social media, with some skeptics and interest groups working to downplay the seriousness of climate issues, causing public confusion. The media strives to cultivate trust with its audience and has a responsibility to combat misinformation by: a) Fact-checking statements: Journalists can investigate and refute false narratives related to climate change and weather phenomena; b) Utilizing reliable sources:

News reporting should draw from respected scientific organizations, like the IPCC (Intergovernmental Panel on Climate Change), the UK Met Office, or RMetS. c) Offering context: Certain news pieces about cold weather events might be misinterpreted to challenge the reality of global warming (RMS, 2025).

The media has a crucial role in providing context to clarify that extreme cold does not negate climate change. While climate change is a worldwide issue, its effects are often experienced locally, but many people are unaware of this connection. Here, the media can play a vital role in bridging these scales by showing how global trends impact specific communities. By merging local narratives with comprehensive climate science, the media can help individuals recognize that climate change is not an abstract concern; it directly influences their everyday lives (RMS, 2025).

In oral discussions, respondents noted that language is crucial for motivating individuals to take action. The choice of words we use when discussing the environment is important. Currently, few issues are as pressing as the consequences of climate change. How people view this crisis is closely linked to the way it is communicated. The language we employ not only delivers facts and observations but also influences attitudes, ideologies, and actions. Storytelling is vital in the fight against climate change. Content creators need to develop engaging narratives that foster a sense of shared purpose and identity, prompting people to become involved with the urgent environmental issues we face worldwide. In Imo State, the variety of languages plays a vital role in encouraging participation in climate action. Language acts as an essential tool for communication that connects communities, enhancing awareness and promoting active participation in efforts to tackle climate challenges. The rich linguistic variety in Imo State mirrors the numerous communities within it, each encountering distinct cultural and environmental obstacles. Language creates a connection between policymakers, environmental organizations, and local communities, facilitating effective communication and cooperation. Additionally, it aids in the preservation of traditional ecological wisdom that has been passed down through generations. As climate change increasingly impacts the area, harnessing the power of linguistic diversity is crucial for improving the efficacy of our climate action initiatives.

We can confidently say that media and language significantly influence how the public reacts to climate change. Various mass media forms—including newspapers, television, and the internet—have considerable potential to improve public understanding and increase awareness of scientific issues like climate change. However, the methods used by the media to tackle these topics can differ widely based on the context. A major factor that affects how climate change is depicted by the media is the framing utilized. Different framing techniques can alter how the public views and responds to the issue. For example, in nations such as Sweden and Germany, media coverage frequently focuses on the social effects of climate change and underscores its serious ramifications. In contrast, in the United States, media framing often tends to emphasize scientific aspects.

**Table 3: Roles of Language and Media in Climate Change Literacy**

| Language and Media Roles | Mean | SD |
|---|---|---|
| Raising awareness and understanding | 2.80 | 0.64 |

| | | |
|---|---|---|
| Shaping attitudes and beliefs | 2.65 | 0.72 |
| Motivating action and behaviour change | 2.74 | 0.57 |
| Education and youth engagement | 2.54 | 0.81 |
| Preserving indigenous and local knowledge | 2.61 | 0.74 |
| Communicating risks and impacts | 2.85 | 0.58 |
| Supporting early warning systems | 2.64 | 0.69 |
| Developing critical thinking skills | 2.59 | 0.81 |
| Building trust and credibility | 2.62 | 0.78 |
| Reaching diverse audiences | 2.58 | 0.75 |
| Influencing policy and leadership | 2.51 | 0.67 |
| Encouraging community cooperation | 2.67 | 0.58 |
| Encouraging preparedness among farmers | 2.83 | 0.60 |
| Addressing emotions and perceptions | 2.54 | 0.64 |

**Accepted Mean = 2.50**

**Climate Change Adaptation and Mitigation Strategies.**

Several adaptation / mitigation strategies exist for the farmers to use. Table 4 shows that farmers employ a wide range of adaptation and mitigation strategies. The most common strategies include the use of resistant crop varieties (98.3%), contour bonding/terracing (98.3%), planting early-maturing crops (97.5%), crop rotation (96.6%), mulching and agro-forestry (96.6%). These strategies help reduce vulnerability to climate variability and improve food system resilience. Use of animal manure (M=83.3), Planting early-maturing crops (M=97.5), Delayed planting time of crops (M=84.1), Practicing crop rotation (M=96.6), Water harvesting/irrigation (M=86.6), Mulching/cover cropping (M=96.6), Minimal tillage (M=84.1), Agro-forestry practices (M=96.6), Reducing agro-chemical use (M=80.8), Improved feed quality for animals (M=85.8), Use of feed additives (M=80.8), Rotational grazing (M=90.8), Contour bonding/terracing (M=98.3), Fodder conservation (M=72.5).

Climate change presents significant challenges, including rising temperatures, shifting rainfall patterns, and more frequent extreme weather events (IPCC, 2014). In response, individuals, communities, and organizations are implementing various adaptation strategies to navigate these changes. In Nigeria's agricultural sector, for example, farmers have turned to practices such as cultivating drought-resistant crops and utilizing agroforestry techniques. These measures have shown promise in mitigating the adverse effects of climate change on crop yields (Okorie & Okorie, 2016). The goal of these adaptation strategies is to enhance the resilience of individuals, assets, and natural ecosystems against climate-related risks.

Such strategies can be categorized into several distinct types, according to Ezeaka et al.,(2025) 1. Technology-based: This includes adopting innovative technologies like drought-resistant crops, advanced irrigation systems, and infrastructure designed to endure climate impacts. 2. Behavior-based: Modifying human behaviors such as changing farming practices, conserving water resources, and relocating from flood-prone regions. 3. System-based: Rethinking policies and organizational structures to foster adaptation, such as establishing early

warning systems and promoting climate-resilient agricultural practices. 4. Nature-based: Protecting and restoring ecosystems like forests, wetlands, and mangroves, which serve as natural buffers against climate-related threats. An example of this would be the integration of climate-resilient crops in farming practices. 5. Water management: Advocating for efficient water management strategies that can withstand climate variability. On the mitigation front, Nigeria can reduce greenhouse gas emissions by harnessing renewable energy sources and promoting energy-efficient technologies (Ibe, 2017; Obi and Nwafor, 2021). Moreover, sustainable land use and effective waste management practices are recommended to minimize the carbon footprint of the nation (Odjugo, 2010). Mitigation strategies aim to lessen the impact of climate change by reducing greenhouse gas emissions or enhancing carbon capture capabilities (IPCC, 2014).

**Table 4: Climate Change Adaptation and Mitigation Strategies**

| Strategies | Frequency | Percentage |
|---|---|---|
| Changing planting dates/periods | 114 | 95.0 |
| Use of resistant crop varieties | 118 | 98.3 |
| Diversification of crops | 109 | 90.8 |
| Mixed cropping and livestock system | 100 | 91.6 |
| Use of animal manure | 100 | 83.3 |
| Planting early-maturing crops | 117 | 97.5 |
| Delayed planting time of crops | 101 | 84.1 |
| Practicing crop rotation | 116 | 96.6 |
| Water harvesting/irrigation | 104 | 86.6 |
| Mulching/cover cropping | 116 | 96.6 |
| Minimal tillage | 101 | 84.1 |
| Agro-forestry practices | 116 | 96.6 |
| Reducing agro-chemical use | 97 | 80.8 |
| Improved feed quality for animals | 103 | 85.8 |
| Use of feed additives | 97 | 80.8 |
| Rotational grazing | 109 | 90.8 |
| Contour bonding/terracing | 118 | 98.3 |
| Fodder conservation | 87 | 72.5 |

***Multiple responses**

**Challenges in Media Dissemination of Climate Information**

Table 5 showed the plenty challenges limiting effectiveness of climate information communication. These include misinformation and disinformation (96.6%), language barrier issues (98.5%), digital divide (90.8%), trust issues (95%), inconsistent and fragmented messaging (82.5%), limited feedback mechanism (92.5%), socio-cultural constraints (8.3%), low literay levels of people (93.3%), poor communication infrastructure (99.1%), and traditional perception of our climate(87.5%). Effective communication about climate change hinges on how we use media tools and language to shape public understanding and influence

behaviors. Despite the growing presence of various media channels like radio, TV, print, and digital platforms, there are several obstacles that hinder effective climate communication, especially for rural farmers and those in vulnerable communities. These include misinformation, language challenges, the digital divide, trust issues, low literacy rates, cultural obstacles, and limited access to necessary communication resources.

Often, climate change information shared through media can be distorted, exaggerated, or manipulated. Social media, in particular, allows for the rapid spread of inaccurate information, which can create confusion and dilute the public's grasp of climate risks. When farmers encounter conflicting information about climate effects or strategies for adaptation, they might ignore accurate scientific data and continue with practices that are harmful to the environment. Research by Cook et al. (2017) illustrates that misinformation around climate change seriously undermines public trust in scientific facts and diminishes support for necessary climate actions. Language barriers represent another considerable challenge. Much of the climate communication material is created in widely spoken languages like English, which may not be accessible to rural communities that communicate primarily in indigenous languages. When climate information isn't translated into local languages or simplified, farmers can struggle to understand key concepts like "greenhouse gases," "mitigation," or "climate resilience." As highlighted by Moser (2016), the success of climate communication relies heavily on framing information in ways that are culturally and linguistically suitable for the intended audiences. The digital divide further restricts the effectiveness of climate communication. While digital platforms like mobile apps, social media, and online news are crucial for sharing environmental information, many rural areas lack reliable internet access, smartphones, or the necessary digital skills. This gap means that farmers miss out on timely climate forecasts, agriculture advice, and educational materials. According to the International Telecommunication Union, billions worldwide still do not have stable internet connectivity, with rural communities in developing nations being particularly affected (ITU, 2022).

The challenge of limited communication infrastructure is closely linked to the accessibility of climate information, particularly in rural areas. Many communities struggle with unreliable electricity, weak radio and TV signals, and limited newspaper distribution, all of which hinder their access to vital climate updates. Even when media outlets produce valuable content, the lack of infrastructure can prevent the intended audience from receiving it. As noted by Hansen, Marx, and Weber (2004), the physical presence of communication channels is essential for ensuring that environmental information reaches those who need it most. Trust and credibility of information sources also present significant hurdles. Many farmers often feel skeptical about information provided by government agencies, scientists, or media organizations, often due to past instances of misinformation or political bias. This distrust makes them less likely to act on climate information, leading them to rely more on local leaders, elders, or traditional knowledge systems. Anthony Leiserowitz (2010) emphasizes the importance of trust in the communicator as a key factor in whether climate information results in behavioral change. Furthermore, low literacy levels add another layer of complexity to climate communication. In many rural farming communities, limited formal education makes understanding written materials like reports and brochures a challenge. Technical language and complex data can alienate those unfamiliar with scientific terms. Nerlich, Koteyko, and Brown

(2010) argue for the necessity of simplifying climate communication and supporting it with visual, oral, and community-based methods to enhance comprehension. Cultural beliefs and perceptions also play a role in shaping how climate messages are received. In some communities, events like droughts or floods might be viewed through a spiritual lens or as part of natural cycles, rather than as consequences of human-induced climate change. Such beliefs can undermine the relevance of scientific explanations and adaptation strategies presented through media.

As Susanne C. Moser (2016) points out, effective climate communication must weave scientific knowledge together with local cultural contexts and indigenous wisdom. In summary, while media tools and language are pivotal in spreading climate information, various structural, social, and cultural barriers impede their effectiveness. Addressing challenges like misinformation, language issues, digital disparities, weak communication infrastructure, trust deficits, low literacy, and cultural beliefs is crucial for enhancing climate literacy among farmers. Collaborative efforts among governments, media organizations, scientists, and local communities are essential to ensure that climate information is accurate, accessible, culturally fitting, and widely trusted.

**Table 5: Challenges in Media Dissemination of Climate Information**

| Challenges | Frequency | Percentage (%) |
|---|---|---|
| Misinformation and Disinformation | 116 | 96.6 |
| Language barrier issues | 118 | 98.3 |
| Digital divide factor | 109 | 90.8 |
| Trust issues | 114 | 95.0 |
| Inconsistent and fragmented messaging | 99 | 82.5 |
| Limited feedback mechanisms | 111 | 92.5 |
| Socioeconomic constraints | 106 | 88.3 |
| Low literacy levels of people | 112 | 93.3 |
| Traditional perception of climate | 105 | 87.5 |
| Poor communication infrastructure | 119 | 99.1 |

*Multiple responses allowed

**Strategies to address media Dissemination challenges of Climate Information**

Table 6 showed the strategies for addressing the challenges earlier encountered by the farmers. These include fact-checking and verifying networks(91.9%), multilingual content production (83.3%), bridging the digital divide (89.1%), rebuilding trust (98.3%), ensuring consistent and integrated messaging (94.1%), addressing socio-cultural constraints (6.6%). One effective approach to combat misinformation and disinformation is to enhance our fact-checking mechanisms and foster collaboration among scientists, journalists, and communication specialists. It's crucial for media organizations and agricultural extension services to source climate information from reputable scientific institutions and present it in straightforward, precise language. Training journalists in environmental reporting can elevate the quality of climate-related information disseminated through the media. According to the

Intergovernmental Panel on Climate Change, effective communication that is accurate and evidence-based is essential for helping communities grasp climate risks and identify suitable adaptation strategies (IPCC, 2022). To bridge language gaps, climate information should be translated into local and indigenous languages familiar to farmers. Utilizing community radio programs, local newspapers, and agricultural extension meetings can facilitate the delivery of climate messages through relatable vocabulary, storytelling, and culturally pertinent examples. By simplifying technical terms and employing relatable analogies, we can significantly enhance understanding among rural audiences. Research highlights that communication is most effective when messages align with the linguistic and cultural contexts of the intended audiences (Moser, 2016). To tackle the digital divide, it's essential to increase access to digital technologies in rural communities. Governments and development organizations should invest in improving rural internet infrastructure, providing affordable mobile devices, and offering digital literacy training. Mobile-based agricultural advisory services, weather alert systems, and SMS updates about climate conditions can furnish farmers with timely information, even in regions with limited internet access. The International Telecommunication Union points out that boosting digital access in rural areas can significantly improve the flow of agricultural and environmental information (ITU, 2022).

Boosting trust in sources of climate information is essential. Farmers tend to embrace climate messages more when they come from reliable local figures, such as community leaders, extension agents, local cooperatives, or respected elders. Hence, climate communication initiatives should involve these local stakeholders in crafting and sharing the messages. Engaging in participatory communication methods—like community gatherings, farmer field schools, and local workshops—can enhance credibility and foster dialogue between scientists and farmers. As pointed out by Anthony Leiserowitz, the trustworthiness of the messenger plays a significant role in whether people embrace and act on climate information (Leiserowitz, 2010).

To combat low literacy levels, climate communication strategies should prioritize visual, oral, and hands-on learning methods over complex written materials. Tools such as diagrams, pictorial guides, videos, demonstrations, and community theater can make it easier for farmers to grasp climate risks and adaptation strategies. Radio programs stand out as particularly effective in rural areas, as they can convey information in straightforward language and reach large audiences, regardless of literacy levels. Additionally, it's important to weave local knowledge and cultural beliefs into climate communication efforts. Rather than dismissing traditional beliefs, communicators should link scientific insights with local experiences of shifting weather patterns, crop failures, or flooding. By connecting climate science with farmers' lived experiences, the messages become more relatable and meaningful. Encouraging participatory approaches that allow farmers to share their observations can also promote learning and mutual understanding. Enhancing communication infrastructure in rural regions is crucial. It's important for governments and development partners to invest in community radio stations, rural information centers, and agricultural extension networks that consistently provide updates on climate and farming practices. Additionally, ensuring a reliable electricity supply and upgrading telecommunications infrastructure can significantly improve access to climate-related information channels.

**Table 6: Addressing Media Dissemination Challenges**

| Strategies to address | Frequency | Percentage |
|---|---|---|
| Fact-checking and verifying networks | 110 | 91.6 |
| Multilingual content production | 100 | 83.3 |
| Bridging the digital divide | 107 | 89.1 |
| Rebuilding trust | 118 | 98.3 |
| Ensuring consistent/integrated messaging | 113 | 94.1 |
| Enhancing feedback mechanism | 97 | 80.8 |
| Addressing socio-cultural constraints | 104 | 86.6 |

**Accepted Mean = 2.0**

## Conclusion

The importance of language and media in discussing climate change is crucial for developing informed, engaged, and resilient communities. This paper has demonstrated that how climate messages are framed, translated, and shared significantly impacts public understanding of scientific data, risk evaluation, and the adoption of sustainable practices. Utilizing local and inclusive language, alongside trusted media outlets, enhances civic participation and effectively connects global climate knowledge with the everyday realities of communities. In places like Nigeria, where there is a rich diversity of languages and uneven access to information, avenues such as community radio, social media, and school communications serve as effective means to reach farmers, young people, and families. Fostering cooperation among media professionals, educators, and climate organizations will enhance the trustworthiness and relevance of climate messaging. Ultimately, impactful climate communication—rooted in suitable language and responsible media usage—can facilitate learning in educational settings, promote civic involvement, and significantly contribute to efforts in climate change adaptation and mitigation.

## References

Abbott, W. (2016). *Climate literacy: Concepts, assessment, and education*. Oxford: Oxford University Press.

Aker, J. C. (2011). Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*, 42(6), 631–647.

Anim, F. D., (2019). "Climate change knowledge and use of seasonal forecasts among Ghanaian farmers," *Climate Risk Management*, 23, 45–58.

**Anijah-Obi FN (2001).** Fundamentals of Environmental Education and Management, Clear Lines Publications, Calabar.

**Awuor CB (2008).** "More Information for Planning" Dealing with Climate Change. Magaz. Low External Input and Sustain. Agric. 24(4):14-15

Ayo, J.A., Omosebi, M.O and Sulieman, A.(2014) Effect of climate change on food security in Nigeria. Journal of Environmental Science, Computer Science and Engineering & Technology; JECET; Sec. A Vol.3.No.4, 1763-1778.

Babbie, E. (2013). *The Practice of Social Research* (13th ed.). Belmont, CA: Wadsworth engage Learning.

Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology*, 3(3), 265–299.

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, 43(4), 51–58.

Bebber, D., Ramotowski, M. & Gurr, S. (2013). Crop pests and pathogens move poleward in a warming world. Nature Clim Change3, 985–988

Chivaura, D.and G. Mararike (1998). The human Factor Development in Africa (University of Zimbabwe Publications, Mt. Pleasant, Harare

Cook, J., Lewandowsky, S., & Ecker, U. K. H. (2017). Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. *PLoS ONE*, 12(5), 1–21.

Cochran, W. G. (1977). *Sampling Techniques* (3rd ed.). New York: John Wiley & Sons.

**Darwin R (2001).** ”Climate change and Food Security”, In, Food Security , Economic Research Series, United States Department of Agriculture, Agric. Inform. Bullet. pp. 765-766.

Deressa, T. T., Hassan, R. M., & Ringler, C. (2011). “Perceptions of and adaptation to climate change by farmers in the Nile basin of Ethiopia,” *Journal of Agricultural Science*, 149(1), 23–31.

Dow, L. and G. Downing. (2007) Atlas of Climate Change. (Routledge, London, 2007).

Eubanks, P (1992) Written Communication. Sage Publications 16 (2), 1992, 18-32

Ezeaka, N. B. and Bartholomew, C. E. (2025), Climate Change Mitigation and Adaptation Strategies for Nigerian Farmers: A Communication Approach. International Research in Material and Environment 5(1), 1-8. DOI: 10.52589/IRME-6KQ28M2E

Food and Agriculture Organization (FAO). (2017). *The future of food and agriculture: Trends and challenges*. Rome: FAO.

**Hellmuth, M. E, Moorhead, A, Thomson, M.C., Williams, J (eds) (2007).** Climate Risk Management in Africa: Learning from Practice: The International Research Institute for Climate and Society, New York.

Hansen, J., Marx, S., & Weber, E. (2004). The role of climate perceptions, expectations, and forecasts in farmer decision making. *International Research Institute for Climate Prediction*.

International Telecommunication Union (2022). *Measuring digital development: Facts and figures*. Geneva: ITU.

Intergovernmental Panel on Climate Change (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Cambridge University Press.

International Telecommunication Union (2022). *Measuring digital development: Facts and figures*. Geneva: ITU.

IPCC (2021) Intergovernmental Panel on Climate Change (IPCC). (2021). *Climate change2021: The physical science basis*. Cambridge: Cambridge University Press.

IPCC. (2023). *Climate Change 2023: Synthesis Report*. Intergovernmental Panel on Climate Change.

IPCC (2014). Climate Change 2014: Impacts, Vulnerability, and Adaptation. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change conservation agriculture

Ibe, C.C. (2017). Climate change communication in Nigeria: a review of the literature. Journal of of Communication and Media Research, 9(1), 1-13.

Ismail, A., Musa, K. B. & Magaji, S. (2019), Socioeconomic and Cost Effective on Deforestation Compliance Policies as Opposed to Pure Deterrence Model of Regulatory Compliance, European Scientific Journal, 15(28), 253-274

**Ivuerah C (2007).** "Climate Change and Global Warming, the Nigerian Perspectives" Vanguard Newspaper, June 5:24.

Kompas, T., Pham, V.H. and Che, T.N(2018) "The Effects of Climate Change on GDP by Country and the Global Economic Gains From Complying With the Paris Climate Accord," *Earth's Futur.*, vol. 6, no. 8, pp. 1153–1173, Aug. 2018, doi: 10.1029/2018EF000922.

Kaushal, S., Dhammi, S. and Guha, A. (2022)"Climate crisis and language – A constructivist ecolinguistic approach," in *Materials Today: Proceedings*, Jan. 2022, vol. 49, pp. 3581–3584, doi: 10.1016/j.matpr.2021.08.093.

Leiserowitz, A. (2010). Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic Change*, 77(1–2), 45–72.

Lemos, M. C., et al. (2012). "Climate information services," *Proceedings of the National Academy of Sciences*, 109(31), 123–132.

Levinson, B. (1983) Pragmatics (Cambridge University Press, Cambridge, 1983).

Lobell, D. B., Schlenker, W., and CostaRoberts, J. (2011). Climate trends and global crop production since 1980. Journal of science research, 333(6042), 616-620

**Macchi M (2008).** "Indigenous and Traditional Peoples and Climate Change" Issues Paper, International Union for the Conservation of Nature (IUCN) Switzerland. http://consdata.iucn.org/downloads/ indigenous_peoples_climatechange.pdf

McCombs, M. E., & Shaw, D. L. (1972). The agenda-setting function of mass media. *Public Opinion Quarterly*, 36(2), 176–187.

Mathews, L. (1992) Oxford Dictionary of Linguistics (Oxford University Press, Oxford.

Makwanya, P. (2013) An Analysis of the Language Used To Communicate Information on Climate Change *IOSR Journal Of Humanities And Social Science (IOSR-JHSS) Volume 17, Issue 2 (Nov. - Dec. 2013), PP 17-25.*

Moeletsi, M. E., & Walker, S. (2012). "Farmers' perceptions of climate change in South Africa," *Journal of Agricultural Science*, 4(3), 45–59.

Moser, S. C. (2016). Reflections on climate change communication research and practice in the second decade of the 21st century. *WIREs Climate Change*, 7(3), 345–369

Nasrullah, R. (2024)"Bahasa dan Perubahan Iklim: Membangun Kesadaran dan Aksi Nyata untuk Masa Depan Indonesia yang Lebih Baik," Jakarta, 1, 2024.

Nasrullah, R., Kisyani, K., Fafi, I., Arditya, P. (2024) **Language and Climate Change: The Role of Language in Climate Change Communication and Mitigation in** Proceedings of the International Joint Conference on Arts and Humanities 2024 (IJCAH 2024)**Indonesia**

Nielsen, J. Ø., & Reenberg, A. (2010). "Cultural barriers to climate change adaptation," *Global Environmental Change*, 20(1), 142–152.

Nerlich, B., Koteyko, N., & Brown, B. (2010). Theory and language of climate change communication. *WIREs Climate Change*, 1(1), 97–110.

Nkomwa, E., et al. (2014). "Constraints to climate change adaptation in Malawi," *Environmental Development*, 10, 96–113.

Nneoyi, I.O., Ghinini, F.E., Ejeje, I. A (2013)The role of communication media in mitigating climate change effects on agricultural production in Cross River State, Nigeria Journal of Agricultural and Crop Research Vol. 1(3), pp. 46-54, September 2013 ISSN: 2384-731X Research Paper

Obi, I. and Nwafor, G.U. (2021). Access to and Diffusion of climate change adaptation information among rice farmers in southeast Nigeria. International Journal of Research and Innovation in Social Science (IJRISS) 5(11) 354-365

Okorie, A and Okorie, E. C. (2016). Climate change communication and the Nigerian farmer: A review. Journal of Agricultural Extension, 30(1), 1-10.

Odjugo, P. A. O. (2010). General overview of climate change impacts in Nigeria. Journal of Human Ecology, 30(1), 47-55

RMS (2025) Royal Meteorological Society The Role of the Media in Communicating Weather and ...Aailable at https://www.rmets.org › news › role-media-communicat... 26 Aug 2025 —

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.

Roncoli, C., Ingram, K., & Kirshen, P. (2001). "The costs and risks of coping with drought," *World Development*, 29(12), 1987–2000.

Saab, A. (2023)"Discourses of Fear on Climate Change in International Human Rights Law,"*Eur. J. Int. Law*, vol. XX, no. 20, pp. 1–23, Mar. 2023, doi: 10.1093/EJIL/CHAD002

Sterman, J. D. (2011). "Climate science and climate literacy," *WIREs Climate Change*, 2(2), 81–104.

Schlenker, W. and Roberts, M.J. (2009) Nonlinear Temperature Effects Indicate Severe Damages to US Crop Yields under Climate Change. Proceedings of the National Academy of Sciences of the United States of America, 106, 15594-15598.http://dx.doi.org/10.1073/pnas.0906865106

Thatchinamoorthy, C. and Meenambigai, J., (2020) Social Media Tools Used for Agriculture Graduate Student for Academic Performance (2020). Available at SSRN: https://ssrn.com/abstract=3858725

Treen, K., Williams, H., Neill, S.O, and Coan, T.G, (2022)"Discussion of Climate Change on Reddit: Polarized Discourse or Deliberative Debate?," *Environ. Commun.*, vol. 16, no. 5, pp. 680–698, 2022, doi: 10.1080/17524032.2022.2050776.

UNESCO. (2018). *Education for sustainable development and climate change education*. Paris:

UNESCO, "(2018) One of world's 6,000 languages disappears every two weeks – UNESCO,"

UNESCO. (2017). *Education for Sustainable Development Goals: Learning Objectives*. Paris: United Nations Educational, Scientific and Cultural Organization.

Verschuur J, Li S, Wolski P, Otto F.E (2021). Climate change as a driver of food insecurity in the 2007 Lesotho-South Africa drought. Scientific Reports. 2021;11(1):1–9.

WHO (2018). Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. S. Hal es, S. Kovats, S. Lloyd & D. CampbellLendrum, eds.

World Bank. (2021). *Climate-Smart Agriculture and Food Security*. Washington, DC: World Bank.

Zhang, M., Wei, X.J. and Xu, A. (2023)"Impact of investment in quality language education on green economic growth: case study of 23 Chinese provinces," *Humanit. Soc. Sci. Commun*., vol. 10, no. 1, 2023, doi: 10.1057/s41599-023-01976-5.