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Forest Practices & Climate Change

MINIPAPER 1: Effective communication for Mitigation of Climate Change and Adaptation to its Impacts
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Authors

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1. Introduction

This mini paper is one of a series of mini papers produced by the EIP-AGRI Focus Group 24 on *New forest practices and tools for adaptation and mitigation of climate change*. Communication for mitigation of climate change and adaptation to its impacts reflects one of the key questions identified in a starting paper elaborating on the scope of this Focus Group¹ and was promoted as an important topic at the first meeting of the Focus Group held in Ljubljana, Slovenia, 20-21 June 2017.

The aim of this mini paper is to provide an overview of current approaches to raising awareness on climate change for mitigation and adaptation in relation to forest management and practices, and to propose new and innovative ways to improve the effectiveness of climate change communications. The target audience is forest owners, other forest professionals and the general public.

2. Challenge and background

Climate change affects everyone and the emissions of greenhouse gases into the atmosphere in one place add to those from all other places on earth. To mitigate human induced climate change as well as adapt to its impacts, **we all need to change our decision-making**. In the following, we refer to a decision-making agent as anyone making a decision that has bearing on climate change and forests.

Adapting to climate change means avoiding harm and/or seizing opportunity from climate change and is in the direct interest of the decision-making agent, for example a private forest owner. A study made among private forest owners in a latitudinal range across Europe shows that **far from all private forest owners in Europe have taken measures to adapt to climate change** (Blennow et al. 2012) (Figure 1).

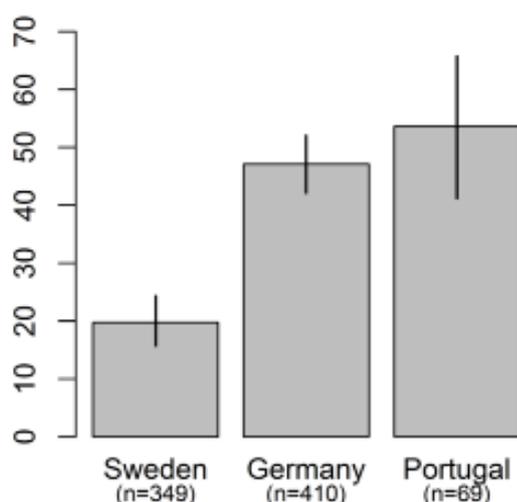


Figure 1. Proportions in percent of private forest owners in Sweden, Germany and Portugal who stated that they had adapted their forest management practices to climate change in a survey. Bars denote 95% confidence intervals. Reproduced from Blennow et al. (2012).

Mitigation of climate change is often assumed to be more distant from the individual decision-making agent and instigating less action than the need for adaptation. The Paris agreement, regulating emissions of

¹ The starting paper can be downloaded through the Focus Group webpage <https://ec.europa.eu/eip/agriculture/en/content/focus-groups/new-forest-practices-and-tools-adaptation-and>

greenhouse gases, has been signed by 175 countries. Still the everyday decisions in relation to forests need to change for the policy, and indeed mitigation of climate change, to be effective.

Policies based on monetary compensation have sometimes been proposed as a means to reach societal climate change mitigation goals. Thereby those whose actions need to change would have the opportunity to earn money by taking measures that are beneficial to reach the climate change mitigation goals of the society. While this can help the society to deal with climate change the decision-making agent accepting monetary compensation would not necessarily be motivated by climate change mitigation; (s)he might be interested in earning money, irrespective of the changing climate.

Information campaigns on climate change mitigation and adaptation directed towards forest owners and forest managers have been launched in many countries across Europe, often with a successful reach (Boxes 1-4). We know little about their effectiveness, however, because not always they have been evaluated. The need to mitigate climate change is urgent and far from all private forest owners have taken measures to adapt (Figure 1). This shows that **there is a need for making communications on climate change and forests more effective.**

Box 1. Aiming to communicate the need for adaptation of forest management to Greek stakeholders and Forest Services personnel, the EU LIFE+-funded project *Adaptation of forest management to climate change in Greece* disseminated a range of information materials communicated through seminars, leaflets, in media and on the web (Kakourous et al. 2014). Guidelines for the adaptation of forest management to climate change in Greece were published in 2,000 copies (Gr & En) and as an electronic version (www.life-adaptfor.gr) that remains available also after the project has finished.



How then can the effectiveness of environmental communications in general and communications on climate change and forests in particular be improved (see e.g. SCU 2014)? Can forest owners be motivated to take measures to adapt to the impacts of climate change but also to contribute to climate change mitigation? What pieces of information in a two-way communication process are needed for different groups of individuals to be effective? When should the communications take place and in what format? **How can we better understand which methods of communication lever adequate action and which don't?**

3. Communication

It is common to **explain decisions by beliefs and values** (e.g. Steele and Stefánsson 2016). The bulk of the climate change adaptation literature, however, builds on the assumption that structures in society such as organisations and economic welfare are the main determinants of the capacity to adapt to climate change (e.g. Smit and Wandel 2006, Acosta et al. 2014). Based on this assumption and that the scientific literature reports climate change to have impacts in all of Europe (e.g. Kovats et al. 2014), more adaptation to climate change in forestry would be expected to take place in northern Europe than in southern Europe were the intensity of forest management in general is lower. However, a study made among private forest owners in a latitudinal range across Europe reported that adaptation to climate change does take place in southern Europe (Figure 1) (Blennow et al. 2012). The study, furthermore, reported that a model of adaptation to climate change based on two personal variables had significantly higher predictive power than several variables related to structural information. The two variables strength of belief in local effects of climate change and strength of belief in having perceived climate change almost completely explained measures taken to adapt

forest management to climate change. The authors concluded that **when forest owners believe in, and see the effects of climate change they are more likely to take measures to adapt to climate change**. This is hardly surprising; why would anyone take measures to adapt to climate change if one does not perceive a risk (or opportunity) from climate change (Blennow and Persson 2009)? Indeed, studies suggest that adaptation decisions depend on the decision-making agent's risk perception (e.g. Slovic 1999). Hence, **knowledge of risk perception and its drivers is important for designing effective communications**.

What then drives risk perception? That belief in the local effects of climate change and having perceived (the effects of) climate change are important drivers of decision-making in forestry potentially indicates that these factors constitute important components of the risk perception of private forest owners (Blennow and Persson 2009; Blennow et al. 2012; Blennow et al. 2014a). Along this line of reasoning, the perception of climate change induced risk was found less strong among Swedish private forest owners than among other members of the Swedish public (Blennow and Persson 2009) and much less strong than among private forest owners in Germany and Portugal (Blennow et al. 2012). In the UK 52% of all respondents to a survey reported that they believe in the impacts of climate change on the forests in the UK (Hemery et al. 2015).

Box 2. Funded by the EU Rural Development Funds the Swedish Forest Agency has conducted extensive extension services in relation to climate change during 2009-2015 (Eriksson et al. 2017). More than 25,000 Swedish private forest owners and forest professionals have participated in educational activities or received advice in relation to climate change and forests. Leaflets, books, films, an internet-based course, and a decision-support tool for different forestry objectives and parts of Sweden (<http://skogsklimatrad.skogsstyrelsen.se/>) have been made available (Eriksson et al. 2017).

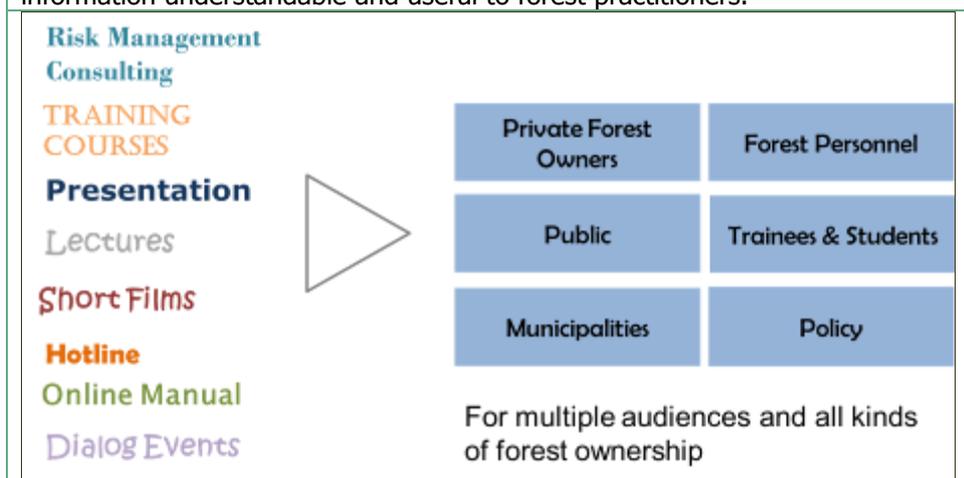


Research has shown that **people may use various decision strategies when making decisions, e.g. depending on the available information, context and how important the decision is perceived to be** (e.g. Payne et al. 1993). This includes different ways to simplify decision-making. Potentially the simplifications or 'rules of thumb' applied help to explain differences in climate action such as with respect to mitigation (distant) and adaptation (close). When adapted to the environment in which they are used, 'rules of thumb' can be effective towards the goals. Bias from rational decision-making, such as confirmation of ones preconceptions, can also occur (e.g. Nickerson 1998). For example, settlers from England in the colonial period and arriving in North America assumed that climate was a function of latitude (Kupperman 1982 in Weber 2010). Hence, they assumed Newfoundland (which is south of London) to have a milder climate than London. Even after repeatedly having experienced devastating consequences from far lower temperature, they maintained their expectations and generated complex explanations to what they thought were climate anomalies. In other situations, beliefs are known to be affected by the local situation. For example, Swedish private forest owners believed more strongly in global warming in 2004 than after the cold winter in 2010 (Blennow et al. 2012). Strong access to information and weak social ties has, furthermore, been proposed to increase the ability to facilitate action that differs from established social norms (Dowd et al. 2014). This implies transformational adaptation to be linked to people that fit this description.

That adaptation to climate change among forest owners appears strongly driven by beliefs indicates that forest owners base their adaptation decisions on causal relationships that they hold to be true. But, what if beliefs of climate change correlate strongly with something else? The role of values has received a lot of

attention among climate change adaptation researchers recently. For instance, the cultural cognition thesis (CCT) stipulates that values polarize perceptions of risk (Kahan et al. 2012). Hence according to CCT, people with the highest degrees of scientific literacy and numeracy are not the most concerned about climate change. In a study on Swedish and German forest owners, however, university education trumps value profiles when it comes to explaining adaptation decisions (Blennow et al. 2016).

Box 3. The German Forest Climate Fund project KoNeKKTiW **KoNeKKTiW**² (www.waldwissen.net/krisenmanagement) aims at making scientific information understandable and useful to forest practitioners.



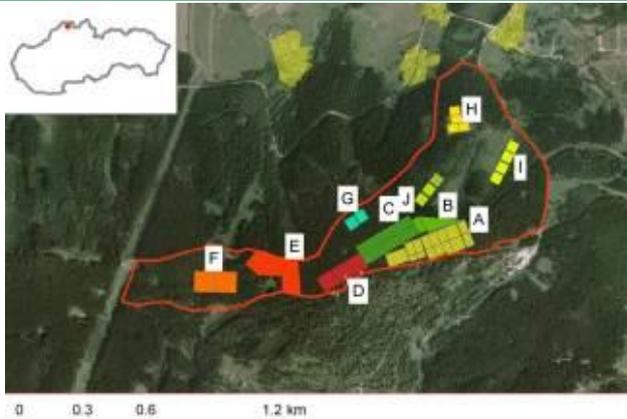
As we have seen, not only belief in the local effects of climate change but also the belief in having perceived climate change is important for instigating adaptation actions in forestry (Blennow et al. 2012). There is a strong tradition in European forestry and nature conservation of localising communication activities in the outdoors (see Boxes 2 to 4). Excursions provide those with a desk job an opportunity to visit the forest and can provide opportunity for personal experience relevant to what is being communicated. Personal experience is more likely to capture the attention of the participant and the impact on learning is often more lasting compared to learning by statistical information (e.g. Erev and Barron 2005). The crux here is that, to be effective in relation to responding to climate change, the person in question needs to associate what they experience with climate change (cf. Blennow et al. 2012). Based on their results, Blennow et al. (2012) suggested that collecting and sharing evidence of climate change and its effects could provide an efficient means to increase peoples' perceptions of having experienced climate change, at least among those who believe in the local effects of climate change. The results also show that **the decision-making agents' understanding and perception of the effects on the local environment needs to be integrated with evidence-based communications for communications to be effective.**

We have learned that **communication is crucial for raising awareness about climate change among decision-making agents in forestry.** A **substantial knowledge gap** between science and individual decision-making agents in European forestry **has been identified** (e.g. Blennow et al. 2012). Hence, **we have identified a need for innovation to make science-policy-practice communications more effective.**

Box 4. In cooperation between research and forestry practice, the Slovakian research and consultancy institute *National Forest Centre* together with the *State Forest Enterprise* have established in 2010 a research

² Funded by the German Federal Ministry of Food and Agriculture and the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety by a resolution of the German Bundestag, 2015/2016.

demonstration object (RDO) in Kysuce, Slovakia. Its core mission is information transfer and this RDO has been used in national and international forestry research projects. In particular, new procedures and technology for forest management are introduced and tested here and the effectiveness and economic efficiency of the undertaken measures have been monitored. The results obtained have been communicated at excursions in the field with forestry managers and has been published as education materials.

	A	Provenance research of domestic and introduced forestry tree species
	B	Use of vegetative reproductive material
	C	New practices of artificial regeneration
	D	Testing of different product for soil improving
	E	Non whole-area planting
	F	Experimental planting of fast-growing tree species, seed-production fir stand
	G	Non whole-area under planting of parent stand
	H	Different methods of advance growth tending
	I	Different methods of young stand tending
	J	Different methods of small-pole stage stand tending

4. Innovation for adequate communications

Which methods of communication, then, lever adequate climate change action? An approach to communications whereby experts help decision-making agents to make better decisions judged by the **decision making agents' own goals** is likely to be more effective than information aiming for someone else's goals (e.g. Fischhoff 2013). It could even be argued that to be sustainable a democratic society depends on its ability to create these conditions.

The success of a decision depends on the information on which it is based. A recent review of the scientific literature emphasizes the important role of communication for sustainable development in relation to forests but the review reports only few studies on how to communicate effectively on this specific topic (Lähtinen et al. 2017). Nevertheless, research on the topic of communication is highly active, not the least in relation to climate change mitigation and adaptation (cf. Persson et al. 2015; Weber 2015; Moser 2016). General standards for effective climate change communication have been proposed. These include to define the purpose and scope of the communication, paying attention to the audience, framing, messages, messengers, and modes and channels of communication (see e.g. Moser 2010). Such standards are often guiding education efforts, such as forest education programmes (e.g. <http://forestpedagogics.eu/portal/>). Still, understanding and perceptions of climate change, its impacts and what works in the local environment often have not been adequately taken into consideration in relation to climate change communications (Blennow et al. 2012).

Sometimes communications have been tailored in a way as to not threaten any group's values (see Kahan et al. 2012; Lähtinen et al. 2017). Such communication approaches neglects for example that updating of beliefs can affect values and they risk leading to misinformation and disingenuousness that would go against scientific virtues such as openness, prudence, reliability, trustworthiness and truthfulness (see Persson et al. 2015). Arguably applying such an approach would lead to distrust in science.

Hence, to meet the innovation need identified, an approach to **two-way communication** that aims at improving the experts' communication for adequate climate change action by providing **evidence-based standards** for the **adequacy of communications** is proposed. By adequate communications is meant that they **contain the information the users need, can access and comprehend** (see Fischhoff et al. 2011). By evidence-based is meant here that it **builds on factual knowledge but also what information is needed by the agent for a certain kind of decision**. Also evidence on its effectiveness can be provided.

To meet the requirements, the approach to effective communications proposed makes use of recent progress in behavioural decision research (e.g. Fischhoff 2010) and the emerging and much promising research field of "Science and Proven Experience" (www.vbe.se) (Blennow et al. 2012; Persson et al. 2015; Wahlberg and Persson 2017). The approach proposed **requires new knowledge on the decision-making agents' understanding and perception of the effects on, and what works in, the local environment** to produce standards for the adequacy of communications.

The approach proposed is different from using pre-defined groups, such as those based on socio-demographic groups alone, and assumed information needs. Further, while useful for generating ideas, standard collective methods such as focus groups have not always had the expected outcomes when it comes to eliciting individuals' beliefs and desires (e.g. Merton 1987; Scott 2011). Hence, the data required for the approach to effective communications proposed will have to be gathered through **interviews and surveys on an individual basis**. By analysing the data collected groups of individuals with similar information needs can be identified. This includes identification of the decision strategies applied (cf. Payne et al. 1993).

Based on the results from analysing the data collected in the approach proposed here, standards for the adequacy of communications, i.e. communications that the receiver needs, can access and comprehend, can be designed. The standards help to provide the information that **meets the needs of different groups identified**. Results already generated (Blennow et al. 2012) suggest that the opportunity to experience the outcomes of new procedures and technology for forest management under climate change (see Box 4), can be an efficient means by which to communicate measures for climate change adaptation, at least for those who believe in the local effects of climate change.

The approach to communication proposed also can make use of pedagogical tools such as new visualization methods to provide means for making complex subject matter such as climate change more comprehensible in communications (for a recent overview see Grainger et al. 2016). It complements monetary compensation policies and also provides an alternative to those situations when monetary compensation will not "do the trick" (see e.g. Blennow et al. 2014b; Lindner 2017).

The standards developed are meant to be used by other communicators such as authorities, extension services and scientists to **build adaptive and mitigation capacity among forest owners and other decision-making agents that helps instigate adequate climate action in relation to forests**. The new knowledge generated when applying the approach proposed can also provide information on how to design effective policies, other than communications.

Communications based on the standards developed

- **integrate knowledge on how the local environment is affected by climate change and evidence based communication,**
- **build climate adaptation and mitigation capacity of the decision-making agents,**
- **provide flexible effects on decision making which is crucial for successful decision-making in a changing world,**
- **help to design effective climate change policies other than communications and**
- **contribute to sustainable and democratic development of the society.**

5. Conclusions

To mitigate human induced climate change as well as adapt to its impacts, people need to change their decision-making. A substantial **knowledge gap between science and individual decision-making agents** in European forestry has been **identified** with respect to **forests and climate change**. To help build adaptive and mitigation capacity with respect to climate change in European forestry, **innovation is needed to make science-policy-practice communications more effective**.

The approach to communication proposed here aims to provide evidence-based standards for the adequacy of communications. By adequate communications is meant that they contain the information the users need, can access and comprehend. Because the success of decisions depends on the information on which they are based, **the integration of robust knowledge about what works in the local environment and evidence-based communication provides opportunities to instigate adequate climate action.**

Communicators such as authorities, extension services and scientists can use the resulting new standards for the adequacy of communications **to bridge the knowledge gaps identified between science, policy and practice.** Providing decision-making agents information on climate change that they can access and comprehend, builds adaptive and mitigation capacity and **provides new opportunities for policymakers and stakeholders to deal with climate change in the society more effectively and with flexibility.**

6. Research needs

To bridge the knowledge gaps identified between science, policy and practice, the key tasks for research are to

- 1. Develop standards for the adequacy of communications for groups of individuals identified for use by communicators such as authorities, extension services and scientists. This requires**
 - **new knowledge on individual stakeholders' understanding of the effects on, and what works in, the local environment and**
 - **new insights into how to integrate this knowledge with evidence-based communications that stakeholders can access and comprehend.**
- 2. Provide local examples of standards for the adequacy of communications for groups of individuals identified.**
- 3. Develop methods for evaluation of communication efficacy.**

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