Effective communication about forests and trees: An analytical framework for communication among segmented audiences

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A B S T R A C T

A vast amount of literature from communication science deals with the questions if and how communication can evoke changes in an audience. This is closely related to communicative persuasion and social influence. Based on audience-oriented approaches to media effectiveness, it is argued that in order to be effective, communication efforts have to match the desires and requirements of the audience. In this context, this paper proposes three conditions that must be met for a communication effect to occur: selection, understanding and acceptance of the information. Drawing on approaches from communication science and media effectiveness studies, variables that influence selection, understanding and acceptance are identified and an analytical framework for effective communication is proposed. Based on the framework, survey questions were developed and a survey representative for the German public was conducted in cooperation with Sinus Institute – a market research institute that groups the German public into ten sinus milieus based on common socio-psychological characteristics – to find out about forest-specific communication needs and p for each milieu. The empirical survey results were analyzed and together with already existing material about sinus milieus were fitted into the analytical framework, resulting in templates for effective communication about forest-related topics for each sinus milieu.

1. Introduction

Communication shapes how we perceive and think about ourselves, each other and the world. It is a means for education, changing or reaffirming beliefs, building relationships and developing new ideas (Vangelisti and Perlman, 2018; Trenholm, 2020; Berger and Luckmann, 1991). As such, communication is a powerful tool to reach, influence and engage with people. In the context of socio-political approaches to forestry science, communication has been studied for various reasons: Communication strategies can improve the science-policy knowledge transfer (Pregernig, 2000) and support policy implementation (Vulturius et al., 2020). Public communication shapes the public's perceptions and attitudes about forests (Jenal, 2019) as well as protected areas (Fienitz et al., 2022) and influences the forest sector's public image (Riedl et al., 2019). Communication is also important for the internal understanding and coherence of the forestry sector (Janse, 2007). On an inter-personal level, good communication can help to manage and mediate conflicts about forests (Nousiainen and Mola-Yudego, 2022) and improve participation processes (Aasetre, 2006).

Communication is significant for public as well as private actors (Wilkes-Allemann et al., 2021; Fabra-Crespo and Rojas-Briales, 2015), but communication effects by traditional forest actors are generally rather modest than high (Wilkes-Allemann et al., 2021; Kleinhück-elkotten and Neitzke, 2009). In most cases, according to Kleinhück-elkotten & Neitzke (2009: 47), "there is a lack of target group-orientated communication geared towards the interests and motives of potential target groups." Wilkes-Allemann et al. (2021) come to a similar conclusion, recommending that communication strategies need to anticipate and be tailored to the lifeworld of the receiver. Therefore, senders must be prepared to listen in order to gather information and understand their intended receivers.

In the forestry sector, most communication-related articles raise the question how forest owners can be better reached. In this context forest owners have been grouped according to their values, attitudes and motivations for owning land (Arnould et al., 2021; Butler et al., 2007; Ficko et al., 2019; Kuipers et al., 2013; Stockmann et al., 2024; Tiebel et al., 2024). This gives a better understanding of the target group but is still just one piece of the puzzle. This paper argues that to develop effective communication strategies, it is necessary to inquire and include various audience characteristics.

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In the forest-owner context, effective communication is often referred to a change in attitudes or behaviors (Rubino et al., 2022; Kuipers et al., 2013; Butler et al., 2007) – such as adapting voluntary management measures or enrolling in certification schemes. Communication towards local citizens has likewise been researched with the goal of behavior change (McGrath Novak et al., 2023) and attitude change (Mylek and Schirmer, 2020).

The exploration of how people's attitudes and behaviors can be influenced by communicative means has a long tradition in communication science. Persuasion research examines how people's attitudes and behaviors can be influenced by communicative means (Stiff and Mongeau, 2016). Research on persuasion is closely related to studies on media effectiveness studies (Bonfadelli and Friemel, 2017; Stoeber, 2008; Jäckel, 2019). Persuasion effects can be defined as "direct and unfiltered effects that could be registered as a result of specific media offerings" (Jäckel, 2019: 6). Effective communication is defined here as communication that evokes persuasion effects. "Persuasion effects" and "communication effects" are used interchangeably from here on.

In this study, concepts from media effectiveness studies and persuasive research are applied as a foundation to derive variables, which are then utilized to identify specific audience characteristics, enabling the comprehensive specification of any given target group. Based on this, an analytical framework for effective communication is proposed.

There are research institutes that provide predefined target groups, such as the Sinus Institute based in Germany. The Sinus Institute is a market research institute that conducts psychometric audience segmentation based on individual's attributes such as values, attitudes or personality traits; and behavioral segmentation. Building on the analysis of the Sinus Institute, the German population can be currently segmented into ten sinus milieus (Barth et al., 2023).

The aforementioned audience characteristics for effective communication were inquired in a population-representative survey conducted in Germany in cooperation with the Sinus Institute. In most cases, the questions were asked specifically for forest-related contexts. Together with the information that is already available from Sinus Institute about sinus milieus, the data is illustrated in communication templates that can be used as the base for practical communication recommendations.

The audience characteristics for effective communication can be used to further define already existing target groups or to build new ones. The suggested framework can be applied to suit various recipients – forest owners, local residents, interest groups and other political actors – because all those target groups can be further refined and defined by socio-psychological and emotional criteria. The author assumes that communication can be more effective in evoking behavior change or attitude change if those characteristics are taken into account.

2. Approaching effective communication

In this chapter a definition of communication is provided and the theoretical background that leads to the understanding of the audience factors for effective communication is presented. As such it is rather a background than theory chapter, because various approaches are combined and not one theory is laid out.

2.1. Defining communication

In this research article, communication is approached from the socio-psychological tradition understanding communication as a social process of meaning-making, in which both sender(s) and receiver(s) of information are involved (van Ruler, 2018).

2.1.1. Communication as a social process
Various scholars from the socio-psychological tradition understand communication at the core as a form of social interaction that shapes and is shaped by human relations (Vangelisti and Perlman, 2018). In this two-way, interactive process both the sender(s) and receiver(s) of information are engaged and influence each other (Littlejohn and Foss, 2011; Merten and Teipen, 1991; Burkart, 2003; Pearson et al., 2011). The communication process has no clearly defined beginning or end, and is dynamic in nature (Berlo, 1960). As it changes over time, so can the relationship between the involved actors (Littlejohn and Foss, 2011; van Ruler, 2018). The interaction between actors can happen directly in-person or indirectly via media or other channels (van Ruler, 2018).

2.1.2. Communication as existence of shared meaning
How individuals see, perceive and talk about the world, is shaped by a number of factors: their previous experiences, knowledge, assumptions, beliefs, attitudes and values (Pearson et al., 2011; Rosengren, 2000). Those factors determine how meaning is created. Meaning represents an individual's subjective reality of their past experiences and can lead to different interpretations of reality (Burkart, 1995; Littlejohn and Foss, 2011). Only when meanings overlap, individuals understand each other - which makes communication possible (see Fig. 1; Burkart, 1995, adopted by Pearson et al., 2011, Fischer et al., 2024). In this case, sender and receiver exchange meaning and stimulate each other to construct new meanings (van Ruler, 2018; Schoeneborn and Tittin, 2013; Rosengren, 2000). (See Fig. 1)

2.2. Components of communication effectiveness

The definition of communication given above sheds light on the complexity of communication – and illustrates that to speak does not automatically mean to be understood. Recent media effectiveness theories consider the audience as decisive for effectiveness (McQuail, 2010): Communication is more likely to be effective if it is tailored to the needs, interests and requirements of the specific audience (Klöckner, 2015, Ang, 1991, Brosius, 2003, Röttger et al., 2014).

Fig. 1 illustrates how understanding presumes the existence of shared experiences, knowledge, assumptions, beliefs, attitudes and values between senders and recipients of information. Therefore, communicators might be interested in the investigation of individuals' inner worlds and adapt their messaging accordingly (McQuail, 2010, Brosius, 2003, Röttger et al. 2014).

Based on insights of media effectiveness studies (summarized in Bonfadelli and Friemel, 2017: 37; see Fig. 2), there are two more components of effective communication: selection (the information must be noticed by the recipient) and acceptance (the information must be accepted by the recipient).

When these three conditions are met, a communication effect can occur — then, the communication can lead to a change in behavior or attitudes. There are various factors that influence selection, understanding, and acceptance. These factors can differ greatly from person to person. Therefore, when defining target audiences, it is important to consider the components for effective communication (selection, understanding, acceptance). In chapter 3.1, corresponding variables will be proposed. These variables can be measured for different target groups, leading to comprehensive target group profiles that enable effective communication with each specific target group.

A communication model is used to structure the variables (see chapter 2.3).

2.3. The pentamodal communication model

Merten (1999) developed a model that allows to operationalize the components of effective communication outlined in chapter 2.3. The so called pentamodal communication model identifies both sender- and audience-related factors that play a role in the interactive, meaning-making communication process (see Fig. 3). It allows to operationalize the communication needs and requirements of the audience as follows: "Effects are no longer determined by the stimulus alone, but by the construction of meaning ascribed to this stimulus by the influence of the
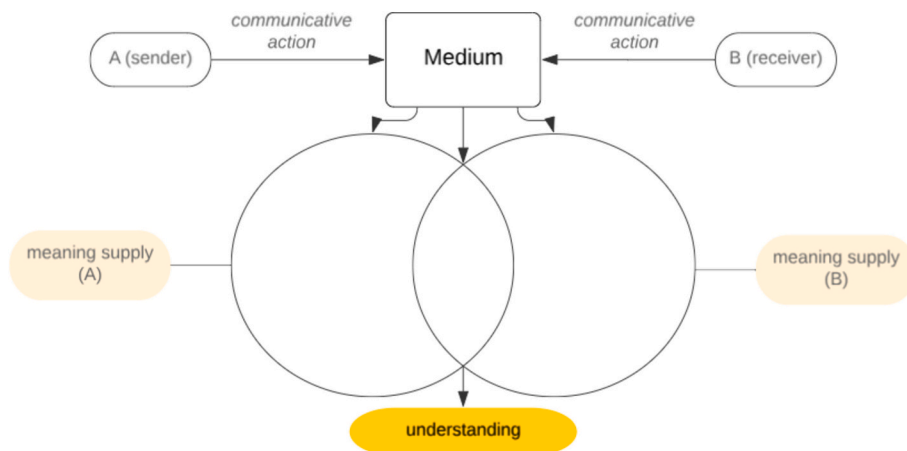
Fig. 1. Shared meaning as the base for understanding. Source: own illustration based on Burkart, 1995
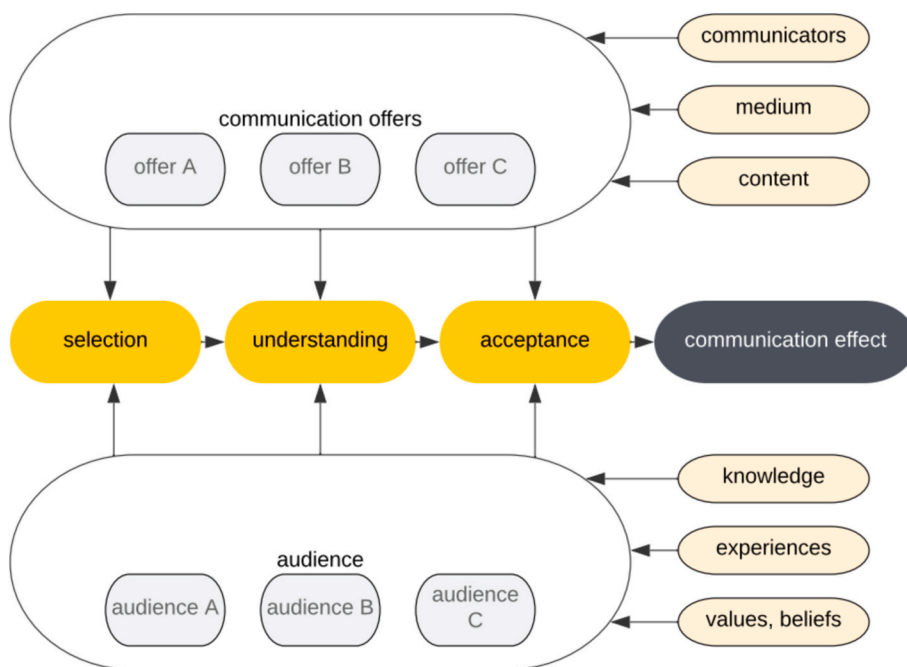

Fig. 2. The effective communication process. Source: own illustration based on Bonfadelli and Friemel, 2017: 37.
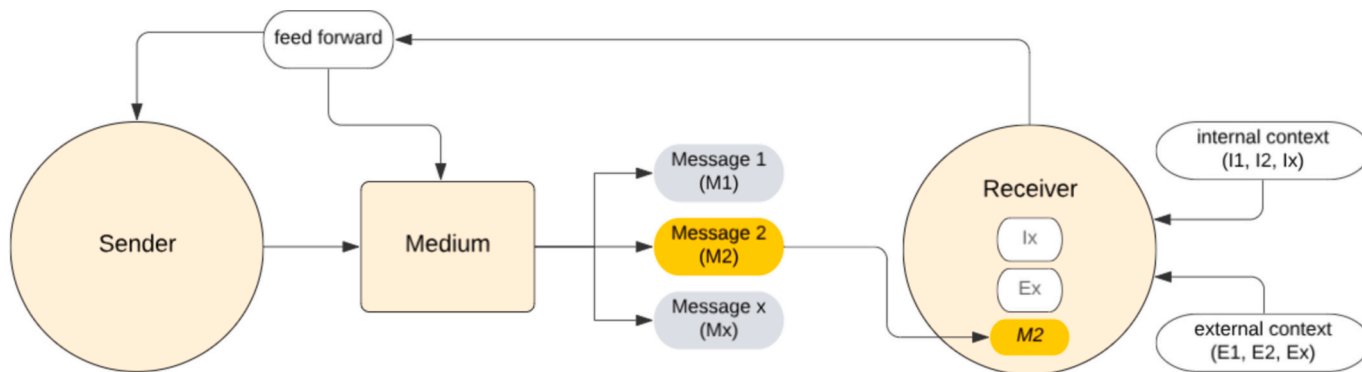

Fig. 3. Communication effectiveness model. Source: Own illustration based on Merten, 1999.

recipient's subjective experience (internal context) on the one hand and by the influence of the external context (situation, social norm, media variables) on the other" (ibid.: 100). Two further structures are integrated into the model: Feed-forward as a direct reflexive modality, which incorporates the receiver's expectations of the sender, and feed-back as an indirect reflexive modality, which represents an ex-post reaction option for the receiver. Feed-back follows the actual impact process and relates to future communication processes. As such, it is not considered a factor for effectiveness (Merten, 1999: 358ff).

Accordingly, one sender-related factor to communication (stimulus) and three audience-related factors to communication (feed-forward, internal context, external context) are identified. It is assumed that communication is effective if the stimulus matches the audience-related factors.

In the following text, the audience-related communication factors are used interchangeably with the term "effectiveness factors". Each effectiveness factor can be ascribed to a component of the process of effective communication (see Table 1).

Merten's communication model has been applied by Janse (2005) and Krafft (2004) in the forestry context.

3. Material and methods

This chapter contains the operationalization of effective communication (see chapter 3.1) and description of data collection and analysis (see chapter 3.2). Additional information about sinus milieus as target groups is provided as background material (see chapter 3.3).

3.1. Operationalization of effective communication

In the next step, communication effectiveness factors are correlated with empirically measurable variables (see Table 4).

The variables formed to fill the feed-forward effectiveness factor are *preferred type of medium* and *estimated trustworthiness of actors*.

Both variables are attributed to Selective Exposure Theory (Klapper, 1960), that assumes that individuals tend to select information that aligns with their existing beliefs, attitudes and values while avoiding or ignoring information that contradicts or challenges them. Selective Exposure Theory draws upon Cognitive Dissonance Theory coming from psychology (Festinger, 1957; Stroud, 2008), and applies it to explain media consumption behavior and how people choose media content that reinforces their pre-existing beliefs. It is, moreover, assumed that individuals are more likely to trust senders with whom they share values and other similarities (Burke, 1969).

To fill the internal context – the recipient's meaning supply (see chapter 2.1), four variables were formed: (1) forest-related topics of interest, (2) self-efficacy, (3) emotional connection to forests and (4) affectedness of forest damage (see Table 2). Those variables were

Table 2
Measurable variables and correspondent communication component. Source: Own representation.

Variable	Corresponds to effectiveness factor	Method	
		Type of data analysis	Methodological approach
Preferred type of medium	Feed-forward	Quantitative	Data collection via specific survey questions
Estimated trustworthiness of actors			
Forest-related topics of interest	Internal context		
Self-efficacy			
Emotional connection to forests			
Affectedness of forest damage			
Values of the social surroundings	External context	Qualitative	Derived from the literature on sinus milieus

derived from communication theory and approaches to media effectiveness.

The Elaboration Likelihood Model (Petty and Cacioppo, 1986) is a dual processing theory that assumes that a long-lasting and stable attitude, behavior or cognitive change can be achieved through communication if individuals are motivated to process the message deeply. This is likely if the recipient perceives the message to be of personal relevance and therefore the involvement factor is high (Petty et al., 1983). It is assumed that *thematic interest, personal affectedness* and *emotional connection* lead to high involvement. *Self-efficacy* is an important concept in Social Learning Theory (Bandura, 1977) and refers to an individual's belief in completing a task by having the cognitive motivation and understanding to successfully execute the necessary actions. Appealing to a person's self-efficacy is assumed to have a strong positive influence on communication effectiveness especially related to behavior change (Bandura, 1977; Moriarty and Stryker, 2008).

Individuals tend to form groups based on common characteristics and derive a sense of identity from the groups they belong to and provide a sense of how they fit into the world (Tajfel and Turner, 1979). According to the coorientation hypothesis (Miller and McHoskey, 1967), individuals are more likely to be influenced by communication efforts when they perceive that others share similar attitudes or opinions on the topic. Coorientation involves the comparison of one's own attitudes with perceived attitudes of others, and effective communication occurs when there is congruence or alignment between these perceptions. Therefore, senders who want to communicate effectively need to know about the *values of the social surroundings* of their target audience.

3.2. Data collection and analysis

Quantitative methods were used to gather data that corresponds to the communication effectiveness factors and can be used to fill the analytical framework for effective communication (see Table 2).

A survey representative of the German public was conducted in 2023 in cooperation with Sinus Institute ($n = 2.081$). The questionnaire comprised of 33 questions (see Annex I). The survey items were sent to the Sinus Institute, who then added more items in order to determine the respondent's milieu affiliation. Therefore, the final results allow that the answers can be distinguished according to one of the ten social milieus suggested by Sinus Institute. The survey was distributed and the data were collected via the Sinus Institute. The researchers received the data in form of an Excel table.

The survey questions were designed based on the adapted pentamodal communication model (see Fig. 3) and the variables derived from

Table 1
Communication effectiveness factors and corresponding components of effective communication. Source: Own representation based on Bonfadelli and Friemel, 2017: 42.

Communication effectiveness factor	Description	Corresponding component of effective communication
Feed-forward	What are the expectation towards the sender? Which senders and channels are preferred/trustworthy?	selection
Internal context	What are the recipient's experiences, previous knowledge, emotions, etc. to draw and build on?	understanding
External context	How are the recipient's social surroundings and what is accepted in this context?	acceptance

the literature (see Table 4). The data analysis was done with SPSS. In almost all cases, new indexes were formed for each possible variable expression so that the answers of more than one question could be considered in the analysis. For example, a new variable "TV_preference" was formed that included the answers 2 and 5 to question 29 ("Where have you looked for this [forest-related] information in the past?" – answers "TV – public broadcasters" and "TV – private broadcasters" senders") and answers 2 and 5 to question 30 ("Which channel would you like to use to receive information about the forest?" – answers "TV – public broadcasters" and "TV – private broadcasters" senders"). The new index was correlated with sinus milieus via cross tabulation. The results were ranked and assigned with three possible expressions: high preference of TV as communication channel for forest-related information (3), medium preference (2), and low preference (1). I asked SPSS to give me the results for each variable expression in percentage and also to give the percentage of expected results for each sinus milieu in case of a perfectly equal distribution of expressions. I compared the number of actual result of variable expression 3 with the expected number. If the actual number was more than 2 % higher than the expected number I assumed "over-average high preference for TV as a communication channel" for forest-related information. In case the actual result of variable expression 1 was at least 2 % lower than the expected number I assumed a "below-average preference of TV as a communication channel" for forest-related information. In the same way, I proceeded for each variable. The complete documentation of how each new index was formed is attached in Annex III and the respective questions and possible answers are attached in Annex II.

3.3. Background material: sinus milieus

The German Sinus Institute has been using empirical methods to research people's lifeworlds, values, attitudes and interests for four decades and conducts psychometric segmentation based on large amounts of quantitative data. Currently, the German population can be segmented into ten sinus milieus, though the milieus are updated and refined about every two years (Barth et al., 2023). Sinus milieus are "groups of like-minded people who have similar values, principles of life organisation, relationships with fellow human beings and mentalities" (Hradil, 2006: 278). Milieu-specific value orientations are relatively stable and are expressed in specific everyday practices and lifestyles (Barth and Flaig, 2014). There are ten sinus milieus for Germany: conservative-established milieu (KOG), post-material milieu (PMA), performer milieu (PER), expeditive milieu (EPE), neoecological milieu (NÖK), adaptive-pragmatic middle (ADA), hedonist milieu (HED), precarious milieu (PRE), nostalgic middle-class (NOB) and traditional milieu (TRA; [SINUS] Sinus Markt- und Sozialforschung GmbH, 2021). The milieu concept originated in Germany and by now has been applied to over 50 countries worldwide ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2024).

3.3.1. Short milieu profiles
Based on the available literature, information about each milieu type was gathered to build milieu-specific profiles. For each milieu, three characteristic values were derived (see Table 7). These values are used to fill the external context of the communication model.

3.3.1.1. Conservative established milieu (KOG). The conservative established milieu is made up of the "traditional elite". Members of this milieu value tradition and see themselves as responsibility bearers ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). An above-average number of members of this milieu group own their own home (Appelrath et al., 2012). Members of this milieu see themselves as contributors to society. They have high expectations towards themselves and others. Success is perceived as directly related to performance ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). This milieu is

characterized by an ethic of responsibility, as well as claims to exclusivity and leadership, which, however, contrast with a tendency towards withdrawal and seclusion (Appelrath et al., 2012). There is a general interest in society, politics and the church, as well as in nature and biodiversity (especially native species), because these are seen as fundamental to human existence (Borgstedt and Schleer, 2019). Positive environmental attitudes and environmentally friendly behavior is quite widespread across this milieu, however, "radical" political measures are rejected (Stockmann and Wisniewski, 2023: 298). Members of this milieu face problems keeping up with digital change which might make them question the stability of their role as elite and opinion leaders ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023).

3.3.1.2. Post-material milieu (PMA). Post-materialists are committed, confident and usually highly educated. They have a liberal attitude and perceive themselves as progressive. They are rather oriented towards sustainability and common good than towards growth and economic competition. Individualism, self-determination and authenticity is rated much more important than material prosperity ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). They are generally willing to take action in line with their values and buy organic products with above-average frequency (Stockmann and Wisniewski, 2023: 300) and, are willing restrict or change personal habits in order to be more environmentally friendly (ibid.: 301).

3.3.1.3. Performer (PER). Performers see themselves as modern business and lifestyle elite. Climbing the career ladder is important for members of this milieu. They are determined, ambitious and want to keep up with the latest trends in lifestyle and technology ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). Performers are optimistic that technological progress will solve global challenges (Appelrath et al., 2012). The relationship to nature and climate change is largely viewed in economic and profit-oriented terms (Borgstedt and Schleer, 2019). They are open to "greening" their lifestyle, if they can gain personal benefits from it (e.g. in terms of better health; Appelrath et al., 2012).

3.3.1.4. Expeditive milieu (EPE). Members of this milieu have positive attitudes towards new technology and digitalization trends (Hirschnitz-Gabers and Schipperges, 2021; Appelrath et al., 2012). They usually associate technology with entertainment and have relatively high expectations of its aesthetics (Appelrath et al., 2012). As they are globally connected, they have high levels of awareness towards climate change and environmental destruction. They believe individuals must make a contribution for a better future, and, as long as they don't have to compromise on their own standards, expeditives are willing to "greening" their lifestyle. They often engage in second hand shopping, urban gardening, vegan nutrition and car-free living (Stockmann and Wisniewski, 2023: 298). They perceive themselves as hip, urban and unconventional. They generally have strong opinions and are likely to show themselves off on social media ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023).

3.3.1.5. Neo-ecological milieu (NÖK). Members of the neoecological milieu are "do-gooders". They have a strong awareness of global issues including environmental damage and climate change. Members of this milieu are advocates of a paradigm shift, criticizing mindless consumption and neoliberalism ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). Issues of diversity and nature protection are particularly important to the neoecological milieu (BMU 2020). They endeavour to lead a consistently ecological lifestyle (Borgstedt and Schleer, 2019). They are willing to get politically involved and want to give impulses for a social transformation ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023).

3.3.1.6. Adaptive-pragmatic middle (ADA). Members of the adaptive-

pragmatic middle milieu are the modern middle class characterized by life pragmatism and utilitarian thinking. They are willing to perform and work hard, but they equally have a desire for fun and entertainment ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). They value flexibility but at the same time, security are important values (Appelrath et al., 2012). Members of this milieu have a strong need for belonging and being anchored ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2021). The world seems increasingly complex to them, and even though they are well educated and connected online, they can get overwhelmed by the information overload (Appelrath et al., 2012). They view nature conservation and climate protection as a social duty (Borgstedt and Schleer, 2019), but there is little willingness to change their own behavior or actively engage in the topic. Trust and responsibility tend to be passed on to the state (Borgstedt and Schleer, 2019; Hirschnitz-Gabers and Schipperges, 2021). Young pragmatists often prioritize professional success and a good standard of living. They also attach great importance to the latest technology, cars, clothing in the latest fashion and (long-distance) travelling (Hirschnitz-Gabers and Schipperges, 2021).

3.3.1.7. Consumption-oriented Hedonists (HED). The Hedonist milieu is the lower middle class, which focuses on entertainment and consumption. Members of this milieu value fun and enjoyment ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). They have a strong orientation towards living in the "here and now", rejecting conventions and behavioral restrictions (Appelrath et al., 2012). They perceive themselves as cool life artists, who hustle at work and enjoy compensation through spontaneous consumption. Social acceptance and belonging to their surroundings is very important. They fear deterioration of their living standard and are increasingly annoyed by the dictates of sustainability and political correctness ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). Environmental awareness is hardly widespread, a carefree attitude is predominant (Borgstedt and Schleer, 2019).

3.3.1.8. Precarious milieu (PRE). People of this milieu can be characterized by a reactive attitude and socially difficult life circumstances. As such, their focus is on coping with everyday life (Borgstedt and Schleer, 2019). However, they perceive themselves as the normal, average citizen. They have a strong desire to be seen and taken seriously. They have strong materialistic values and seek to keep up with consumption standards of the middle class ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2021). As external circumstances are perceived to be unstable, they place increased importance on stability in social relationships, health, solidarity, and respect. They are generally fearful of the future and often seek identification through differentiation from others ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023).

3.3.1.9. Nostalgic middle class (NOB). Having strong values of responsibility, reliability and a hard work ethics, members of the nostalgic middle class milieu perceive themselves as "backbone of society". However, they can also feel as taken advantage of by societal elites. They desire status and stability and security, and fear social decline ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). They have a general affection for nature and are willing to live in an environmental-friendly manner, but they worry about rising costs and threats to their personal lifestyle that might accompany a sustainability transition. They are rather drawn towards practical solutions than to abstract sustainability concepts (Stockmann and Wisniewski, 2023: 297). They yearn for the orderly conditions of the old days ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023).

3.3.1.10. Traditional milieu (TRA). Members of the traditional milieu perceive themselves as small righteous people, rooted in traditional working-class culture. They prioritize family, religion and tradition and

tend to stick to what they know instead of making experiments or setting ambitious goals ([SINUS] Sinus Markt- und Sozialforschung GmbH, 2023). Even though they are not explicitly interested in sustainability, they criticize excessive mass consumption and modern moral decay. Responsibility for taking action about that is passed on to the government (Stockmann and Wisniewski, 2023: 300).

3.3.2. Limitations to sinus milieu studies

The exact empirical method applied by Sinus Institute to form the milieus is their unique selling point and, as such, secret. Sinus milieus have been criticized for their intransparency, lack of scientific context, and unclear definitions (Ilg, 2016). Schulze (1988, 1990) developed an approach to lifestyle-based audience segmentation that can be compared to the one by Sinus Institute and is "open source" – yet, not as popular. According to Diaz-Bone (2003) what makes sinus milieus studies so successful is the simplicity of the generalized typologies, illustrated by examples, which is more appealing than simple statistics from survey results. It should be noted that Sinus is a market research institute, and as such of course also engages in – quite successful - self marketing, including the adaptation of their products to the needs of their target group, who are, often, not scientists.

4. Results

In this section, the results are presented.

4.1. Results of milieu-specific variables for effectiveness factors

4.1.1. Feed forward

As mentioned before, the communication effectiveness factor feed-forward influences the "selection" component of the effective communication process and, as such, determines which information the audience chooses to consume. Table 3 gives an insight into the preferred communication channels per milieu. To make it more likely that the information will be selected, it is advisable for communicators to communicate via the channels preferred by the respective target groups. Table 3 shows clearly that some milieus can be reached through a variety of communication channels (EPE, KOG, PMA, PER), while others are less frequent users of communication channels for forestry-related topics. How to deal with milieus that have no preferred communication channel for those topics (NOB, PRE) will be discussed in another section (see chapter 4.2).

As described in 3.2, people are more likely to choose information from trusted and credible senders. Table 4 gives an overview of the estimated forest-specific credibility of actors for each milieu. Some interesting milieu-specific differences are revealed. While for most milieus, information from politicians and the government seem to be a credible source, some rate the credibility of those actors rather low (NOB, TRA, PRE). Differences in credibility across the milieus can be seen for every actor – indicating clearly, that there is no "one size fits all" approach for communication about forestry. How the findings can be applied will be further discussed in 4.2.

4.1.2. Internal context

In Table 5, the varying thematic interests per milieu are presented. Thematic interests differ depending on each milieu – there is not one topic that reaches all milieus equally. The thematic interest groups – ecological-biological, ecological-critical and technical-pragmatic; see 3.2 for a description of each - are broad and can be approached from different perspectives. Still, they can give an insight into the interests and make the target groups even more tangible.

To further fill the internal context and gain a deeper understanding of the lifeworld and attitudes of each milieu, the levels of emotional attachment to forests, personal affectedness by forest damage and self-efficacy were analyzed and are represented in Table 6.

Table 3

Preferred forest and forestry-specific communication channels per milieu. Source: Own representation.

	KOG	PMA	PER	EPE	ADA	NOB	TRA	PRE	HED	NÖK
Print media	++	++	−	++	−	−	−	−	−	−
Radio	++	++	−	++	−	−	++	−	−	−
TV	++	++	++	+	−	−	−	−	−	−
Podcast	−	++	+	++	−	−	+	−	−	+
Youtube	+	−	+	++	−	−	+	−	−	++
Messenger	−	−	++	++	++	−	++	−	−	−
Instagram	++	+	++	++	−	−	−	−	++	−
Facebook	++	−	+	+	−	−	+	−	++	−
Personal contact	++	++	−	+	−	−	−	−	−	+

KOG = Conservative established m.	EPE = Expeditive milieu	PRE = Precarious milieu
PMA = Post-material milieu	ADA = Adaptive-pragmatic middle	HED = Consumption-oriented Hedonists
PER = Performer milieu	NOB = Nostalgic middle class	NÖK = Neo-ecological milieu
EPE = Expeditive milieu	TRA = Traditional milieu	

Table 4

Forest and forestry-specific credibility of the actors per milieu. Source: Own representation.

	KOG	PMA	PER	EPE	ADA	NOB	TRA	PRE	HED	NÖK
Politcs	+	+	+	+	+	−	−	−	+	+
NGOs	+	++	−	+	−	+	−	−	−	+
Science	−	++	+	+	−	−	−	−	−	+
Influencer	+	−	−	−	++	−	+	−	++	−
Forester	+	+	+	+	−	+	+	−	−	+
Wood industry	+	−	+	−	+	−	−	+	++	−

KOG = Conservative established m.	EPE = Expeditive milieu	PRE = Precarious milieu
PMA = Post-material milieu	ADA = Adaptive-pragmatic middle	HED = Consumption-oriented Hedonists
PER = Performer milieu	NOB = Nostalgic middle class	NÖK = Neo-ecological milieu
EPE = Expeditive milieu	TRA = Traditional milieu	

Table 5

Forestry-specific topic interest per milieu.

	KOG	PMA	PER	EPE	ADA	NOB	TRA	PRE	HED	NÖK
Ecological-biological	+	−	+	+	+	+	−	−	−	−
Ecological-critical	+	++	−	++	−	−	−	−	−	++
Technical-pragmatic	−	−	+	+	++	−	−	−	++	−

KOG = Conservative established m.	EPE = Expeditive milieu	PRE = Precarious milieu
PMA = Post-material milieu	ADA = Adaptive-pragmatic middle	HED = Consumption-oriented Hedonists
PER = Performer milieu	NOB = Nostalgic middle class	NÖK = Neo-ecological milieu
EPE = Expeditive milieu	TRA = Traditional milieu	

Table 6

Level of self-efficacy, emotional attachment to the forest and personal impact of forest damage per milieu.

	KOG	PMA	PER	EPE	ADA	NOB	TRA	PRE	HED	NÖK
Emotional attachment	++	−	−	+	−	−	+	−	−	+
Personal affectedness	++	++	−	+	−	+	+	−	−	+
Self-efficacy	+	++	−	++	−	−	+	−	−	−

KOG = Conservative established m.	EPE = Expeditive milieu	PRE = Precarious milieu
PMA = Post-material milieu	ADA = Adaptive-pragmatic middle	HED = Consumption-oriented Hedonists
PER = Performer milieu	NOB = Nostalgic middle class	NÖK = Neo-ecological milieu
EPE = Expeditive milieu	TRA = Traditional milieu	

4.1.3. External context

Based on the short profiles outlined in chapter 3, three representative values were derived for each milieu. Those values are used to fill in the communication effectiveness factor external context and are constitutive for the acceptance-component of effective communication.

4.2. Fitting the results into the communication effectiveness model

The data was grouped into effectiveness factors (feed-forward, internal and external context), fitted into the communication effectiveness model and put together as a template for effective communication for each sinus milieu. Figs. 4–13 show milieu-specific results - the ways in which the findings per milieus differ highly (in bold) or slightly from the

average of the whole German population.

Fig. 4 shows the communication effectiveness template for the conservative-established milieu (KOG). Members of this milieu can be effectively reached by a variety of sender and through different communication channels. Trust levels in politics, NGOs, influencers, foresters and the wood industry are high compared to the results of other milieus. Conservative-established are quite active media users and therefore likely to consume information via print, radio, TV and as well social media such as Instagram, Facebook and Youtube. As their levels of emotional attachment to forests are very high compared to those of other milieus, KOG can be reached via an emotional appeal, drawing on positive emotions of connectedness with forests, or negative emotions related to affectedness by forest damage. KOG show high levels of self-

Table 7

Specific values for each milieu.

Milieus	Mileu-specific values		
KOG (Conservative established milieu)	Tradition	Responsibility	Order
PMA (Post-material milieu)	Open-mindedness	Tolerance	Sustainability
PER (Performer milieu)	Ambition	Efficiency	Freedom
EPE (Expeditive milieu)	Self-realization	Independence	Flexibility
ADA (Adaptive-pragmatic middle)	Consisteny	Pragmatism	Belonging
NOB (Nostalgic middle class)	Harmony	Security	Reliability
TRA (Traditional milieu)	Tradition	Conformity	Security
PRE (Precarious milieu)	Security	Stability	Belonging
HED (Consumption-oriented Hedonists)	Fun	Enjoyment	Social recognition
NÖK (Neo-ecological milieu)	Solidarity	Idealism	Curiosity

efficacy and therefore might appreciate practical advice or information on how they can personally engage in forest protection. This would be in line with their thematic interest in ecological-biological and ecological-critical information: KOG are interested in natural processes and biodiversity in the forest and perceive it as worthy of protection. At the same time, they are interested in topics around environmental protection and climate change. Information tailored to KOG should not contradict their values tradition, responsibility and order.

Members of the post-material milieu (PMA) are likely to be reached via print media, radio and TV; as well as above-average likely to be reached via Podcasts. Instagram is as well a channel they use and that can be effective for reaching them. Interestingly, PMA have highly above average trust levels towards NGOs and science, and slightly above

average trust levels towards politics and foresters. In terms of thematic interest, PMA prefer ecological-critical information – which is in line with the perceived credibility of NGOs who often disseminate critical information. PMA indicate to be highly above average personally affected by forest damage and they report highly above average levels of self-efficacy. They can be seen as engaged in the world around them, aware of environmental problems and willing to take action to make a change. Communication directed to PMA should draw upon their value of sustainability and be aware to not contradict their open-mindedness and tolerance.

Fig. 6 illustrated communication p and desires of the performer milieu (PER). It allows to assume that PER can be reached via politics, science, foresters and wood industry who communicate via TV, messenger, Instagram, Podcast, Youtube or Facebook. TV, messenger and Instagram are highly above-average preferred communication channels. Performers in general do not feel personally affected by forests damage, have low levels of self-efficacy and no emotional connection to forests. Still, they are interested in technical-pragmatic and ecological-biological topics. Together with their values ambition, efficiency and freedom this could mean that they would be, for example, interested in biotechnology or bioeconomy, technological innovations in forest machinery.

The expeditives (see Fig. 7) are the most media-savvy milieu. They can be reached through nearly all communication channels and prefer information by politics, NGOs, science and foresters. They are highly above average interested in ecological-critical topics and have highly above average self-efficacy levels. They can be reached by a variety of topics and via emotional appeal. To create communication especially for this target group it would be recommended to specifically draw upon their values self-realization, independence and flexibility.

Fig. 8 illustrates recommendations for effective communication with the neoecological milieu (NÖK). They are less frequent media users than
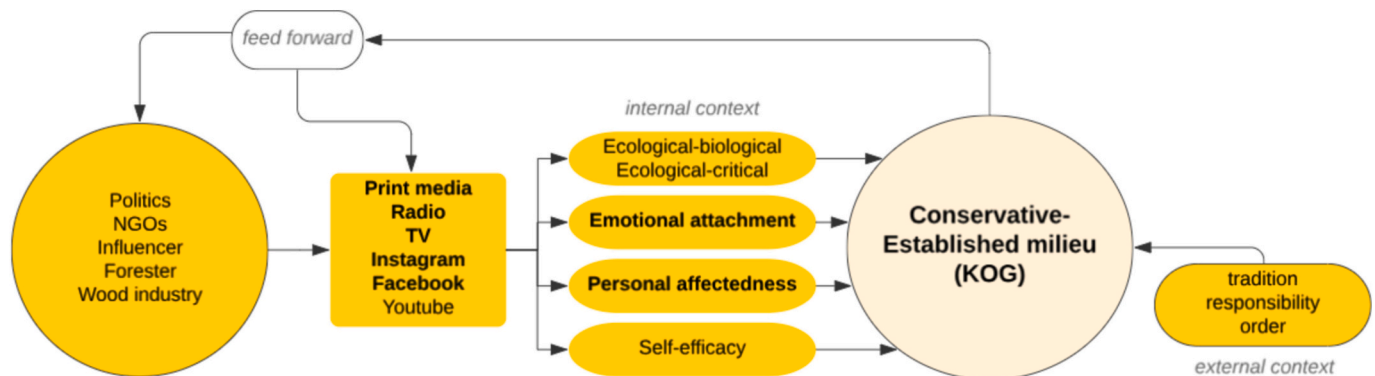

Fig. 4. Forest-specific communication effectiveness factors of the Conservative-Established milieu (KOG). Source: Own representation.
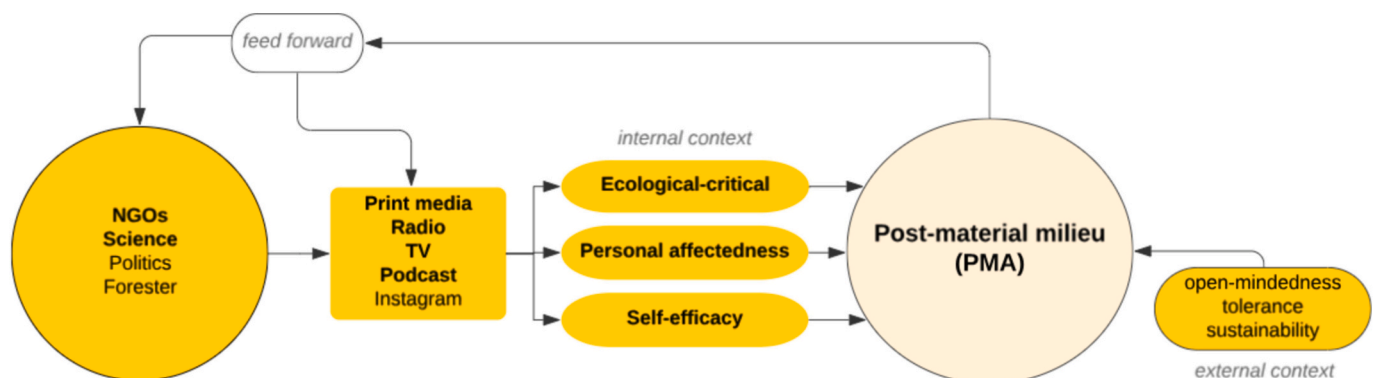

Fig. 5. Forest-specific communication effectiveness factors of the Post-material milieu (PMA). Source: Own representation.
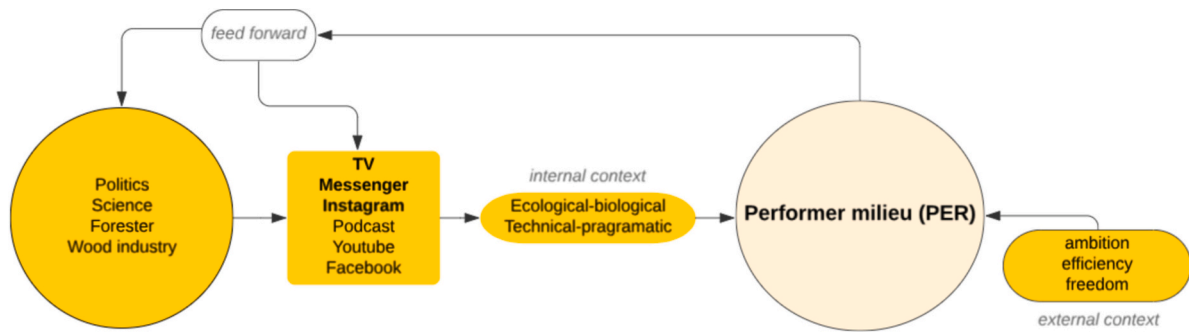
Fig. 6. Forest-specific communication effectiveness factors of the Performer milieu (PER). Source: Own representation.
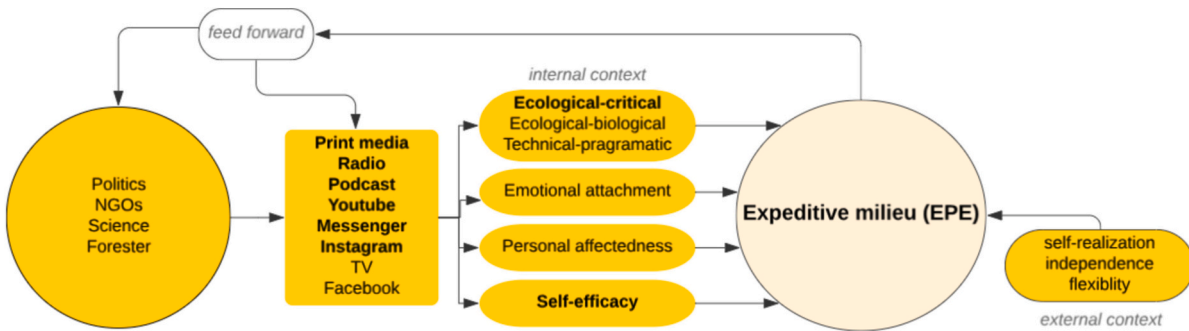

Fig. 7. Forest-specific communication effectiveness factors of the Expeditive milieu (EPE). Source: Own representation.
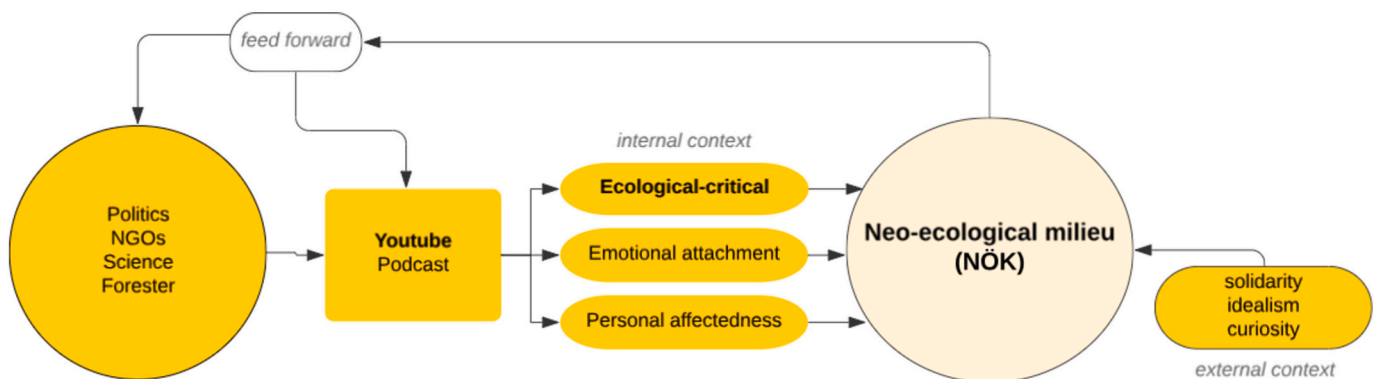

Fig. 8. Forest-specific communication effectiveness factors of the Neo-ecological milieu (NÖK). Source: Own representation.
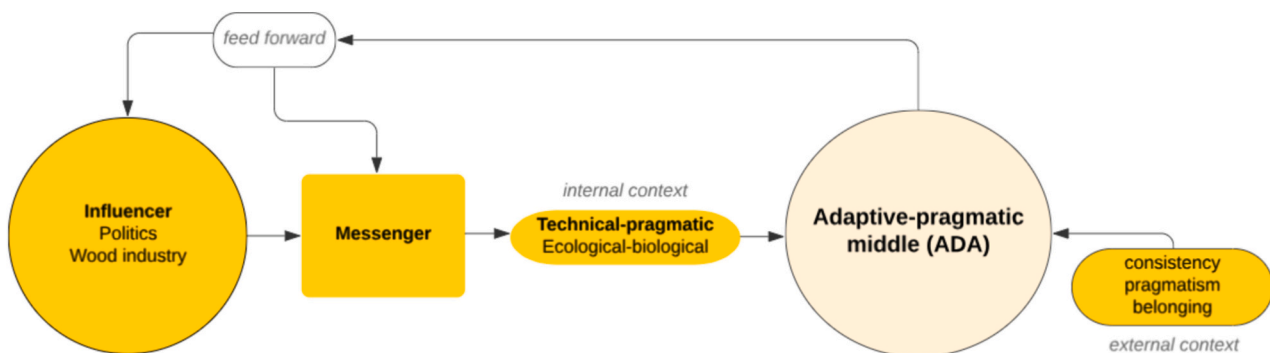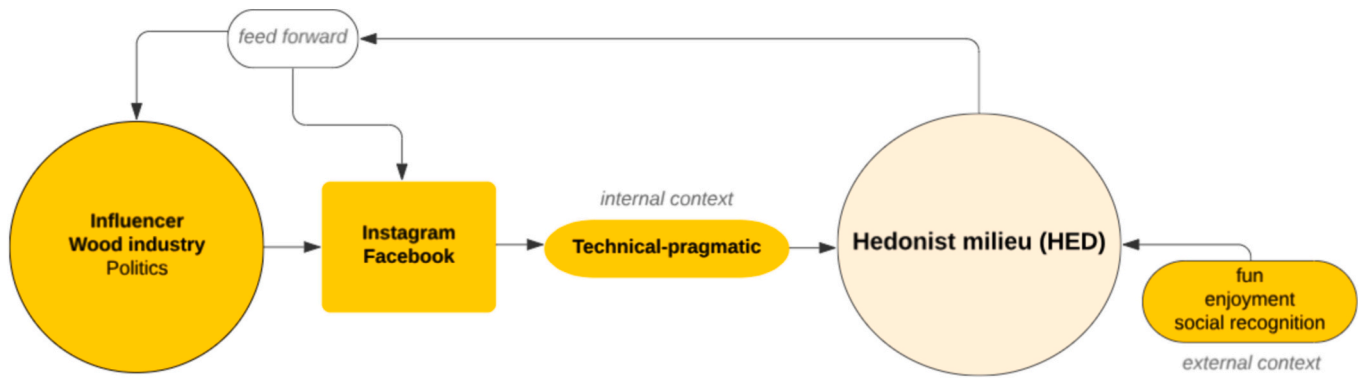

Fig. 9. Forest-specific communication effectiveness factors of the Adaptive-pragmatic middle (ADA). Source: Own representation.

Fig. 10. Forest-specific communication effectiveness factors of the Hedonist milieu (HED). Source: Own representation.
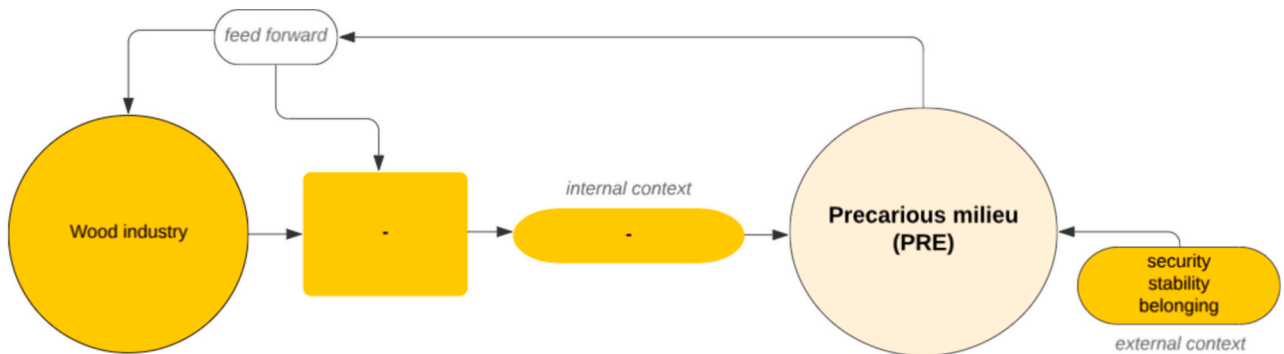

Fig. 11. Forest-specific communication effectiveness factors of the Precarious milieu (PRE). Source: Own representation.
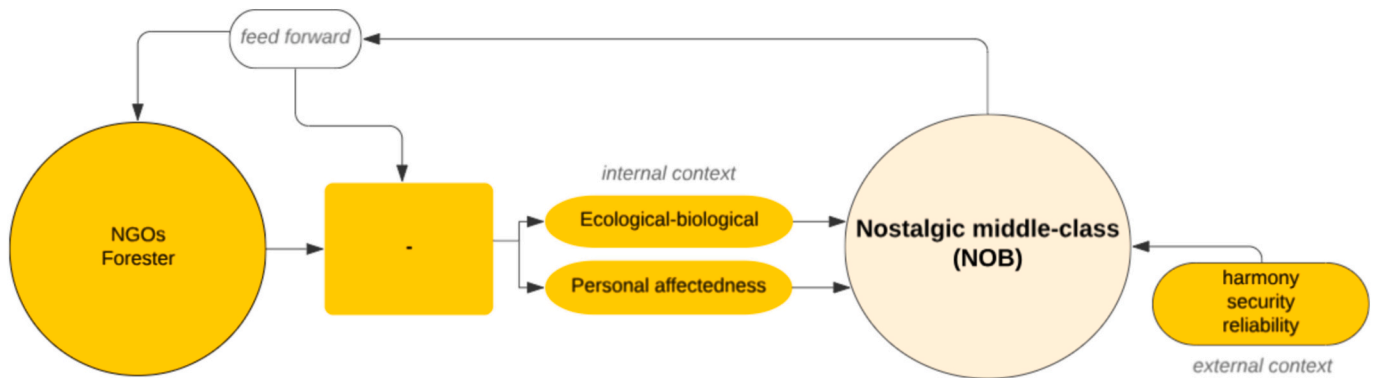

Fig. 12. Forest-specific communication effectiveness factors of the Nostalgic middle-class (NOB). Source: Own representation.
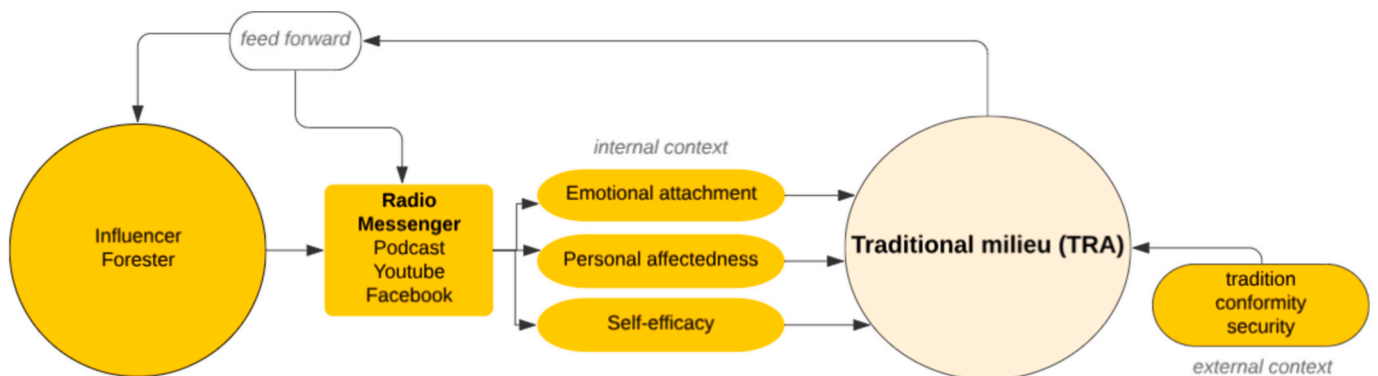

Fig. 13. Forest-specific communication effectiveness factors of the Traditional milieu (TRA). Source: Own representation.

the aforementioned milieus. They can be reached highly above average via Youtube and above average via Podcasts, indicating their interest for self-selected and in-depth information. NÖK are likely to choose information from politics, NGOs, science and foresters. They have highly above average interest in ecological-critical information, feel emotionally attached to forests and personally affected by forest damage. Therefore, it would be recommended to draw upon their emotions. NÖK show low levels of self-efficacy, meaning that they are not so eager to become actively engaged. Communication efforts should not contradict the values solidarity, idealism and curiosity.

The adaptive-pragmatic middle (ADA, see Fig. 9) can be highly above average reached via Messenger. They highly above average trust influencers, and slightly above average politics and the wood industry. ADA are highly above average interested in technical-pragmatic topics around wood harvesting, timber trade, and forestry technology and machines. Communication tailored to ADA should not contradict their values consistency, pragmatism and belonging.

Fig. 10 shows that the Hedonist milieu (HED) can be best reached via Instagram and Facebook, with information sent out from influencers and the wood industry. Trust levels for politics are slightly above average, meaning that it is also likely that HED would consume information from politics. They are especially interested in technical-pragmatic topics while there are low levels of personal affectedness by forest damage, emotional connection to forests, and self-efficacy. Thematically, communication could be similar to the one tailored to ADA. The values are somehow different to ADA in that HED highly value fun, enjoyment and social recognition.

To reach the precarious milieu (PRE) with forest-related communication could be a more difficult task than reaching other milieus (see Fig. 11). They report low levels of emotional connection, personal affectedness, self-efficacy and show no interest in a specific forest-related topics. Further, they are less frequent media users and have no preferred communication channel for forest communication. They show above average trust levels in the wood industry and value security, stability and belonging. Information tailored to PRE should be careful not to contradict those values.

Fig. 12 shows the recommendations for effective communication for the nostalgic middle-class (NOB). They have no preferred communication channels for forest-related information, but above-average trust levels in NGOs and foresters. They are interested in ecological-biological topics and feel above average personally affected by forest damage. They value harmony, security and reliability. As such it would not be recommended to draw upon negative emotions related to forest damage, but to, for example, refer to forests as a place of harmony and security.

The traditional milieu (TRA) trusts influencers and foresters above average and is best reached via radio and messenger. Further, above average preferred communication channels for forest-related information are Podcast, Youtube and Facebook. TRA feel emotionally attached to forests, personally affected by forest damage and have above average levels of self-efficacy. They can be reached via emotional appeal, and it is likely that they would value practical advice on how to get engaged in forest-related topics. Communication tailored to TRA should not contradict their values tradition, conformity and security.

5. Discussion

In the discussion, results are summarized and set in context with other research findings. The limitations of the study are discussed, as well.

5.1. Contextualizing the results

First, the study sheds light on the complexity of effective communication. Insights and approaches from communication theory and media effectiveness studies are combined to create a comprehensive approach to communication effects and how they can be reached.

Attitude and behavior change have been studied broadly in persuasion and media effectiveness research. This study adds to the already existing research by identifying and operationalizing the components of effective communication (selection, understanding, acceptance) that are necessary for a change or communication effect to occur.

Second, it is suggested that some audience characteristics matter more than others for effective communication. The presented framework illustrates those components and links them to both sender- and audience-related characteristics. Audience characteristics that matter for effective communication are transformed into variables and presented in a structured way. The variables can be collected empirically to develop new target groups or refine existing ones. In this way the target groups will be based on a comprehensive set of factors that matter for effective communication.

Third, the application of the framework shows that the p for forest-related communication differ greatly among sub-groups of the German population. Communication needs and p for forest-related communication are highly variable, depending on milieu type.

Fourth, it is suggested that communication with "hard to reach" target groups can be improved greatly if the target groups are studied in a more comprehensive way and the communication is adapted accordingly. If forest-related communication aims to reach the "broad public" the risk is high that only those who are already interested in forests and specifically seek out that information will be reached. In this way, the results explain why some groups of the German general public can be more easily reached with forest-related topics than others (Kleinhückelkotten and Neitzke, 2009). Media-savvy target groups who are interested in and have experience with forest-related topics are easier to reach than those who rarely use media, and have less interest. This does not mean that the latter are impossible to reach – but they are rarely reached with a rather general communication approach. The "hard to reach" target groups need to be studied well so that their communication needs and p are understood and the communication strategy can be adapted accordingly (Reisch and Bietz, 2007). The same can be said for forest-owner communication. In order to address not so engaged forest owners, it is necessary to find out and define who they are and what interests them by collecting data that fits the variables in the proposed framework and adapt the messaging accordingly. More useful insights about forest-owner communication based on sinus milieus comes from a research group from Georg August university Göttingen who has published a handbook with communication recommendations and exemplary measures to address forest owners belonging to different milieus (Aurenhammer et al., 2024).

5.2. Reflection of the study design

This study gives valuable insights into the life world and forest-related communication demands of each sinus milieu in Germany. Despite the appealing straight-forwardness and simplicity of the concept, it is important to note that milieus are constructed. In reality, milieus often overlap; individuals can belong to various milieus and switch between them; or belong to various social groups. This in mind, the milieu model from SINUS Institute is based on qualitative and quantitative data that was gathered throughout the past 50 years. Derived from this extensive data are statements that reflect the basic orientation of the different milieus. This milieu indicator has been incorporated into the survey for this study by SINUS. The milieu indicator is a tool for larger samples (in this case, $n = 2.040$) and also leads to misclassifications. In the aggregate, however, this milieu localisation is perceived in social science as reliable despite the individual border areas and transition probability between milieus (Barth, 2021). Critical reflections on the intransparency of the methodology have been already mentioned in 3.3.2.

The communication recommendations are exemplary and are meant first and foremost to illustrate the great difference in communication needs and requirements among varying target groups. This paper is not

meant to give practical communication advice, as this would fall into the study field of marketing or public relations.

Another important point for reflection is that even though the pentamodal model fits a variety of factors that contribute to communication effectiveness, it is not possible to include all possible factors. Communication as a social process is influenced by dynamic, day-to-day interpersonal and psychological factors, that are challenging to grasp. This in mind, the analytical framework is to be seen not as a definite representation of reality, but as an approach to categorize communication needs and requirements of a specific audience. Further studies could revise and refine the model.

Audience-oriented media effectiveness studies assume that media have moderate effects. Other approaches assume that media communication has little to no effects on the audience (Bonfadelli and Friemel, 2017). Research results depend on which perspective is chosen. If and under which circumstances communicative actions can influence people towards a change, is a broad research field that can be approached from different perspectives (Stiff and Mongeau, 2016). There is much more research in the field of communication science that can be of relevance for forest-related topics.

6. Conclusions

The study suggests a framework for effective communication and provides an example on how audience characteristics can be translated into communication recommendations.

The results show clearly that there is no "one size fits all" approach to communication about forest-related topics. Communication offers need to fit the needs and requirements of the specific target groups in order to be selected, understood and accepted. Once these three components of the effective communication process are fulfilled, a communication effect might occur. This paper is not meant to give recommendations on how to evoke communication-related changes – it is meant to shed light on the process that comes before the desired change. When it comes to communication, drawing upon population-representative surveys without filtering out clearly defined target groups runs danger of undermining group-specific communication demands. This article develops and employs an operationalizable framework to construct milieu-specific communication recommendations and can make a contribution to better understanding the communication p and demands of the

German population in regards to forest-specific communication using sinus milieus as a target-group grid. Further research might be needed to test and verify the given communication recommendations.

Sinus milieus as a psychometric approach to audience segmentation can be applied not only to the general public, but also to actor groups such as private forest owners. An improved communication strategy towards private forest owners might have positive effects on voluntary policy implementation (Hysing and Olsson, 2005; Tiebel et al., 2024) – and has the potential to contribute to an environmentally-friendly and sustainable future (Klöckner, 2015; Vulturius et al., 2020).

Author statement

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

CRediT authorship contribution statement

Lena Riemann: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Conceptualization.

Declaration of competing interest

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Appendix A. Annex 1: Complete survey (German)

<u>Fragebogen: Wald in Deutschland.</u>
Vielen Dank, dass Sie sich die Zeit nehmen, den Fragebogen zum Thema Wald in Deutschland auszufüllen. Das Ausfüllen der Fragen dauert etwa 12 Minuten.
Soziodemografie.

0.1 Geschlecht: Sind Sie…?
❑ Männlich
❑ Weiblich
❑ Divers
0.2 Alter: Wie alt sind Sie?
____ Jahre (offen)
0.3 Welche Schul- und Berufsausbildung haben Sie? Bitte nennen Sie uns Ihre höchste abgeschlossene Ausbildung.
❑ (noch) keine Schul- oder Berufsausbildung
❑ Hauptschule ohne abgeschlossene Lehre oder Berufsausbildung
❑ Hauptschule mit abgeschlossener Lehre oder Berufsausbildung
❑ Mittlere Reife/Realschulabschluss
❑ Fachschule, Handelsschule
❑ Abitur

Teil 1: Sie und der Wald.
Zuerst möchten wir Ihnen einige Fragen dazu stellen, welche Rolle der Wald in Ihrem Leben spielt. Wenn nicht anders angegeben, ist keine Mehrfachnennung möglich.

1. Wie würden Sie Ihren Wohnort beschreiben?

   ❏ Ländliches Umfeld (Sie wohnen in einer Kommune mit weniger als 20.000 Einwohner:innen oder in einem sehr ländlichen Gebiet einer Stadt)
   ❏ Kleinstadt (bis 20.000 Einwohner:innen)
   ❏ Mittelstadt (20.000 bis 350.000 Einwohner:innen)
   ❏ Großstadt (ab 350.000 Einwohner:innen)
   ❏ Weiß nicht

2. Wie oft gehen Sie in den Wald?

   ❏ 5 bis 7 Mal in der Woche
   ❏ 1 bis 4 Mal der Woche
   ❏ 1 bis 3 Mal im Monat
   ❏ Seltener
   ❏ Nie

3. Wenn Sie in den Wald gehen, wie gelangen Sie für gewöhnlich dort hin?

   ❏ Ich gehe zu Fuß in den Wald.
   ❏ Ich nehme das Fahrrad, um zum Wald zu gelangen.
   ❏ Ich nutze den ÖPNV (z.B. Bus, Straßenbahn) oder das Auto, um zum Wald zu gelangen.
   ❏ Ich gehe nicht in den Wald.

4. Wenn Sie im Wald sind, was machen Sie dort? (Mehrfachnennung möglich)

   ❏ Hund ausführen
   ❏ Joggen oder Nordic Walking
   ❏ Natur beobachten (z.B. Vögel beobachten, Pflanzen bestimmen)
   ❏ Naturverbundene Aktivitäten (z.B. Pilze/Wildkräuter/Holz sammeln)
   ❏ Radfahren oder Mountainbiking
   ❏ Soziale Aktivitäten (z.B. Freund:innen treffen, mit Kindern zum Spielen in den Wald gehen)
   ❏ Spazieren gehen (bis zu einer Stunde unterwegs)
   ❏ Waldarbeit und Waldpflege (z.B. Bäume fällen, Bäume pflanzen)
   ❏ Wandern (mehr als eine Stunde unterwegs)
   ❏ Anderes
   ❏ Ich bin nie im Wald.

5. Haben Sie einen Beruf, der sich mit Wald oder Holz beschäftigt oder waren/sind Sie ehrenamtlich aktiv in diesem Bereich?

   ❏ Ja
   ❏ Nein

6. Sind Sie aktives oder passives Mitglied einer Umweltschutzorganisation (z.B. NABU, BUND e.V., Greenpeace, …)?

   ❏ Ja
   ❏ Nein

7. Gibt es Menschen in Ihrem sozialen Umfeld (Freund:innen/Familie/Personen mit denen Sie sich regelmäßig austauschen), die sich beruflich oder im Ehrenamt mit Wald oder Holz beschäftigen?

   ❏ Ja
   ❏ Nein

8. Wie häufig sprechen Sie in Ihrem sozialen Umfeld (mit Freund:innen, Familie, Kolleg:innen) über den Wald?

   0 1 2 3 4 5
   Sehr selten ❏ ❏ ❏ ❏ ❏ Sehr häufig

9. Besitzen Sie Wald? (Mehrfachnennung möglich)

   ❏ Ja, ich besitze Privatwald.
   ❏ Ja, ich besitze eine Waldpatenschaft in Deutschland.
   ❏ Nein
   ❏ Nein, aber voraussichtlich werde ich zukünftig Wald besitzen (z.B. durch Erbschaft, Kauf).
   ❏ Nein, aber ich besitze eine Waldpatenschaft in anderen Ländern weltweit.

10. Welche der folgenden Themen zum Wald interessieren Sie am meisten? Bitte kreuzen Sie bis zu drei Antwortmöglichkeiten an.

   ❏ Bäume und Waldpflanzen
   ❏ Forsttechnik und Holzernte (z.B. Bodenschutz, Waldarbeit)
   ❏ Freizeitaktivitäten im Wald
   ❏ Holz und Markt (z.B. Holzhandel, Verarbeitung)
   ❏ Naturgefahrenschutz (z.B. Hochwasserschutz, Steinschlag, Felssturz)
   ❏ Naturschutz
   ❏ Klimawandel
   ❏ Pilze, Flechten, Moose
   ❏ Tiere im Wald
   ❏ Waldbau (z.B. Waldwachstum, Pflanzenanzucht)
   ❏ Waldboden
   ❏ Wälder in anderen Ländern
   ❏ Wald zur Erholung und Gesundheit
   ❏ Andere
   ❏ Nichts davon

11. Welche Bedeutung hatte der Wald für Sie in Ihrer Kindheit?

(*continued*)

0 1 2 3 4 5
Keine Bedeutung ❑ ❑ ❑ ❑ ❑ Sehr große Bedeutung

12. Welche Bedeutung hat der Wald für Sie heute?

0 1 2 3 4 5
Keine Bedeutung ❑ ❑ ❑ ❑ ❑ Sehr große Bedeutung

13. Was empfinden Sie, wenn Sie im Wald sind? (Mehrfachnennung möglich)

❑ Angst
❑ Ärger
❑ Entspannung
❑ Freiheit
❑ Liebe
❑ Sorge
❑ Stolz
❑ Zufriedenheit
❑ Langeweile
❑ Freude/Spaß
❑ Nostalgie / Kindheitserinnerungen
❑ Anderes

14. Wie sehr fühlen Sie sich dem Wald emotional verbunden?

0 1 2 3 4 5
Überhaupt nicht ❑ ❑ ❑ ❑ ❑ Sehr verbunden
verbunden

15. Wissen Sie, woher das Holz kommt, das Sie zu Hause verwenden (z.B. Böden, Feuerholz, Möbel etc.)?

❑ Überwiegend ja
❑ Überwiegend nein

16. Wie schätzen Sie den Einfluss ein, den Sie persönlich durch Ihr Konsumverhalten (z.B. den gezielten Kauf zertifizierter Holzprodukte aus nachhaltiger Forstwirtschaft) darauf haben, den Zustand der Wälder zu verbessern?

0 1 2 3 4 5
Sehr niedrig ❑ ❑ ❑ ❑ ❑ Sehr hoch

17. Wie könnten Sie zukünftig bei Kauf und Nutzung von Holz und Holzprodukten Verantwortung für einen nachhaltigeren Umgang mit Wäldern übernehmen? Ich könnte mir vorstellen… (Mehrfachnennung möglich)

❑ …überwiegend zertifizierte Holzprodukte zu kaufen.
❑ …Holzware überwiegend Second Hand zu kaufen.
❑ …darauf zu achten, dass das Holz aus der Region kommt.
❑ …meine Holzprodukte sorgfältig zu pflegen.
❑ Mir fallen noch weitere Maßnahmen ein.
❑ Ich fühle mich nicht verantwortlich

Teil 2: Wie nehmen Sie den Wald wahr?

Nun möchten wir erfahren, wie Sie den Wald wahrnehmen und wie Ihre Einstellung zum Wald ist. Wenn nicht anders angegeben, ist keine Mehrfachnennung möglich.

18. Haben Sie schon einmal bei einem Waldbesuch eine abgestorbene Waldfläche gesehen?
❑ Ja
❑ Nein

19. Was haben Sie dabei empfunden, als Sie eine abgestorbene Waldfläche gesehen haben? (Filterfrage) (Mehrfachnennung möglich)

❑ Ich habe mich bedroht gefühlt.
❑ Ich habe mich geärgert.
❑ Ich habe mir Sorgen gemacht.
❑ Ich sehe das gelassen.
❑ Ich hätte gerne mehr Informationen dazu gehabt.
❑ Ich habe mir keine weiteren Gedanken dazu gemacht.

20. Empfinden Sie Schäden im Wald als eine **persönliche** Bedrohung? (Mehrfachnennung möglich, es sei denn, es wurde „Nein, …"angegeben)

❑ Ja, weil ich auf das Holz angewiesen bin.
❑ Ja, weil ich Sorge um das Klima habe.
❑ Ja, weil wichtige ökologische Funktionen, Tier- oder Pflanzenarten verloren gehen.
❑ Ja, weil der Wald als Erholungsraum verloren geht.
❑ Ja, aus anderen Gründen.
❑ Nein, Waldschäden stellen für mich kein persönliches Risiko dar.

21. Wie sehr machen Sie sich Sorgen um die Zukunft der Wälder **weltweit**?

0 1 2 3 4 5
Keine Sorgen ❑ ❑ ❑ ❑ ❑ Große Sorgen

(*continued*)

22. Wie sehr machen Sie sich Sorgen um die Zukunft der Wälder **in Deutschland**?

0 1 2 3 4 5
Keine Sorgen ☐ ☐ ☐ ☐ ☐ ☐ Große Sorgen

23. Wie schätzen Sie den Einfluss ein, den Verbraucher:innen durch ihr Konsumverhalten auf den Zustand der Wälder haben (z.B. durch den gezielten Kauf zertifizierter Holzprodukte aus nachhaltiger Forstwirtschaft)?

0 1 2 3 4 5
Gar keinen Einfluss ☐ ☐ ☐ ☐ ☐ ☐ Sehr starker Einfluss

24. Diskutieren Sie über das Thema Wald? (Mehrfachnennung möglich, es sei denn, es wurde „Nein, …"angegeben)

☐ Ja, hin und wieder mit Familie oder Bekannten.
☐ Ja, ich habe schon an öffentlichen Diskussionen zum Thema Wald teilgenommen (z.B. Bürgerbeteiligung).
☐ Ja, bei jeder Gelegenheit.
☐ Eher selten.
☐ Nie.

25. Haben Sie schon einmal aus eigenem Impuls im Wald Müll gesammelt oder andere waldpflegende Maßnahmen ergriffen?

☐ Ja
☐ Nein

26. Im Folgenden handelt es sich um mögliche Aussagen verschiedener Personen oder Gruppen zum Thema Wald. Kreuzen Sie an, inwiefern Sie zustimmen.

	stimme überhaupt nicht zu	stimme eher nicht zu	stimme eher zu	stimme voll zu	Weiß nicht
Aus Sicht des Klimaschutzes wäre es nicht hilfreich, die deutschen Wälder sich selbst zu überlassen.	☐	☐	☐	☐	☐
Bauen mit Holz ist die effizienteste Methode, um CO_2-Emissionen zu vermeiden.	☐	☐	☐	☐	☐
Der Klimawandel geschieht zu schnell, sodass natürliche Anpassungsprozesse im Wald nicht Schritt halten können.	☐	☐	☐	☐	☐
Der ökologische Zustand unserer Wälder hat sich in den letzten Jahren positiv entwickelt.	☐	☐	☐	☐	☐
Der Wald erfüllt wichtige ökologische Funktionen, die einen hohen Wert für das Gemeinwohl haben. Waldbesitzer:innen sollten für diese Gemeinwohlleistungen finanziell honoriert werden.	☐	☐	☐	☐	☐
Der Wald muss durch Bewirtschaftung (z.B. Baumpflanzungen, Fällen kranker oder alter Bäume) aktiv an den Klimawandel angepasst werden.	☐	☐	☐	☐	☐
Es ist gut möglich, dass der Wald verschiedene Funktionen gleichzeitig erfüllt (z.B. Holzproduktion, Lebensraum für Tiere und Pflanzen, Erholungsgebiet).	☐	☐	☐	☐	☐
Die aktuelle, intensive Bewirtschaftung (z.B. intensiver Anbau schnell wachsender Fichtenanbau da diese Bäume schnell wachsen und Holz liefern) der deutschen Wälder ist nicht nachhaltig.	☐	☐	☐	☐	☐
Die Klimakrise allein ist nicht schuld am Waldsterben. Fehler in der Waldbewirtschaftung und fehlendes Eingreifen durch die Politik begünstigen die Schäden im Wald massiv.	☐	☐	☐	☐	☐
Die Rechte der Natur müssen allzu oft hinter den Interessen der Mächtigen zurückstehen – das gilt auf für den Wald.	☐	☐	☐	☐	☐
Jagd ist Tradition, die bewahrt werden muss.	☐	☐	☐	☐	☐
Politische Entscheidungen dürfen nicht dazu führen, dass in Deutschland weniger vom kostbaren Rohstoff Holz verfügbar ist.	☐	☐	☐	☐	☐
Das in deutschen Wäldern vorhandene Holz reicht aus, um den nationalen Bedarf an Brennholz zu decken.	☐	☐	☐	☐	☐
Stürme, massive Hitze und ausgelaugte Böden gefährden die Widerstandskraft der deutschen Wälder. Das macht sie anfällig für Schädlinge.	☐	☐	☐	☐	☐
Um gewinnbringend zum Thema Wald zu diskutieren, ist es wichtig, eine Balance zwischen emotionalen und rationalen Botschaften zu finden.	☐	☐	☐	☐	☐
Die Nutzung von Holz aus regionalen Wäldern fördert die regionale Wirtschaft.	☐	☐	☐	☐	☐
Wälder reagieren auf menschengemachte Veränderungen oft schneller und anders als im Rahmen natürlicher	☐	☐	☐	☐	☐

der Wald in Ruhe gelassen wird, wächst er ganz natürlich nach, und eine ökologisch wertvolle Artenvielfalt stellt sich von alleine ein.

Teil 3: Information zum Thema Wald.
Zuletzt möchten wir herausfinden, ob - und wenn ja, über welche Wege - Sie sich über den Wald informieren.

27. Wie gut fühlen Sie sich über den deutschen Wald informiert?

  0 1 2 3 4 5

Gar nicht informiert ☐ ☐ ☐ ☐ ☐ Sehr gut informiert

28. Haben Sie schon einmal gezielt nach Informationen zum Thema Wald gesucht?

☐ Ja
☐ Nein

29. Wenn ja, wo haben Sie in der Vergangenheit nach diesen Informationen gesucht? (Mehrfachnennung möglich, Filterfrage)

☐ Bücher, Buchhandlungen, Bibliotheken
☐ Fernsehen - öffentlich-rechtliche Sender
☐ Facebook
☐ Fachzeitschriften (z.B. AFZ, Der Wald etc.)
☐ Fernsehen - private Sender
☐ Informationsveranstaltungen
☐ Instagram
☐ Mastodon
☐ Persönlicher Kontakt zum/zur Förster:in
☐ Podcast
☐ Radio
☐ Regionale Tageszeitung - Print
☐ Regionale Tageszeitung - Online
☐ Reportagemagazine (z.B. GEO)
☐ Suchmaschinen (z.B. Google, Ecosia)
☐ Telegram
☐ Tiktok
☐ Twitter
☐ Überregionale Zeitung (z.B. Zeit, FAZ, SZ) - Print
☐ Überregionale Zeitung (z.B. Zeit, FAZ, SZ) - Online
☐ Websites im Internet
☐ Wöchentliches Nachrichtenmagazin (z.B. Spiegel, Stern) - Print
☐ Wöchentliches Nachrichtenmagazin (z.B. Spiegel, Stern) - Online
☐ Youtube
☐ Anderes

30. Über welchen Kanal würden Sie gerne Informationen über den Wald erhalten? (Mehrfachnennung möglich)

☐ Bücher, Buchhandlungen, Bibliotheken
☐ Fernsehen - öffentlich-rechtliche Sender
☐ Facebook
☐ Fachzeitschriften (z.B. AFZ, Der Wald etc.)
☐ Fernsehen - private Sender
☐ Informationsveranstaltungen
☐ Instagram
☐ Mastodon
☐ Persönlicher Kontakt zum/zur Förster:in
☐ Podcast
☐ Radio
☐ Regionale Tageszeitung - Print
☐ Regionale Tageszeitung - Online
☐ Reportagemagazine (z.B. GEO)
☐ Suchmaschinen (z.B. Google, Ecosia)
☐ Telegram
☐ Tiktok
☐ Twitter
☐ Überregionale Zeitung (z.B. Zeit, FAZ, SZ) - Print
☐ Überregionale Zeitung (z.B. Zeit, FAZ, SZ) - Online
☐ Websites im Internet
☐ Wöchentliches Nachrichtenmagazin (z.B. Spiegel, Stern) - Print
☐ Wöchentliches Nachrichtenmagazin (z.B. Spiegel, Stern) - Online
☐ Youtube
☐ Anderes
☐ Ich möchte keine Informationen.

31. Für wie glaubwürdig halten Sie die folgenden Personen oder Institutionen, wenn es um Informationen über den Wald **in Deutschland** geht?

	sehr unglaub-würdig	eher unglaub-würdig	eher glaub-würdig	sehr glaub-würdig	kenne ich nicht
BUND e.V.	☐	☐	☐	☐	☐
Forschungsinstitute und Universitäten	☐	☐	☐	☐	☐
Forstamt/lokale:r Förster:in	☐	☐	☐	☐	☐
Forstverbände	☐	☐	☐	☐	☐
Freund:innen/Familie	☐	☐	☐	☐	☐
Greenpeace	☐	☐	☐	☐	☐
Influencer:innen auf Social Media	☐	☐	☐	☐	☐
NABU	☐	☐	☐	☐	☐
Offizielle Seiten der Bundesregierung oder der Bundesländer (z.B. Ministerien)	☐	☐	☐	☐	☐
Parteien/Politiker:innen	☐	☐	☐	☐	☐

32. Was meinen Sie, welche dieser Personen oder Institutionen setzen sich wirklich für das Wohlergehen des Waldes ein? (Mehrfachnennung möglich)

❑ Bundesregierung oder Bundesländer (z.B. Ministerien)
❑ BUND e.V.
❑ Europäische Union
❑ Forschungsinstitute, Universitäten
❑ Forstamt/lokale/r Förster:in
❑ Freund:innen/Familie
❑ Greenpeace
❑ Influencer:innen auf Social Media
❑ NABU
❑ Offizielle Seiten der Bundesregierung (z.B. BMEL, BMU, UBA)
❑ Parteien/Politiker:innen
❑ Unternehmen aus der Holzindustrie
❑ WWF
❑ Zertifizierungssiegel (z.B. FSC, PEFC)
❑ keine davon

33. Glauben Sie, dass Sie Informationen zum Thema Wald nach dem Ausfüllen dieses Fragebogens bewusster wahrnehmen?

❑ Ja
❑ Nein

Soziodemografie.

0.4 In Welchem Bundesland leben Sie?
❑ Baden-Württemberg
❑ Bayern
❑ Berlin
❑ Brandenburg
❑ Bremen
❑ Hamburg
❑ Hessen
❑ Mecklenburg-Vorpommern
❑ Niedersachsen
❑ Nordrhein-Westfalen
❑ Rheinland-Pfalz
❑ Saarland
❑ Sachsen
❑ Sachsen-Anhalt
❑ Schleswig-Holstein
❑ Thüringen

0.5 Wenn Sie einmal alles zusammenrechnen: Wie hoch ist das monatliche Netto-Einkommen Ihres Haushaltes insgesamt?
  Gemeint ist die Summe, die sich ergibt aus Lohn, Gehalt, Einkommen aus selbstständiger Tätigkeit, Rente oder Pension, jeweils nach Abzug der Steuern und Sozialversicherungsbeiträge aller in Ihrem Haushalt lebenden Personen.

❑ Bis unter 1.000€
❑ 1.000 bis unter 2.000€
❑ 2.000 bis unter 3.000€
❑ 3.000 bis unter 4.000€
❑ 4.000 bis unter 5.000€
❑ 5.000€ und mehr
❑ Keine Angabe

Vielen Dank, dass Sie sich Zeit genommen haben.

Annex II

Survey questions and answer possibilities relevant for the analysis (English).

Question no. (F)	Question description	Answer no. (r)	Answer description
10	Which of the following forest-related topics are you most interested in? Please tick up to three possible answers.	1	Trees and plants in the forest
		2	Forestry technology and timber harvesting (e.g. soil protection, forestry work)
		3	Leisure activities in the forest
		4	Wood and the market (e.g. timber trade, processing)
		5	Protection against natural hazards (e.g. flood protection, rockfall, rockslides)
		6	Nature conservation
		7	Climate change
		8	Fungi, lichens, mosses
		9	Animals in the forest
		10	Silviculture (e.g. forest growth, plant cultivation)
		11	Forest soil
		12	Forests in other countries
		13	Forests for recreation and health
		14	Other
		15	None of the above
11	Which meaning did the forest have for you as a child?	0	No meaning
		1	
		2	
		3	
		4	
		5	Very high meaning
12	Which meaning does the forest have for you today?	0	No meaning
		1	
		2	
		3	
		4	
		5	Very high meaning
14	How emotionally attached do you feel to the forest?	0	Not attached
		1	
		2	
		3	
		4	
		5	Strongly emotionally attached
15	Do you know where the wood you use at home comes from (e.g. floors, firewood, furniture, etc.)?	1	Mostly yes
		2	Mostly no
16	How do you rate the influence you personally have on improving the condition of forests through your consumer behavior (e.g. the targeted purchase of certified wood products from sustainable forestry)?	0	Very low
		1	
		2	
		3	
		4	
		5	Very high
17	How could you take responsibility for a more sustainable use of forests when buying and using wood and wood products in the future? I could imagine… (multiple answers possible)	1	…to buy mainly certified wood products.
		2	…to buy mainly second-hand wood products.
		3	…to make sure that the wood comes from the region.
		4	…to look after my wooden products carefully.
		5	I can think of other measures.
		6	I do not feel responsible.
20	Do you consider damage to the forest to be a personal threat? (Multiple answers possible, unless "No, …" was indicated)	1	Yes, because I am dependent on the wood.
		2	Yes, because I am concerned about the climate.
		3	Yes, because important ecological functions, animal or plant species are being lost.
		4	Yes, because the forest is being lost as a recreational area.
		5	Yes, for other reasons.
		6	No, forest damage is not a personal risk for me.
29	If yes [if you indicated in the previous question that you have already searched specifically for information on the topic of forests], where have you searched for this information in the past? (multiple answers possible, filter question)	1	Books, bookshops, libraries
		2	Television - public broadcasters
		3	Facebook
		4	Specific journals (e.g. AFZ, Der Wald etc.)
		5	Television - private broadcasters
		6	Information events
		7	Instagram
		8	Mastodon
		9	Personal contact with the forester
		10	Podcast
		11	Radio
		12	Regional daily newspaper - print
		13	Regional daily newspaper - online
		14	Reportage magazines (e.g. GEO)
		15	Search engines (e.g. Google, Ecosia)
		16	Telegram
		17	Tiktok
		18	Twitter
		19	National newspaper (e.g. Zeit, FAZ, SZ) - print
		20	National newspaper (e.g. Zeit, FAZ, SZ) - online

Annex II (*continued*)

Question no. (F)	Question description	Answer no. (r)	Answer description
		21	Websites on the internet
		22	Weekly news magazine (e.g. Spiegel, Stern) - print
		23	Weekly news magazine (e.g. Spiegel, Stern) - online
		24	Youtube
		25	Other
30	Which channel would you like to use to receive information about the forest? (multiple answers possible)	1	Books, bookshops, libraries
		2	Television - public broadcasters
		3	Facebook
		4	Specific journals (e.g. AFZ, Der Wald etc.)
		5	Television - private broadcasters
		6	Information events
		7	Instagram
		8	Mastodon
		9	Personal contact with the forester
		10	Podcast
		11	Radio
		12	Regional daily newspaper - print
		13	Regional daily newspaper - online
		14	Reportage magazines (e.g. GEO)
		15	Search engines (e.g. Google, Ecosia)
		16	Telegram
		17	Tiktok
		18	Twitter
		19	National newspaper (e.g. Zeit, FAZ, SZ) - print
		20	National newspaper (e.g. Zeit, FAZ, SZ) - online
		21	Websites on the internet
		22	Weekly news magazine (e.g. Spiegel, Stern) - print
		23	Weekly news magazine (e.g. Spiegel, Stern) - online
		24	Youtube
		25	Other
31	How credible do you consider the following people or institutions when it comes to information about forests in Germany? (0 = don't know, 5 = highly credible)	1 (1–5)	BUND e.V.
		2 (1–5)	Research institutes, universities
		3 (1–5)	Forestry office/local forester
		4 (1–5)	Forestry associations
		5 (1–5)	Friends/family
		6 (1–5)	Greenpeace
		7 (1–5)	Influencers on social media
		8 (1–5)	NABU
		9 (1–5)	Official pages of the federal government (e.g. BMEL, BMU, UBA)
		10 (1–5)	Political parties/politicians
		11 (1–5)	WWF
		12 (1–5)	Certification seals (e.g. FSC, PEFC)
		13 (1–5)	None of these
32	Which of these people or institutions do you think are really committed to the well-being of the forest? (multiple answers possible)	1	Federal government or federal states (e.g. ministries)
		2	BUND e.V.
		3	European Union
		4	Research institutes, universities
		5	Forestry office/local forester
		6	Friends/family
		7	Greenpeace
		8	Influencers on social media
		9	NABU
		10	Branches of the federal government (e.g. BMEL, BMU, UBA)
		11	Political parties/politicians
		12	Companies from the timber industry
		13	WWF
		14	Certification seals (e.g. FSC, PEFC)
		15	None of these

Annex III
Documentation of the survey analysis.

Variable	Expression	Survey items (F = question, r = answer)	Description
Preferred type of medium	TV	F29r2 + F29r5 + F30r2 + F30r5	Already use and desire information via TV
	Radio	F29r11 + F30r11	Already use and desire more information via radio
	Facebook	29r3 + 30r3	Already use and desire more information via Facebook
	Youtube	29r24 + 30r24	Already use and desire more information via Youtube
	Messenger	29r8 + 29r16 + 30r8 + 30r16	Already use and desire more information via Messenger (Telegram, Mastodon)
	Instagram	29r7 + 30r7	Already use and desire more information via Instagram

Annex III (*continued*)

Variable	Expression	Survey items (F = question, r = answer)	Description
	Personal contact	29r6 + 29r9 + 30r6 + 30r9	Already use and desire more information via personal contact (direct contact tot he forester, in-person workshops)
Estimated trustworthiness of actors	Politik	31r9 + 31r10 + 32r1 + 32r10 + 32r11	Believed to be credible when it comes to the well-being of the forest and believe that they are really committed to the well-being of the forest: Politicians, political parties, federal government, federal states
	NGOs	31r1 + 31r6 + 31r8 + 31r12 + 32r2 + 32r7 + 32r9 + 32r13	Believed to be credible when it comes to the well-being of the forest + believe that they are really committed to the well-being of the forest: NGOs (Greenpeace, BUND, NABU, WWF)
	Forschung	31r2 + 32r4	Believed to be credible when it comes to the well-being of the forest + believe that they are really committed to the well-being of the forest: Science
	Influencer	31r7 + 32r8	Believed to be credible when it comes to the well-being of the forest + believe that they are really committed to the well-being of the forest: Influencers on social media
	Forstverbände & lokale/r Förster/in	31r3 + 32r5	Believed to be credible when it comes to the well-being of the forest + believe that they are really committed to the well-being of the forest: Local forester and forestry associations
	Unternehmen aus der Holzindustrie	31r11 + 32r12	Believed to be credible when it comes to the well-being of the forest + believe that they are really committed to the well-being of the forest: Wood industry
	EU	32r3	Believed to be credible when it comes to the well-being of the forest + believe that they are really committed to the well-being of the forest: EU
Forest-related topics of interest	Ecological-critical	10r6 + 10r7	Are interested in the topics: Nature conservation, climate change
	Ecological-biological	10r1 + 10r8 + 10r9 + 10r11	Are interested in the topics: Trees and forest plants, fungi, lichens, mosses, animals, forest soil
	Technical-pragmatic	10r2 + 10r4 + 10r5 + 10r10	Are interested in the topics: Forestry technology and timber harvesting, timber market, natural hazard protection, silviculture
ISelf-efficacy	High self-efficacy	F15 + F16 + 17r1 + 17r2 + 17r3 + 17r4 + 17r5	Know where the wood used at home comes from + Highly value their influence on the well-being of the forest through consumption decisions + Take measures or are willing to make conscious consumption decisions and/or consciously handle wooden furniture
Emotional connection to forests	High emotional connection to forests	F11 + F12 + F14	Have a strong emotional attachment to the forest in childhood and as adults, and report feeling emotionally connected to the forest
Affectedness of forest damage	High affectedness of forest damage	20r1 + 20r2 + 20r3 + 20r4	State that they are affected by forest damage (for whatever reason)

Characteristics of survey respondent's and correspondent communication component. Source: Own representation.

Data availability

Data will be made available on request.

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