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New Media in Environmental Communication: A Study on CIFOR (The Center for International Forestry Research)

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ABSTRAK

Saat ini media baru khususnya media sosial banyak digunakan tidak hanya untuk tujuan hiburan, tetapi juga untuk meningkatkan kesadaran publik tentang isu-isu lingkungan utama yang sangat penting untuk menyajikan topik-topik seperti perubahan iklim, pemanasan global, keanekaragaman hayati, dan deforestasi, serta mendorong debat publik dan pertukaran informasi. Penelitian ini bertujuan untuk mengetahui media baru dalam komunikasi lingkungan. Komunikasi lingkungan dianggap melampaui kegiatan terkait kampanye yang juga mempengaruhi bagaimana orang melihat diri mereka sendiri dan alam di sekitar mereka. Penelitian ini menggunakan CIFOR (The Center for International Forestry Research) sebagai subjek studi kasus karena diakui sebagai organisasi ilmiah nirlaba internasional yang melakukan penelitian tentang isu-isu terpenting dalam pengelolaan hutan dan lanskap global. Penelitian ini memanfaatkan Model Ekologi Proses Komunikasi dalam Komunikasi Lingkungan. Sementara itu, metode penelitian ini menggunakan kualitatif dengan pendekatan studi kasus instrumental tunggal dengan satu kasus, yaitu CIFOR. Pengumpulan data dilakukan melalui observasi langsung, wawancara semi terstruktur, dan studi pustaka ekstensif. Hasil penelitian ini menunjukkan bahwa CIFOR telah mengembangkan berbagai saluran digital termasuk podcast, video, kumpulan data, presentasi, dan presentasi. Hal ini sesuai dengan Model Ekologi Proses Komunikasi untuk mengkomunikasikan temuan mereka. Selain itu, ditemukan bahwa media baru di CIFOR menggabungkan dan mengaburkan batas antara komunikasi interpersonal dan komunikasi media massa.

***Kata kunci*:** Media Baru, Media Sosial, Model Komunikasi Ekologis, Komunikasi Lingkungan, CIFOR

ABSTRACT

Nowadays new media is widely used not only for entertainment purposes, but also to raise public awareness about major environmental issues which is critical for presenting topics like climate change, global warming, and deforestation, as well as encouraging public debate and information exchange. This research aims to seek the utilization of new media in environmental communication. Environmental communication extends beyond campaign-related activities which also affects how people see themselves and the natural world around them. This research uses CIFOR (The Center for International Forestry Research) as a study case because it is recognized as an internationally non-profit scientific organization that carries out research on the most important issues in global forest and landscape management. This research benefits from Ecological Model of the Communication Process which employs qualitative research method with single instrumental case study approach. Data is gathered through direct observation, semi-structured interviews, and extensive literary study. The result demonstrates that CIFOR has been developing multiple digital channels including podcasts, videos, datasets, presentations, and datasets. This is in accordance with the Ecological Model of the Communication Process to communicate their findings. Additionally, it has been found that new media in CIFOR combines and blurs the lines between interpersonal communication and mass media communication.

***Keywords*:** New Media, Social-Media, Ecological Model of Communication, Environmental Communication, CIFOR

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1. INTRODUCTION

The development of new media and digital world offers its users many conveniences, such as social media, which enables people to communicate in previously unthinkable ways. On social media, users may contact anyone directly and find out what's happening across the globe. During the COVID-19 pandemic social media becomes even more crucial in delivering the knowledge that a person or community needs. Nowadays social media is widely used not only for entertainment purposes but also to raise public awareness about major societal issues such as forestry and science. It is critical for presenting topics like climate change, global warming, and

deforestation, as well as encouraging public debate, information exchange, and gathering comments, opinions, and replies from social media users.

Social media is part of the new media involved in modern environmental communication. The new media "itself reinforces a persistent misconception about technology, namely that the introduction of any new technological advancement invariably leads to significant transformation (Everett & Caldwell, 2003). The term 'new media' was coined as a direct contrast to traditional media such as television and newspapers which relied heavily on automated processes, making their materiality and usage strategies so familiar that they were essentially invisible to the users (Roberts & Goodall, 2019). From a pragmatic standpoint, social media encompasses a compilation of software-driven digital technologies, typically manifested as applications and websites, that provide users with digital realms wherever they can transmit and receive digital content or information. Examples of popular social media platforms are Facebook, Instagram, and Twitter which have become increasingly major platforms for accessing information (Hansen, 2019)

Additionally, social media may be regarded as an additional form of digital channel that can be employed to engage in communication with their target audience and empower freedom of expressions and human rights. For instance, the proliferation of social media platforms, such as Facebook, among students in higher education is considered to have significant potential in effectively spreading knowledge about environmental sustainability (Hamid et al., 2017). The concept of human freedom and individual rights is undergoing a transformation, as evidenced by historical instances where the emergence of new forms of media (such as the printing press, radio, or television) has sparked similar shifts (Koltay, 2019)

Social media can be a useful tool for complementing or even opposing traditional media discourse such as television, radio, and printed newspapers. Traditional media can use quotes and published statements from policy players as well as journalistic viewpoints to frame topics like REDD+ as source of one-way information (Di Gregorio, et al., 2013), while in topics like peatland fires and toxic haze in Indonesia, new media is regarded an important component that has influential storytelling (CIFOR, 2017). It also has the possibility to be framed and skewed by the political agenda portrayed in it, which can have implications for policy processes and outcomes for non-state actors' opinions (Pham, Di Gregorio, & Brockhaus, 2017; Dirgantara, 2021).

Many politicians, institutions, and organizations have made use of new media. CIFOR (The Center for International Forestry Research) is one of many INGOs (International Non-Governmental Organizations) that tries to engage more varied audiences when it comes to disseminating forestry and environmental issues, research, and discoveries. The non-profit organization CIFOR established in 1993 carries out studies on the most important issues in global forest and landscape management and seeks to advance equity, safeguard the environment, and enhance human well-being by employing a worldwide, multidisciplinary approach (CIFOR, 2019). To accomplish this, they carry out cutting-edge research, build the capacity of their partners, and actively participate in discourse with all stakeholders to shape the policies and practices that have an impact on both forests and people. Therefore, social media can have a role in environmental communication. The CIFOR's headquarters is in Bogor, Indonesia, and it also has offices in Lima, Peru, Yaounde, Cameroon, and Nairobi, Kenya.

There has been prior research and studies on environmental communication. Arina (Arina, 2013) attempted to carry out study into the ways in which six environmental non-governmental organizations (ENGOs) in Malaysia utilized mass media to spread their environmental messages and raise public awareness of environmental preservation and conservation. With a focus on the problem of climate change, Ross and Rivers (Ross & Rivers, 2019) conducted research to examine the framing strategies used by the phenomena of Internet memes in the new media landscape. Research on the reflecting relationship between environmental communication and the New Research Agenda was done by Anderson (Anderson, 2015). He draws attention to the paucity of research on the various effects of online and offline media in environmental communication. Additionlly, Ameli et al (2021) elaborates the extensive reach of social media that has elevated the water crisis, recognized as the predominant environmental challenge in the nation, to a highly significant subject on Persian Twitter. Focusing on the construction of water crisis communications using the environmental justice perspective. According to Lindenfeld et al. (2012) environmental communication research ought to be pushed into the field of sustainability science. Three key points are included in their findings: public engagement, cooperation across many institutional and academic barriers, shifting communication processes away from one-way transmission models and toward active methods. However, there aren't many studies that specifically examine how INGOs, specifically CIFOR, use new media to communicate about environmental issues, thus this research is urgently needed. This research aims to seek the utilization of new media in environmental communication through a study of CIFOR.

2. LITERATURE REVIEW

2. 1. Environmental Communication

One of the communication contexts that can support communicator-communicant relationship is nature and environment. There are numerous forms of communication depending on the specifications in the various communication contexts (2010). Environmental communication is one of many

contexts for communication. It includes a plan and strategy used in a communication process and across a variety of media to support political decisions and project execution with a focus on nature, environment, sustainability, and ecological concerns (1999). It also encompasses all campaign-related actions, including plans and evaluations for the establishment of environmental sustainability.

Additionally, environmental communication extends beyond campaign-related activities. Such communication also affects how people see themselves and the natural world around them. The role of media and communications in the generation and distribution of knowledge about the environment has always been complex and at times conflicting, and it is still changing (Lester, 2020). Consequently, environmental communication is the systematic creation and exchange of human communications for, in, from, and about human interaction with nature and the environment (2010). The earth, or nature, is not a passive element because there are elements that continue to actively provide feedback on human actions, adding another part of environmental communication. This feature is that the earth has its own message to convey to humanity.

Environmental communication is one of the effective communications that helps people understand what they can do on their own to protect the environment (2010). According to the definition, environmental communication is a practical and essential part of how we understand the environment and how people interact with nature. This viewpoint is a result of environmental activists' willingness to raise public awareness of their surroundings (Yenrizal, 2017). With this understanding, it is possible to interpret environmental communication as a carrier of awareness that nature, such as a river or forest, can become an ally or an adversary, respecting and appreciating natural resources as one of the systems that play a crucial role in supporting life or are only used for exploitation.

There are numerous models for environmental communication. The Foulger model, Ecological Model of Communication Process, is used in environmental communication in an effort to update and improve core theoretical information that hasn't changed much in more than 50 years (Jurin, 2010). This paradigm is well suited for analysing environmental communication because it finds parallels in how species in natural ecosystems and those created by humans interact with one another. The model used for this research follows Figure 1.

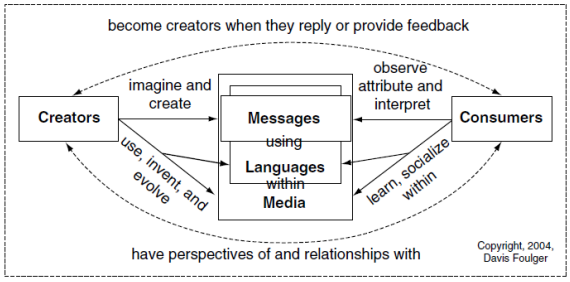

Figure 1. Ecological Model of Communication Process
Source: Foulger (2004)

Ecological Model of Communication on Figure 1 emphasizes the creators as the sender of the messages and consumers as the receivers of the messages. Foulger (2004) highlights the significance of creators—those who produce the communications, not only convey them—and consumers—those who carefully choose what they want to receive, rather than the terms sender and recipient of the messages. Consuming messages doesn't always equate to getting messages, according to the Foulger model. Consumers pay more attention when deciding what information they want to take in. Both creators and consumers have dual motivations. There are two ways for the creators and consumers to communicate. The message is first imagined and created by the creators through language and media, and then it is observed, attributed to, and interpreted by the consumers. When the consumers offer comments and replies as feedback and interact with the creators, they take on the role of creators themselves. The second method involves the creators using, inventing, and evolving their message as the consumers interact and learn from the message they are consuming. The makers and consumers create perceptions of and connections with one another in this way.

2.2 New Media

The emergence of new media has broadened and altered the range of socio-technological communication options. New media has the emphasis on the 'distribution' rather than 'production' of contents through computerization or digitalization. Accordingly, materials delivered on paper are not considered new media, although texts distributed on a computer (Web sites and electronic books) are (Manovich, 2006). New media refers to forms of mass communication that heavily depend on digital technologies, encompassing many platforms such as social media, online games and apps, multimedia, productivity software, cloud computing, interoperable systems, and mobile devices (Rohlinger, 2019). It is considered to be a constituent element of mass media.

The presence of the internet has revolutionized the way of human communication. The use of information and communication technology as a means of communication allows everyone to communicate with other parties who connected to the internet even

though they live far apart. Indonesia's internet industry is still expanding and becoming very large. The youth-dominated Indonesian society has made it easier for this technology to thrive and gain popularity. In 2021, Indonesia had 201.37 million internet users, more than 160 million of whom regularly use social media (Nurhayati-Wolff, 2022). It is clear that Indonesians have been embracing new media as a communication and informational tool.

Online media, which includes social media such as Facebook, Twitter, and Instagram, is a new media type. Social media refers to digital technologies that prioritize user-generated content or interaction. Frequently, social media platforms are categorized based on their channel attributes, which might indicate the flow of communications or highlight specific tools such as Facebook or Twitter to illustrate different forms of communication (Carr & Hayes, 2015) which brings significant impact in modern world (Allcott et al., 2020). Social media profoundly impacts every facet of human existence, serving as a platform for disseminating both financial and non-financial information to diverse audiences with varying interests(Stawicka & Paliszkiewicz, 2021).

People may chat, interact, share, and develop networks online because of new media. It is not only technological tool, but also related to the communication system that emerged following it and impact on pre-existing media directly or indirectly (2011). The organization, institution, and public sector can communicate with new media, which often spreads information that is available to the public. But occasionally, this communication is also conducted in a small setting, such as a seminar forum, a discussion, or a member gathering, leading one to conclude that, when seen against the backdrop of a constrained setting and circumstance, public communication is also known as group communication (Syaipudin, 2020).

The availability of new media is one of the quick actions that can target different societal levels with information regarding the COVID-19 pandemic. Science, information requirements, and facilities or infrastructure that support people's life can all benefit from the growth of communication and information technology in the modern day. Everybody requires information since it allows them to understand and acknowledge everything that occurs in the world. Information can also be helpful in decision-making, both for the now and the future. Society needs mass media, including newspapers, television, radio, and online media, which of course give the necessary information, to obtain this information.

Since the beginning of its emergence, technology and the growth of new media have been inextricably linked. This is true for both print media and media that predate the birth of the printing press. Following the development of radio and television, technology is now rapidly advancing due to the presence of broadcast media. Nevertheless, there exists a discrepancy in the access of information between an individual and the information necessary to support their daily activities (Brown & Duguid, 2017).

As a result, individuals want information that can increase knowledge in order to solve difficulties. The emergence of this gap drives people to seek out information to meet their information demands and to expand their knowledge in order to achieve their life goals. Information needed by human has various types and also adjust with their background for example their occupation, age, status, hobbies and many more (Dewi, Aulia, & Putut, 2015).

3. METHODOLOGY

This study employed a qualitative method with a case study approach. The purpose of the case study is to acquire a deeper understanding (Creswell & Poth, 2018) of the utilization of social media by research-based organizations in the field of forestry and environment. CIFOR has been selected to offer the most extensive comprehension of the issue at hand.

This approach focuses on in-depth interviews with two or more individuals through their storing, reporting their experiences, and sorting their meaning (Creswell & Creswell, 2018). The in-depth interviews were formulated through semi-structured, open-ended questions. The informant selection was conducted by purposive sampling based on their participation, authorities, and expertise on the activities. The interviews were conducted with four participants: CIFOR's social media coordinator, communications assistant, and senior researcher officer. These three people act as the initial creators of CIFOR. And the last two persons are the consumer (followers) of CIFOR who works at academic institution and non-profit non-governmental organization. The table of informants is on Table 1.

Table 1. Informants List

No	Name	Position	Gender
1	Leandra Carolina Flor	Communications Consultant CIFOR	Female
2	Angga Pratama Putra	Communications Assistant CIFOR	Male
3	Bimo Dwisatrio	Senior Research Officer CIFOR	Male
4	Rizky Ramadhan	Academics at Kyoto University	Male
5	Anissa Ratna Putri	Senior officer at Non-profit organization	Female

Source: researcher, 2023

This study also used participatory observation where the researcher got involved in a series of activities in CIFOR. Participatory observation is used to collect field-based data from first-hand observations in an environment that the researcher seeks to become fully immersed in, such as interviews, journal entries, and even photography (Yin, 2016; Denzin & Lincoln, 2005).

After completing the interviews, the data gathered were transferred into transcripts to be analysed. No standardized method in qualitative data analysis, but

there are several suggested ways to reconstruct meaning manually and with the help of technology (Saldaña, 2011). The transcripts are used in analysing the data and then sorting it to construct the meaning of the information using NVivo to extract the key points. Through data reduction, data analysis is conducted, and therefore the conclusion is drawn. For the validity, this study used data triangulation from interview with different sources, and direct/participatory observation.

4. RESULT AND DISCUSSION

4.1 Result

The utilization of New Media is taken very seriously by CIFOR. To disseminate its research findings and information, CIFOR has created many social media profiles in addition to e-papers and websites. Social media, according to CIFOR's Social Media Coordinator, is a very strong tool for disseminating information and research on forestry, environment, and related themes. CIFOR has been reaching out to a wider audience throughout the world using various social media channels, including seven Facebook pages, ten Twitter profiles, six Instagram accounts, and three LinkedIn accounts. These accounts are written in a variety of languages, including English, Spanish, Bahasa Indonesia, and French. Top six of CIFOR's social media channels is shown on Table 2.

Table 2. CIFOR's social media per January 2023

No	Social Media	Year Joined	Followers/Subscribers
1	Twitter	2009	82.100
2	LinkedIn	2021	60.530
3	Facebook	2010	54.011
4	Instagram	2015	12.100
5	YouTube	2009	11.700
6	TikTok	2021	73

Source: researcher, 2023

According to Table 2, CIFOR has the fewest followers on TikTok because they have difficulties utilizing the platform's algorithms to interact with a younger audience. Since it was one of the earliest social media platforms, CIFOR has the most followers on Twitter, where it also benefits from the way that the platform condenses textual and visual content. CIFOR has different growth in numbers of their followers/subscribers for their social media platform which can be seen on Figure 3.

CIFOR has encountered various challenges in expanding its presence on social media platforms. LinkedIn has made significant strides in just two years of existence, offering not only environmental and forestry research material but also job prospects. It is worth noting that Twitter is the media platform that CIFOR has been using for the longest period and has gained the largest number of followers.

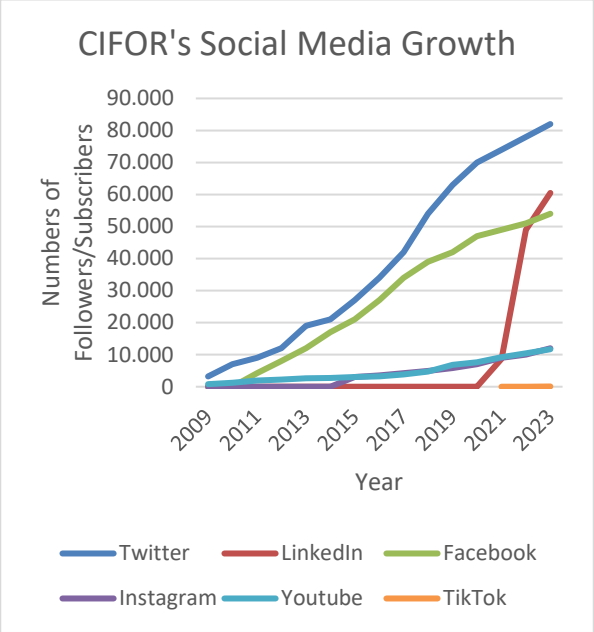

Figure 3. Cifor's Social Media Growth

Every year, CIFOR releases more than 400 publications on topics such agroforestry, landscape restoration, rights, forest policy, and forests and climate change. Using an ecological model of the communication process, it has been discovered that CIFOR acts as the creator of messages connected to forestry, the environment, and science communication. CIFOR first imagines or plans the message they want to ultimately convey since they conduct study on topics relating to forestry and the environment. Then, using the results of their study, they create the message. These messages are translated into several languages and published in various media, such as blog postings or e-papers, in addition to English, Spanish, Bahasa Indonesia, and French. Along with using various media, CIFOR also creates local social media accounts in each of those four languages to satisfy its consumers. In this setting, CIFOR works on new media rather than traditional media to spread its messages. CIFOR releases its content in a variety of media, including publications, presentations, photographs, datasets, podcasts, videos, forest news, databases of past projects, and features. In Ecological Model of Communication Process, this process represents use, invent, and evolve.

The messages that are created by the creators utilizing the languages of particular media are not then transmitted straight to the consumers. Instead, the messages are carefully chosen by the consumers in this process, especially by people with an interest in forestry, the environment, and science communication. The consumers of CIFOR's messages include researchers, college students, communities living in forests, governmental organizations, and non-governmental organizations. According to an interview with a CIFOR follower, there are several reasons to subscribe to their updates, including their

high-quality publications, community participation, and credibility. The consumers first observe, attribute, and interpret their interest with the messages from the creators. After that, they learn and socialize within the languages and media provided by the creators.

Consumers must respond or provide input in order to become creators. This is evident in the feedback, ideas, and focus group discussions from the CIFOR webinar or YouTube live. Additionally, CIFOR can get consumers' viewpoints through social media involvement with the community and relationship-building with its clients. On the flip hand, clients like academics or the community can also access CIFOR's viewpoints and continue to interact with them.

LinkedIn has an interesting point to be elaborated as CIFOR joined it recently new in 2021 but has garnered lots of followers. CIFOR has three associated LinkedIn accounts per January 2023 which serve different purposes: research information and jobs based in Bogor, Indonesia (CIFOR), local takes in Nairobi (CIFOR-ICRAF Nairobi), and research based in Montepellier, France (CGIAR). Based on the interview, CIFOR allows branching for social media to garner more followers if it is still following their mission and social media guidelines. Additionally, LinkedIn has shown more attention from academics and job seekers that want to work at CIFOR.

The senior researcher at CIFOR also mentioned that CIFOR has been urging its researchers to open public social media accounts in order to engage with a bigger audience. Social media use for environmental communication is inextricably linked to institution branding. When participating in social media as institutional representation, there are also non-negotiable points to bear in mind, such as organizational branding, visions, missions, core values, and key messaging. It is true that forestry, such as REDD+, has a broad area of understanding and often is considered complex. As a result, people who are interested in these issues are highly fragmented. CIFOR's Senior Researcher stated that one of the most difficult challenges is attracting the younger generation, who are unfamiliar with the subject, to become involved and engaged in it. To prepare for this, CIFOR started to expand its social media channels to TikTok in 2021, which is more visually appealing and engaging, and has a younger user base. TikTok short videos are projected to encourage increased youth participation by allowing them to share and comment on short video content.

The audience in different regions has varied qualities, according to CIFOR's Communications Assistant. For instance, several viewers complimented CIFOR on using his office as his background as a good, cozy environment during one YouTube livestream. CIFOR has been trying to craft interesting content that cater to their audience. Therefore, their Indonesian Twitter account (@CIFOR_hutan) uses a combination of interesting words, emoticons, a brief video, hash tags, and interesting graphics to engage with Indonesian followers.

Through a limited context, such as a webinar, twitter thread, or Instagram comments, the utilization of New Media, such as Instagram, TikTok, YouTube, and Twitter, illustrates the significance of public engagement on the internet for environmental communication. CIFOR has been establishing a setting that permits private conversations and interactions with public communications. However, this also poses a problem because forestry and environmental issues are complex and call for face-to-face communication. Through mediated communication, new media can offer accessibility and adaptability, but it can be challenging to employ for serious talks and themes (Littlejohn, Fross, & Oetzel, 2017, p. 149).

4.2. New Media Use: Depth versus Breadth

In environmental communication, the shift from a linear communication model that only allows one-way information transfer to a dialogic approach creates a new door for the public to participate with issues that are happening around them. This dialogic approach in environmental communication has been found to have positive outcomes for organizations (Lee & Van Dyke, 2015). Unlike traditional media, social media allows people to connect and share information instantly for a dynamic engagement inter-user and between user and the issues resulting a dialogic discourse (Kent, 2013; Bortree & Seltzer, 2009; Sweetser & Lariscy , 2008). By offering engagement, feedback, and input, CIFOR has been attempting to develop a relationship with their audience as consumers of their content. The ethical and compliance reporting portal page on CIFOR's websites also offers access to an anonymous reporting hotline. Social media is a rapid and highly efficient method for disseminating information. The growing prevalence of social media has compelled numerous companies to exhibit greater interest in utilizing social media platforms for a multitude of purposes, ranging from communication to establishing sophisticated connections or disseminating information.

However, when it comes to a complex subject with limited space on social media, a few challenges emerge. When discussing about forests and forest land in Indonesia, for example, the dynamics of actors are complex because forest and forest land in Indonesia are ones of the most contested resources in the country (Dwisatrio, et al., 2016), especially when it comes to dispossessed and marginalized indigenous groups living in and around forests. According to Indonesia's Forestry Law No.41 of 1999, a forest is described as a cohesive ecosystem in a terrain dominated by tree groups present in the natural world. Forest land, on the other hand, is defined in rigorous legal terms based on its ownerships, which are divided into state forest and forest tenure on this law. In Indonesia, only a small percentage of forest lands are under private control, with private forest landowners ranging from individuals to cooperatives to corporations (CIFOR, 2015).

Elaboration on complex subjects on social media is only provided to a restricted degree. They should be further expanded upon with audio-visual presentations or lengthy articles which usually are not fit for social media dissemination. Compared to previous research by Pavelle and Wilkinson (2020), the utilization of online videos, disseminated through social media platforms, has the capacity to establish a meaningful connection from the creator with their audience. CIFOR has been combining texts, audio, and video so that their audience can grasp the context properly. This finding is also supported by Allgaier (2019) which highlights the use of YouTube as a highly popular online platform for sharing videos. It is widely used as a resource for science and environmental information. However, there is limited knowledge regarding the specific type of information that users encounter when they search for content related to climate science, climate change, and climate engineering on YouTube.

CIFOR has been utilizing YouTube since 2009, nevertheless, it has encountered a gradual expansion in terms of both subscribers and viewers. During the initial five years of their presence on YouTube, CIFOR managed to accumulate fewer than 3000 subscribers. This is because the content they provide focuses on intricate and specialized research and academic conversations, such as webinars, interviews, and dialogues on policy, forestry, and the environment. Nevertheless, because of the growing prevalence of the internet and YouTube as platforms for accessing information, CIFOR has gained a larger number of subscribers, reaching about 12,000.

Because it has a limited amount of room for words and most users spend less time on a given problem, social media is an unsuitable medium for conveying a complicated narrative (Groshek & Bronda, 2016; Weng, Flammini, Vespignani, & Menczer , 2012). As a result, controlling a complicated narrative is challenging since facts and discussion might be lost in the shuffle of competing information, limited attention, or both, resulting in oversimplification (Williams, 2017). Therefore, discussing a serious matter like forest and forest lands on Twitter, Instagram, or even TikTok tend to lead to oversimplification. To tackle this challenge, CIFOR has made various efforts to disseminate its findings, publications, reports, and stakeholder dialogues on social media which cater to different types of audiences. For example, their YouTube channel has videos ranging in length from less than three minutes to more than three hours. They upload recordings of researchers' presentations, high-level ministerial dialogues, and webinars that provide strong material and details on their YouTube account for the long lengths. While on Instagram, they upload more visual content to engage with their followers.

In the current era where environmental topics are prominent of public concern, promoting public engagement and action towards pro-environmental behaviors necessitates a combination of understanding conservation matters and fostering effective collaboration between the scientific community and society. In the present media landscape, it is crucial for CIFOR as a creator to strategically disseminate information on social media platforms and foster meaningful conversations about the environment and forestry. This approach ensures that the audience becomes informed about pro-environmental practices and can consequently make informed decisions to mitigate environmental issues. Additionally, it is important to minimize the dissemination of outdated environmental norms through traditional media channels. This is further corroborated by Han and Cheng (2020) that highlights the significant influence of new media in governing the perception of norms and promoting environmentally friendly actions across various cultural settings.

Additionally, CIFOR's publications are gathered and updated on their websites in the form of infobriefs, infographics, working papers, and journals, which are primarily accessible to the public. These publications provide depth in terms of knowledge, data, and results needed by segmented audience. CIFOR researchers are also encouraged to use social media channels to assist the organization better communicate with the public. For example, on Twitter, researchers can connect directly with audiences by responding to their queries, explaining a topic, and even clarifying information. They cater to a variety of demographics. Their Instagram account, however, has a particular role to play in reaching out to Indonesians. The engagement on their Instagram is mostly from Indonesian audience. By employing this strategy, CIFOR is hopeful to cover both the depth of themes and the breadth of audiences. However, it is inevitable that CIFOR's utilization of new media, particularly its dialogic approach and encouragement of its researchers to engage in social media interaction, would have the potential to mix and blur the boundaries between interpersonal communication and mass media communication.

5. CONCLUSION

Since almost its commencement, CIFOR has utilized the media to share its results and interact with its audiences. The audience segmentation of traditional media can be widened by switching to new media. For the past ten years, CIFOR has developed several new media platforms, including Instagram, YouTube, LinkedIn, Twitter, and TikTok as their most recent one. CIFOR's persistent attempts to interact with a larger audience have cemented not only their status as creators but also as an organization that serves as a conduit for consumers' feedback. The relationship between creators and consumers can be improved by consumer feedback which follows Ecological Model of Communication Process.

This research is subject to several limitations. Firstly, it employs an ecological model of communication process that is deemed outdated for

social media analysis. Secondly, it relies heavily on qualitative methods, which primarily involve informants and interviews. Lastly, there is a need to incorporate more data-driven analysis and adopt an interdisciplinary approach when studying environmental issues and communication in the digital era. Hence, it is feasible to do additional study on the application of social media network analysis for CIFOR using quantitative methods, and to examine the level of interaction with its audience across various social media platforms.

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