Mistra Environmental Communication

Reframing Communication for Sustainability

MISTRA ENVIRONMENTAL COMMUNICATION - REFRAMING COMMUNICATION FOR SUSTAINABILITY

Programme Host: Swedish University of Agricultural Sciences (SLU), Division of Environmental Communication (EC-SLU), Uppsala

Programme Directors: Associate Professor Sofie Joosse (EC-SLU) and Dr Eva Friman, Uppsala University

Contact person: Sofie Joosse, EC-SLU, PO Box 7012, 750 07 Uppsala, Sweden, +46(0)72-0858158, sofie.joosse@slu.se

Summary

Mistra Environmental Communication's (M-EC) overarching aim is to reframe environmental communication, i.e., to mainstream a broader, more nuanced and more advanced understanding of environmental communication in research, policy and practice, such that it can effectively foster sustainability transformations. M-EC draws on a transdisciplinary approach that involves researchers from a range of disciplinary backgrounds as well as partners representing crucial actors in wider society to harness existing thinking, co-develop new insights and approaches and translate these into communication practice.

The vision of M-EC is that by 2035 transformative environmental communication will underpin Sweden's transition to a more sustainable society, acting as an internationally recognised model of critical and change-oriented environmental communication that is socially legitimised and inclusive. This is the result of a strong collaborative approach, scaling out from M-EC from the regional to national and international levels, which in 2028 leads to the full establishment of 'the EC Hub' at SLU and partnering universities Uppsala University, Lund University, University of Borås.

The following five principles are crucial ingredients in a reframed approach to environmental communication:
- Principle 1. Environmental communication is an instrumental practice and a constitutive process.
- Principle 2. Environmental communication is multimodal and multilateral.
- Principle 3. Socio-environmental change is the result of the agency-structure interplay.
- Principle 4. Environmental communication is a field of discursive struggle.
- Principle 5. Power and conflict are inherent to environmental communication.

M-EC's scientific contribution is to strengthen the development of critical and change-oriented approaches to environmental communication research and produce in-depth knowledge on how and under what conditions environmental communication can contribute effectively to sustainability transformations. It addresses five focus areas in environmental communication: (1) Information, (2) Meaning-making, (3) Knowledge, (4) Governance and (5) Transformation. These focus areas are brought together and supported by the Commons platform, that delivers programme-wide infrastructure, supports creativity, synthesis and collaboration and ensures scientific quality and impact. As a programme, M-EC provides a comprehensive and in-depth understanding of different forms of environmental communication and their roles in sustainability transformations and allows us to effect change in environmental communication scholarship, policy and practice.

The programme brings together a strong consortium of researchers and societal actors. M-EC is hosted by the Division of Environmental Communication at the Swedish University of Agricultural Sciences (SLU) in Uppsala, and involves the Centre for Health and Sustainability (CHS, former SWEDESD) at Uppsala University (programme co-lead), Lund University, University of Borås, the University of the Sunshine Coast (Australia), the University of Texas at Austin (USA), and a wide range of other academic and wider societal partners, including public authorities and agencies (e.g., Uppsala municipality and the Swedish Environmental Protection Agency), businesses, NGO's, research institutes, and organisations within media, museums and the arts.

Sammanfattning

Mistra Environmental Communications (M-EC) övergripande mål är att omformulera miljökommunikation, det vill säga att integrera en bredare, mer nyanserad och mer avancerad förståelse av miljökommunikation i forskning, policy och praktik, som främjar omställningen till ett hållbart samhälle. M-EC bygger på en transdisciplinär ansats som involverar forskare från en rad olika disciplinära bakgrunder såväl som partners som representerar centrala samhällsaktörer, som tillsammans bygger vidare på befintliga tänkesätt, utvecklar nya insikter och ansatser och omsätter denna kunskap till nya kommunikationspraktiker.

M-EC:s vision är att Sveriges hållbarhetsarbete vid ingången av år 2035 understödjs av transformativa kommunikationspraktiker. Den kritiska och förändringsorienterade och inkluderande ansats som dessa praktiker bygger på, har fått bred samhällelig acceptans och internationellt erkännande. Detta är resultatet av en genomtänkt transdisciplinär forskningsstrategi som med M-EC som nav har fått spridning regionalt, nationellt och internationellt, och som år 2028 leder till etableringen av 'the EC hub' vid SLU och partneruniversiteten Uppsala universitet, Lunds universitet och Högskolan i Borås.

Vi hävdar att följande fem principer är avgörande för utvecklingen av miljökommunikation:
- Princip 1. Miljökommunikation är samtidigt både en instrumentell praktik och en konstituerande process.
- Princip 2. Miljökommunikation är multimodal och multilateral.
- Princip 3. Socioekologiska förändringar är resultatet av samspelet mellan individuella och strukturella nivåer.
- Princip 4. Inom miljökommunikation drabbar olika diskurser samman.
- Princip 5. Makt och konflikt är inneboende aspekter av miljökommunikation.

M-EC:s vetenskapliga bidrag är att stärka utvecklingen av kritiska och förändringsorienterade miljökommunikativa ansatser och generera fördjupad kunskap om hur och under vilka förutsättningar miljökommunikation på ett effektivt sätt bidrar till hållbarhetsomställningen.

M-EC adresserar fem fokusområden inom miljökommunikation: (1) Information, (2) Meningsskapande, (3) Kunskap, (4) Styrning, och (5) Förändring. De förs samman och stödjs av den övergripande plattformen Commons som levererar programomfattande infrastruktur, stödjer kreativitet, syntes och samarbete och säkerställer vetenskaplig kvalitet och genomslagskraft. Sammantaget kommer vårt arbete att erbjuda en omfattande och djupgående förståelse för olika former av miljökommunikation och dess roller i hållbarhetsomställningen, liksom en förändrad och fördjupad miljökommunikation inom forskning, policy och praktik.

M-EC bygger på ett starkt konsortium av forskare och samhällsaktörer. Värd för M-EC är Avdelningen för miljökommunikation vid Sveriges Lantbruksuniversitet (SLU) i Uppsala, och involverar vidare Centrum för hälsa och hållbarhet (CHS, f.d. SWEDESD) vid Uppsala universitet (co-lead), Lunds universitet, Högskolan i Borås, University of the Sunshine Coast (Australien), University of Texas i Austin (USA) samt ett stort antal partners inom både akademi och samhället, däribland kommuner och offentliga myndigheter (t.ex. Uppsala kommun och Naturvårdsverket), företag, frivilligorganisationer och andra medlemsorganisationer, forskningsinstitut och organisationer inom konst, museer och media.

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1. Relevance, vision, aims and impacts

1.1 Relevance

Our society faces a broad set of urgent sustainability challenges that have no easy solution and are difficult to govern. These challenges, as well as the agenda that the international community has developed to tackle them – Agenda 2030 and the Sustainable Development Goals (SDGs) – are characterised by complexity, uncertain and disputed facts, conflicting interests and values, high stakes and a pressing need to act (Funtowicz & Ravetz 1994, Sardar 2010). Difficult to delineate and without simple technical solutions, they are often labelled as 'wicked'. As such they call for an entirely different governance approach (Jentoft & Chuenpagdee 2009), in which environmental communication is a crucial component for understanding and facilitating transformations to sustainable societies (Stirling 2014a).

Environmental communication is the social negotiation of meaning, including knowledge, values, emotions and embodied experiences related to environmental and sustainability issues. Environmental communication research is the study of this social negotiation of meaning, including its social, material and political implications. Traditionally, environmental communication has largely been understood from a knowledge-deficit model, in which effective communication of the right information and knowledge will lead people to change in the desired direction (Corner et al. 2017, Irwin et al. 2018).

Broader, richer and more nuanced understandings and practices of the relationship between environmental communication and change exist, both in research (Hansen 2011, van Ruler 2018, Pezzullo & Striphas 2018, Seethaler et al. 2019 to name a few) and communication practice. When those understandings and practices are incorporated, environmental communication can be transformative, i.e., enabling deep, constructive and meaningful learning and supporting critical ways in which people and groups consciously make meaning of their practices and lives (Simsek 2012, Aboytes & Barth 2020) - thereby opening up for a more radical restructuring of current practices (O'Sullivan et al. 2016).

Mistra Environmental Communication (M-EC) takes in ongoing developments in the research field of environmental communication as well as in adjacent areas and the constantly evolving socio-political landscape. Emerging key themes are polarisation (Rekker 2021), populism and disinformation and their implications for agonistic meaning-making in democratic systems (Korstenbroek 2022), the changing role of expertise and trust in decision-makers and information systems (Sprain & Reining 2018), and how these impact environmental governance and societal change. These themes reflect contemporary, urgent concerns, enabling M-EC to conduct cutting edge research and to play a key part in policy, practice and public debate.

1.2 Vision, aims and impacts

M-EC's vision is that by 2035 transformative environmental communication will underpin Sweden's transition to a more sustainable society, acting as an internationally recognised model of critical and change-oriented environmental communication that is socially legitimised and inclusive.

M-EC's overarching aim is to reframe environmental communication, i.e., to mainstream a broader and more advanced understanding of environmental communication in research,

policy and practice, such that it can effectively foster sustainability transformations. To achieve its vision and overarching aim, M-EC's specific aims are to:

1. bridge the gap between theory and practice through close and meaningful collaboration between researchers and societal partners, in cross-cutting activities based on transdisciplinary and interactive methodologies,
2. develop and mainstream a theoretically and empirically grounded understanding of environmental communication that can address wicked challenges and that contributes effectively to societal transformations for sustainability,
3. develop methods for reflexivity for the programme participants and their wider communities, to reflect on and improve their own transformative environmental communication practices,
4. explore, develop and apply strategies for transformative environmental communication practices and ensure continued development – including training and capacity building of relevant practitioners, and
5. establish a powerful hub for environmental communication research and practice with Swedish and international reach, which stimulates inter- and transdisciplinary learning, dialogue and collaboration.

M-EC produces a wide range of outputs for academic and non-academic audiences, such as policy- and decision-makers, and environmental communication practitioners from different types of organisations. Through a variety of pathways, these outputs have the following impacts:

- In both academic and wider societal contexts, the understanding of environmental communication is broadened and deepened in ways that allow a more effective engagement for sustainability transformations.
- M-EC stimulates conceptual renewal, wider reflection and debate among relevant actors in Sweden and beyond, on what environmental communication means and how it can support socially inclusive and democratically legitimate (and ultimately sustainable) processes and outcomes.
- Through co-creation and multi-actor dialogue, environmental communication research gains increased societal relevance and validity.
- Environmental communication practices in academia, environmental consultancies, businesses, non-governmental and governmental organisations, media and civil society are more effective and legitimate as actors are equipped with theoretically informed models and tools for communication and have the capacity to critically reflect upon and adapt activities to the situation at hand.
- Environmental communication practitioners are more confident and empowered to work in a variety of contexts with different actors because of M-EC's capacity building activities, including learning fora to improve skills and knowledge for transformative environmental communication, and the EC-SLU and CHS-UU Master's programmes that integrate and reflect the latest insights from M-EC.
- Arenas and formats for environmental communication are pluralised, and less formal or alternative settings are recognised as spaces where meaningful environmental communication takes place.

M-EC strengthens environmental research, policies and practice in impact and ensures better alignment with a wider range of stakeholders, which helps organisations, municipalities and the entire country to achieve their environmental and sustainability goals.

2. Scientific value of the programme

2.1 The Environmental Communication perspectives

Environmental communication practice and theory have long been shaped by models that assume a causal connection between knowledge, attitudes and behaviour, i.e., people will change their attitudes and behaviour to align with the information they have, provided this information is communicated effectively (Ajzen 1991, Stern 2000). In these models, experts, such as scientists, create the right knowledge, which then is disseminated, so that people and groups, based on this information, change their ways to more sustainable ones. These simple models have always been insufficient to understand or intervene in more complex communication processes but are particularly maladapted for tackling the wicked sustainability challenges of our time.

These models have been critiqued in environmental communication research and related academic fields, and more nuanced theories on communication and societal change have been proposed (Katz-Kimchi & Goodwin 2015, Cox 2007, Hansen & Cox 2015, Simpson & Seibold 2008, Endres et al. 2009). Research in environmental communication and related fields has made numerous and diverse contributions that can help to reframe environmental communication. One key aspect is the socially constructed and contested understandings of the causes of, and proposed solutions to, the socio-ecological challenges of our times. Another is how practices underpinning environmental degradation and climate change are reproduced, interlinked and supported by political and economic institutions, discourses, and technical arrangements. Yet another is, in what way environmental communication can contribute to social change (Milstein 2009, Katz-Kimchi & Goodwin 2015).

Despite these advances, simple communication models continue to shape how public authorities, civil society organisations, consultants, experts and many researchers think and act about environmental communication problems, and more complex conceptualisations of communication have had limited impact on mainstream environmental communication practices, which are reproduced through policy documents and instruments, manuals and skills development courses.

M-EC draws on these advances to scrutinize the assumptions that underpin current environmental communication activities and use insights from this analysis to reframe environmental communication in research, policy and practice. The following five principles are crucial ingredients for reframing environmental communication:

Principle 1. Environmental communication is an instrumental practice and a constitutive process. Environmental communication can be seen as a set of purposeful activities, which are intended to impact people's understanding of and relationship to the environment through e.g., mobilization, deliberation, persuasion, and learning for (collective) action and change (Hansen & Cox 2015, Hallgren 2016). At the same time, environmental communication is a much broader, constantly ongoing, constitutive meaning-making process that shapes people's understanding of socio-environmental reality.

Principle 2. Environmental communication is multimodal and multilateral. Environmental communication is performed in different ways and by a variety of actors. Environmental communication happens between individuals and groups and is also part of individual meaning-making processes. More than sharing information or knowledge, communication

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includes the sharing and social negotiation of values, emotions, embodied experiences and practices (see van Ruler 2018 for an overview).

Principle 3. Socio-environmental change is the result of agency-structure interplay. Socio-environmental change and continuity result from the interplay between people's actions and socio-material structure. To understand environmental communication's role in change processes therefore requires approaches focusing on the individual, on groups, on social-material structures, and combined approaches across the structure-agency spectrum (Carvalho et al. 2017).

Principle 4. Environmental communication is a field of discursive struggle. Environmental communication is a field of discursive struggle, in which sustainability is a central, yet contested concept. Ideas about the environment and human-environment relations provide "structures of understanding" (Hall 2007: 93). These ideas are multiple, conflicting, and engage with one another in discursive struggles (Ganesh & Zoller 2012, Peterson et al. 2016, Pezzullo & Striphas 2018).

Principle 5. Power and conflict are inherent to environmental communication. Power, disagreement, conflict and resistance are inherent to environmental communication processes. This includes deliberative, learning and participatory approaches. Environmental communication research and practice needs to take power and conflict explicitly into account (Hansen 2011).

These principles guide all parts of our research programme and are evaluated and revised through in-depth research, active use and discussion. The programme is concerned with communication at the micro-, meso- and macro-level: Communication includes the sharing and constitution of specific pieces of knowledge or feelings (e.g., as in concrete messages or answers to questions) as well as comprehensive discourses, frames, representations or ideologies. The concept of discourse is found across much of the programme, and we understand discourses here broadly as shared "ensembles of ideas, concepts and categories through which meaning is given to social and physical phenomena" (Hajer 2006, p. 67) while recognising the different theoretical perspectives taken in the different parts of the programme (see e.g., Peeples 2015, Carpentier et al. 2019 for the role of discourse perspectives in environmental communication research).

Overall, M-EC brings work done in communication research, information studies and the foundational disciplines of modern communication science, such as sociology and social psychology, together with relevant insights from other social sciences, such as political science, sustainability studies and human geography, to reinforce and further develop already existing trends in environmental communication research towards a richer, more nuanced understanding of environmental communication in the 21st century.

2.2 Our approach

2.2.1. Inter- and transdisciplinary
M-EC brings together an inter- and transdisciplinary consortium of researchers and practitioners to work in a critical, engaged and change-oriented way (Joosse & Powell et al. 2020). The consortium partners identify with the sustainability agenda, and the programme explicitly aims to contribute to the United Nations' Sustainable Development Goals (SDGs) by improving communication for sustainability transformations. M-EC advances the understanding of environmental communication to support the enactment of the SDGs.

The programme is situated in a broad action arena with researchers from a variety of disciplines, professional communicators, such as journalists and communication officers, and a variety of actors who in some way 'do' environmental communication (e.g., scientists, policy-makers, authorities, businesses, NGOs, governmental organisations) and members of the public who engage in debates on environmental issues and sustainability.

We work in an interdisciplinary way, where researchers from different disciplines collaborate across boundaries to create something new together in analysis and synthesis. The programme, however, moves beyond academia and applies a transdisciplinary approach, which includes actors from other key societal sectors.

Transdisciplinary is central to understanding, approaching and navigating today's wicked challenges, and to ensure societal relevance and applicability of research. Transdisciplinary research aims to create legitimate, scientifically rigorous and effective solutions to complex societal problems through the involvement of both multiple disciplines and a diversity of societal actors in research situated in real-life contexts (Nowotny et al. 2001, Pohl & Hirsch-Hadorn 2007, Wiek et al. 2012). Transdisciplinary methodology includes processes where problems are jointly identified, and possible solutions examined. As in most research, an important challenge for transdisciplinary research is to ensure that findings are implemented in practice (Westberg & Polk 2016). Based on the decades-long strong engagement in multi-actor transdisciplinary work by the two core academic partners, M-EC uses a diversified and differentiated approach to transdisciplinary collaboration, working and learning from each other in formats from co-creation of research to short-term interactions, and a range of other formats in between.

M-EC aims at changing environmental communication policy and practice, but advances in academic knowledge do not automatically lead to such changes. Changing practices is inherently difficult, cannot happen in isolation and requires connectedness. Our transdisciplinary approach entails that:

- Collaboration with societal partners is integral to the programme.
- Researchers and environmental communication practitioners together critically explore the expectations, routines, norms, assumptions, models and methods that characterise communication practices.
- Researchers and environmental communication practitioners experiment with and evaluate new ways of working that are informed by both theory and empirical experience. Moreover, built on an in-depth and nuanced understanding of how environmental communication can best inform societal transformations, they develop effective approaches that help reframe environmental communication.
- Short-term and agile co-creation projects led by societal partners and/or academics, and executed by them together, develop activities and events that address specific topics of practical interest, and which may cut across several focus areas.

The scientific contribution of M-EC is thus to continue to strengthen the development of critical and change-oriented approaches to environmental communication and produce in-depth knowledge on how and under what conditions environmental communication can contribute effectively to sustainability transformations.

2.2.2. From fields of practice to five focus areas in environmental communication
M-EC is organised to cut across a multitude of fields of practice along focus areas
(organised in work packages, WPs) in environmental communication:

- **Information (WP1).** Information cultures, data and technology in environmental
  communication
- **Meaning-making (WP2).** Processes of meaning-making in environmental
  communication
- **Knowledge (WP3).** The constitution of knowledge and truth in environmental
  communication
- **Governance (WP4).** Governance collaboration and resistance in environmental
  communication
- **Transformations (WP5).** Co-creating transformations through environmental
  communication

We further develop our interdisciplinary approach to environmental communication,
giving explicit weight to macro-perspectives on information cultures and systems (as in
WP1) as well as to micro-perspectives investigating processes of meaning-making in and
between individuals (as in WP2), to complement mid-range approaches that explore the
interplay between structure and agency (as in WPs 3, 4 and 5). The Commons provides a
space for shared programme infrastructure, the development of creative cross-cutting
collaborative endeavours, overarching synthesis, quality and impact work.

M-EC further develops the principles that underpin our understanding of environmental
communication. Each WP is informed by all five principles and makes major contributions
to two or three of these. For example, WP2 unpacks intra-individual as well as inter-
individual processes of meaning-making, while WP3 investigates tensions between
instrumental and constitutive perspectives. WP1 examines how information technologies
and data are involved in material-discursive struggles over sustainability and
environmental concerns, and WP4 analyses the role of power and conflict in collaborative
governance. Factors shaping socio-environmental change and transformation are explored
in WP5. WPs collaborates in developing the principles, as well as on other crosscutting
concepts and approaches. Such collaboration takes the form of programme laboratories
(Section 6.2 - Task 5), conference sessions (e.g., at international communication
conferences) and publications (both popular and scientific), for example, looking across
different understanding of struggles over meaning (Principle 4, WPs 1, 2, 3) and examining
the role of conflict in deliberative democracy (Principle 5; WPs 1, 3, 4). In terms of the role
of power in environmental communication (Principle 5), WP1, 2 and 3 are inspired by a
Foucauldian understanding of power in the everyday, built into the information
technologies we use (WP1), socialised into the feeling of emotions and the intra-personal
emotional conflicts that people experience (WP2), and expressed in societal struggles over
facts and knowledge (WP3). WP4 and WP5 put power and conflict at the front and centre as
they explicitly research and discuss contestation and power in politics and transformation,
and WP5 also addresses power relations through power-sensitive transdisciplinary
methodology.

Synthesis activities have so far included theoretical approaches and practical
understandings of power (through a focused Programme Laboratory and
Miljökommunikationsdag, see page 24), and could include further work on storytelling in
sustainability processes (all WPs), the role of emotions in environmental communication
(e.g., WPs 2, 3 and 4), the relationship between knowledge, data and evidence (WPs 1, 3 and
4), shared cases and fields of application such as nature interpretation (WPs 2, 3 and 5),
transition governance (WPs 1, 3 and 4) and forestry (WPs 4 and 5).

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Over and above the five principles, several concepts are used across WPs that are central to the proposed research. One central cluster of concepts is knowledge(s), data and evidence (WPs 1, 3 and 4). Mistra's call text emphasises the need to "enhance our understanding of how knowledge and action are connected. More knowledge and facts do not automatically result in better decisions", and the proposed programme unpacks the role of "knowing" in the joint construction of meaning, decision-making and, ultimately, action and change. Complementing this, the programme (specifically, WPs 2 and 3) explores the role of emotions in such processes of meaning- and decision-making. While WP2 focuses on emotions as experienced, WP3 looks at implicit and explicit uses of emotions in discourse. WPs 3 and 5 both engage with storytelling as an important mode of environmental communication. While WP5 emphasises different ways of thinking and knowing and the content of stories about land and nature and their transformative potential, WP3 is particularly interested in emotions and values in relation to different types of knowledge, and the instrumentality of stories. Finally, governance, i.e., the coordination and steering of society and societal change is a core concern of WPs 1 and 4 and the programme as a whole, and we aim to elucidate the roles that communication in its many forms (whether technology-mediated, in collaborative or political processes or as part of everyday meaning-making) plays within the democratic system, not least in terms of its ability to constructively deal with pluralism and disagreement.

M-EC engages with a range of contexts of communication practice and involves and examines the roles of a wide spectrum of publics and organisations in environmental communication, their discourses and imaginaries, and how these interact in communication and social practices. M-EC also investigates power relationships and patterns of inclusion and exclusion. Our work includes both well-established and emerging formats and sites of environmental communication, ranging from institutionally embedded environmental communication to spontaneous and/or novel forms of communication. We also specifically examine the changing roles and interpretations of scientific knowledge in environmental communication, and how different forms of communication interact, support or contest each other. In these sites, we investigate public knowledge-making, largely using a discourse-analytical lens that examines both the discourses in their communicative contexts and the underpinning meta-discourses, i.e., shared mental models of how communication works. Finally, M-EC examines the role that communication plays, and how different models and practices of communication can help or hinder the effectiveness of governance approaches.

2.2.3. Supporting the next generation of EC scholars
Supporting the next generation of EC scholars is at the heart of M-EC, and one of the reasons for advancing the programme further to an EC Hub. In terms of positions, M-EC involves, one postdoc researcher and one early career researcher each in WP1 and WP2, parts of a PhD student in WP1, one PhD student in WP3 and three postdocs in WP5. These are supported through annual career development sessions.

In addition, we support the next generation of EC researchers through developing the EC hub, which includes e.g., the biennial EC research conference that involves early career as well as more senior researchers and provides a forum for EC-related PhD students in Sweden and beyond to discuss their research. M-EC programme activities (e.g., most sessions at programme meetings) are open to all PhD students, postdoctoral and early career researchers at partner organisations regardless of their direct involvement in M-EC, which has so far led to very interesting and relevant instances of mutual learning. The EC textbook writing process provides space for structured reflection, not least for early career and postdoctoral researchers, who also partake in the synthesis process for which the

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textbook is a vehicle. We also actively invite Master students (notably within the Environmental Communication and Management programme at SLU) to write their theses as part of M-EC.

In addition to M-EC-funded activities, the academic partners also host other PhD studentships in environmental communication, and EC-SLU runs PhD courses in environmental communication open to all interested doctoral students (including international). These courses are tightly connected to the theoretical and empirical insights developed in M-EC, and partnering researchers as well as other, external scholars in (environmental) communication are invited for lectures and seminars. The collaboration between M-EC and existing PhD students at SLU's Division of Environmental Communication (at present 8) and at other academic partner organisations takes many different forms. For example, one existing EC PhD student (funded by SLU) orientates her work to conceptually align with WP3's focus on the interplay between knowledge and emotions in EC. The research of another PhD student (funded by Formas and starting in September 2023) and a 2-year postdoctoral researcher (funded by Stora Enso) working at the EC-SLU aligns empirically and conceptually with WP5's work on land-use transformations. Although not all of our work with young researchers is thus directly funded through M-EC, the next generation of EC scholars benefits directly from the opportunities that the programme offers, and from the close connections with other Sweden-based and international academics that the programme collaborates with.

3. Societal relevance and benefits

Mistra Environmental Communication (M-EC) is of direct importance to key policies at local, national and international level. At local level Uppsala Municipality is a key societal partner. A reframed transformative environmental communication practice is essential to achieve their goal of a fossil-free Uppsala by 2030 and a climate-positive Uppsala by 2050. At national level, transformative environmental communication under-pins Sweden's environmental quality objectives, such as the goals of generational justice, and a climate-neutral Sweden by 2045. The Swedish Environmental Protection Agency (SEPA) is a key national societal partner and views communication as one of the most important tools for their work toward Sweden's environmental objectives (from their support letter for M-EC). Linked to the international level, M-EC aspires to contribute to the national and global work towards the Sustainable Development Goals (SDGs). All WPs contribute the SDGs (Table 3.1), and M-EC's unique contribution lies in the promotion of inclusivity and legitimacy in environmental communication (SDG 16), with the ambition to support sustainability transformations more generally (all SDGs).

M-EC expects to benefit a) professional communicators, b) other environmental communication practitioners such as scientists, staff of public authorities and NGO representatives, c) policy- and other decision-makers who shape institutional structures for communication, and d) (indirectly) the public. For all these groups, the main expected benefits of M-EC are a more inclusive environmental communication practice, leading to more societally relevant, valid and legitimate outcomes that are more effective in achieving societal-level transformation towards sustainability.

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Table 3.1: M-EC's contributions towards the Sustainable Development Goals (SDGs)

SDG	SDG summary	Contribution to M-EC
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	WP3 examines knowledge, emotions and values in the governance of genetic modification in agriculture. WP4 examines collaborative approaches to restoration of lakes and water sheds. WP5 contributes through agricultural cases in Sweden and Honduras.
3	Ensure healthy lives and promote well-being for all at all ages	WP2 supports psychological well-being, by enhancing the understanding of processes of meaning making.
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	WP1 contributes with developing critical media and information literacies necessary in datafied society and by identifying areas for potential educational intervention. WP1 and 3 (indirectly) help authorities and other relevant actors to foster citizens' critical engagement with knowledge within the boundaries of democracy. WP5 provides space for actors in land-use sectors to articulate new perspectives on land use.
6	Ensure access to water and sanitation for all	WP1 contributes with a task studying environmental apps in everyday life (including for water monitoring).
10	Reduce inequalities within and among countries	Programme-wide. WP1contributes by providing current awareness of the ongoing datafication of environmental meaning-making with a specific focus on power, visibility, values, and control over knowledge. WP4 contributes by developing tools for communication in collaborative governance. WP5 (transformations) contributes by developing inclusive imaginaries of future land use, and methods for working that explicates potentials and synergies of nature-based transformations.
11	Make cities and human settlements inclusive, safe, resilient and sustainable	WP1 contributes with a case study on urban resilience as an advocacy issue. WP4 contributes through a case study of collaboration in urban planning. WP5 contributes by developing tools and methods that facilitates nature-based transformations aiming at resilient and sustainable land use across urban and rural divides.
12	Ensure responsible production and consumption patterns	WP1 investigates sustainability certification systems and Environmental Social Governance. WP5 contributes with case studies from the agricultural and forestry sectors investigating the potentials and synergies of changes in management practices.
13	Take urgent action to combat climate change and its impacts	Programme-wide. WP1 contributes with a task studying formation of and conflict around advocacy issues significant for climate change mitigation. WP2 contributes by addressing people's interpretation and emotions associated with climate change. WP3 contributes with a case examining the role of knowledge, emotions and values in transition governance. WP4 contributes by developing tools for communication in collaborative governance. WP5 contributes by focusing particularly on nature-based transformations, which is an integrated approach to cope with climate change and biodiversity loss.
15	Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss	WP2 contributes by addressing people's interpretation and emotions associated with biodiversity loss. WP4 contributes through a case study collaborative forest governance. WP5 contributes through cases in Sweden and Honduras.
16	Promote just, peaceful and inclusive societies	Programme-wide. WP1 contributes by establishing alliances with libraries as institutions promoting democratic values diversity and inclusion and free access to knowledge and information. WP3 contributes (indirectly) by helping authorities, decisionmakers and other relevant actors to foster citizens' critical engagement with knowledge within the boundaries of democracy. WP4 contributes by developing tools for communication in collaborative governance. WP5 contributes by providing space for more marginalised groups and engaging with them in knowledge co-creation processes.

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3.1. Pathways to impact

M-EC ensures high societal impact by combining two major pathways to impact with a thorough evaluation of these processes and their effects. First, M-EC achieves impact through our transdisciplinary and interactive methodologies, which enable researchers and societal partners to actively and collaboratively design, plan and implement the work. The transdisciplinary process consists of a variety of methods and formats to meet the different needs and possibilities of the participants and ensure wide participation. The interactive research methodology provides societal actors with the opportunity and support needed to critically reflect on their current practices and to test new ones. Knowledge is mediated between researchers, policy makers, organisations and interest groups by way of a dynamic and iterative process (Gibbons et. al. 1994). M-EC also uses collaborative strategic reserve projects and other collaborative activities within and outputs from the programme as co-creative doing-of-impact channels. Individual work packages also host platforms, such as the Co-Creation Lab in WP5.

Second, M-EC develops and maintain platforms, activities and methods for sharing findings, lessons learned, and tools with wider audiences and the public. Examples are the programme's online presence (e.g., the website and the LinkedIn account), and training and capacity building in environmental communication practice. The annual Environmental Communication Day (In Swedish: *Miljökommunikationsdagen*) and the Nature Interpretation Lab are recurring formats of activities that engage with wider audiences (see Commons), and these are complemented with more traditional and targeted forms of research communication, such as policy- and practice briefs, debate articles, articles in trade magazines, blogposts and podcasts. We actively use national and international relevant research and practitioner networks for dissemination and knowledge sharing.

To monitor and track impact continuously, M-EC uses partner dialogues, i.e., yearly as well as ad hoc conversations between the programme team members to elicit feedback from our societal partners to be able to learn and adapt, to track and strengthen the outcomes of our work in a structured way and compile evidence of the programme's effects and usefulness. Partner dialogues are annually analysed by the programme team and reported on for internal use only. To track and document our impact, we use impact stories, which summarise societal partners' experiences in the programme. Together, partner dialogues and impact stories reflect a case-based and narrative approach to impact monitoring (Reed 2018).

Our monitoring work is further strengthened by an external evaluation process (year 2 and 3). An external consultancy will be invited to co-design and execute a suitable and specific longitudinal process together with us (building on Barquet et al. 2022), to monitor learning processes in and impact of the research process at large, as well as the effectiveness of our recurring activities, e.g., *Miljökommunikationsdagen*, Programme Meetings, and Programme Laboratories. Also, using the external evaluation to catalyse a reflection of our own strategic communication, we intensify tracking that impact, following e.g., the integrated framework for measurement and evaluation in strategic communication suggested by Buhmann and Volk (2022), and also looking into the framework of Goldberg and Gustafson (2023) on driving force and restraining force to monitor our strategic communication in relation to reach, effect and durability.

Taken together, these pathways for impact will constitute a legacy from the programme. The intent is the establishment of an EC hub at SLU and Uppsala University which acts as a

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node, go-to contact point and meeting place for EC research in Sweden and beyond. The hub builds on both past and ongoing work, and we work on its establishment by connecting researchers in environmental communication in Sweden and adjacent countries with each other, but also constituting a bridge to EC researchers and environmental communication debates in Europe, North America and elsewhere. It is the intent of Uppsala University's Vice Chancellor that the Co-Creation Lab (currently in WP5) could serve as a transdisciplinary research vehicle for Uppsala University's Regenerative Sustainability Academy – the Vice Chancellor's new large-scale investment in sustainability. The EC hub will thus be a collaboration between SLU and Uppsala University, where the hub is hosted at SLU and the Co-Creation Lab (as part of the hub) is hosted at Uppsala University, and with powerful Swedish and international reach. Key features of the hub will be run, expanded on, applied and systematically evaluated for their impact during M-EC, for the hub's independence in 2028.

4. Organisation of the programme

4.1 Partner set-up

Transdisciplinarity is core to M-EC. Therefore, the programme has a firm and well-established basis with critical mass and collaborations in Uppsala enriched by selected Swedish and international partners.

The academic partners are:

- The Division of Environmental Communication at the Swedish University of Agricultural Science (EC-SLU) in Uppsala, and the programme host.
- The Centre for Health and Sustainability (CHS) at Uppsala University, which will co-lead the programme.
- The Division of Landscape Architecture, SLU.
- The Department of Ecology, SLU.
- Environmental psychologists, Lund University.
- Cultural scientists in information studies, University of Borås.
- Scholars in sustainable development, the University of the Sunshine Coast, Australia.
- Organisational communication scientists, the University of Texas at Austin, the US.
- The Storytelling Academy, Loughborough University, the UK.

Societal partners represent a variety of relevant societal actors in environmental communication, and include:

- Public authorities dealing with environmental policies at local, regional and national levels.
- Non-governmental organizations (NGOs) and other membership organisations.
- Relevant actors in the creative, media and business sectors.

We are working with over 30 non-academic organisations from local to international level, to address the dynamics of environmental communication in relation to their varying contexts. These actors have demonstrated their engagement through our collaborative work, and through partner dialogues preparing for M-EC where shared interests, diversity of perspectives and ideas for activities and outputs of the programme were jointly explored. The partner dialogues continue throughout the programme to help ensure that

the work remains relevant and meaningful for partners and society. We include continual frequent mapping exercises to ensure that the partnership reflects important changes in the environmental communication landscape. The programme connects with societal partners in three ways: a) as consortium partners, that sign the consortium agreements and actively cooperate programme-wide or in one or more WPs); b) WP-partners, that are specific to one or more WPs; and c) programme partners without current attachments, taking part in programme activities to gain insights and scan for interesting and timely collaborations. Partners from all three categories can apply for and partake in strategic reserve projects.

While the consortium continues to stretch across a variety of sectors, administrative levels and countries, M-EC also has a geographical home, and is rooted in Uppsala through its collaborations with local and regional authorities and a network of local NGOs and businesses. From there, it will scale out to the national and international level, through a range of pathways, drawing on the structures and networks of M-EC partners, such as the International Environmental Communication Association network and the SLU-EC network of Master's alumni – both networks that include environmental communication researchers and practitioners.

4.2 Programme structure

M-EC consists of the WPs 1-5 and the Commons. The WPs can be viewed as the pillars of the programme, which are supported and linked by the overarching and crosscutting Commons. Each WP focuses on an area of environmental communication, while the Commons is a space for programme-wide theoretical and methodological development, cross-cutting and synthesis work, and emerging ideas and applications, such as the programme laboratories and strategic reserve projects. Coordination and knowledge sharing, and ensuring scientific quality and impact are other features of the Commons. The WPs together with the Commons identify, consolidate and reflect on the programme's main contributions to a reframed understanding and practice of environmental communication, linking back to the five principles introduced in Section 1.

M-EC makes use of a wide range of research methods and a diversity of empirical materials. Research methods include qualitative (interviews, focus groups and group feedback analysis, observation, co-writing, co-creation and co-inquiry, serious games, document and media analyses) and quantitative approaches to data collection (surveys, experiments, media analysis, computational methods). Mixed methods, understood as the combination of quantitative and qualitative methods, are used in WPs 1-4. Beyond mixed methods as a quantitative-qualitative methods combination, WP3 and WP5 also 'mix methods' in other ways: WP3 combines visual and textual data, and WP5 brings together methods of very different types, such as games, photovoice and storytelling.

These approaches are applied to a spectrum of real-world cases. WP1 follows the data, which means that within the boundaries of research ethics, a variety of different platforms, media genres and publication forms are likely to coalesce. WP2 collects placed-based experiences and does communicative interventions and observations in shared cultural organisations cases. WP3 analyses policy documents, scientific reports, social media, political debates on other media (radio/TV), diverse materials for nature interpretations (both visual and text), as well as data from interviews, workshops and observations. WP4 analyses, with the purpose to understand how actors frame collaborative governance processes, material from policy documents, public speeches, news items and online fora. As a basis for understanding the history of disrupting dominant land use discourses, and co-create alternative land-use futures, WP5 analyses

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policy documents, public speeches, webpages of public and private actors, media reporting (national newspapers and sector journals) and scientific debates. We also conduct interviews (individual and focus groups), make observations at public seminars and conferences, and host workshops. Apart from interview transcripts, we take notes and photos to document more interactive research activities.

M-EC's collaborative strategic projects function to consolidate and further develop practice-relevant insights and approaches across the five focus areas (the five WPs). It gives the opportunity to follow-up on new insights and collaborations gained during the programme. These collaborative strategic reserve projects are initiated and led by societal or academic partners, and collaboration between these partners is key. The collaborative projects can be smaller or larger in scope and run for longer or shorter time periods. They can address direct needs of societal partners and/or provide space for more wide-ranging exploration of an issue. The outputs of the collaborative strategic reserve projects cannot be defined a priori, but all projects are encouraged to produce contributions to the website, tweets, blogposts and summary briefings. A possible collaborative strategic reserve project that has been proposed to date is:

Impact node – M-EC research findings used at flexible workshops at environmental consultancies, and other practice or policy organisations (lead: Commons and WSP; partners: apt researchers and societal partners in M-EC). Resulting from WSP's work in the programme, this project focuses on collaboration, synergies, and external communication. The aim is to identify research relevant to WSP and other environmental consultancies, create collaboration teams with researchers and societal partners in the programme, and form impact projects (workshops, seminars, media) for communication of programme results with practice and policy.

4.3 Management structure

M-EC is hosted by the Division of Environmental Communication at the Swedish University of Agricultural Sciences (EC-SLU). Together with the Centre for Health and Sustainability (CHS) at Uppsala University, EC-SLU forms the core of the M-EC consortium. The management structure is set up to create optimal conditions for all participants to work collaboratively towards the aims of the programme, and to ensure the best possible short- and long-term impacts, and:

- ensure compliance with the programme agreement.
- maintain reliable overall coordination.
- provide equitable and appropriate methods for decision-making and conflict resolution.
- ensure timely and accurate execution of administrative and financial tasks.
- optimise the use of resources available within the programme.
- monitor progress and support integration of work across all WPs.
- ensure efficient communication within and beyond the consortium.

4.3.1. Programme Directors, Programme Leadership and Programme Team
The M-EC programme directors liaise between MISTRA and the programme partners. The programme directors are responsible for ensuring that decisions made by the programme board are appropriately planned and undertaken, for administering and distributing MISTRA funds, as well as for monitoring partners' compliance with their obligations. Programme directorship includes research leadership, with responsibility for overall research strategy, design and implementation. The programme directors are in regular contact with WP leaders to ensure research obligations are met and ensure scientific

quality and impact. The programme director role is shared between Associate Professor Sofie Joosse (EC-SLU) and Dr Eva Friman (CHS-UU), each devoting 50% of their time to the leadership of M-EC. The two programme directors together with two coordinators (each at 50%; one tasked with policy impact and one with strategic communication) constitute the M-EC programme leadership. The programme leadership works closely together to fulfil the triple role of the Commons of delivering programme-wide infrastructure, inspiring creativity and collaboration among partners, and ensuring scientific quality and impact.

The M-EC programme team plays a key role as it brings together the programme leadership, the WP leaders, the financial officer and other programme participants. The programme team convenes regularly to discuss, plan and advise on matters that concern the entire programme. In conjunction with the Programme Board and the guidance from the International Scientific Advisory Group, the programme team is a crucial forum for ensuring suitability of joint processes and outputs where a discussion in plenum would not be appropriate.

4.3.2. Programme Communication and Administration Team
Communication is at M-EC's core: apart from the research on communication and the creative communication led by the programme leadership, this includes the development of improved communication methods and approaches, and external communication, i.e., the sharing of findings and methods. While all researchers and many of the societal partners are actively involved in sharing their work, and these activities are an integral part of the WP plans, we have engaged a web- and visual communication specialist, to work closely together with the coordinators with designated tasks to support policy impact and strategic communication and the programme directors (see Section 4.3.2).

A programme administration team (including 25% of a dedicated finance officer funded by M-EC) is hosted at EC-SLU. The administrative team supports day-to-day and long-term financial management, including the processes required to ensure that the programme is completed according to MISTRA's requirements, and within the approved budget.

4.3.3. Consortium agreement
A consortium agreement was set up between the host (SLU) and the programme consortium partners. The consortium agreement covers financial, legal, procedural and ethical matters, and relations between programme partners. If additional legal issues arise, they will be managed in consultation with the legal departments of the other partners.

4.3.4. Programme Board
The Programme Board is appointed by SLU in consultation with MISTRA. The Programme Board directs and monitors programme activities in relation to the programme plan, including the budget and the use of the strategic reserve, and supervises its execution. It meets 3-4 times a year. The programme board members are:

- Berit Oscarsson, Communications Manager, Swedish Environmental Protection Agency, chair.
- Marie Grusell, Senior Lecturer in Strategic and Political Communication, Department of Journalism, Media and Communications, University of Gothenburg.
- Ylva Hillbur, Pro Vice-Chancellor, Swedish University of Agricultural Sciences.
- Eva Lövbrand, Professor (Knowledge Politics of the Environment), Department of Thematic Studies, Linköping University.

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- Sturle Simonsen, Head of Communication, School of Electrical Engineering and Computer Science, Royal Institute of Technology, Stockholm.
- Annika Sjöberg, Senior Partner, Gullers Grupp Communications Agency, Stockholm.
- Johannes Stripple, Associate Professor (Environmental and Climate Politics), Lund University.

4.3.5. International Scientific Advisory Group

The International Scientific Advisory Group (ISAG) acts as a sounding board for the programme leadership and programme team. The ISAG ensures the programme's scientific quality and development, are critical friends in relation to the programme's ambition to develop critical and change-oriented environmental communication research that also connects to the communication research field, and together with us forms a network for research exchange including dissemination and utilization of the research. Its members are accomplished scholars with critical perspectives and the ability to challenge us to break new ground in our endeavour to transcend what environmental communication is, can be and can do:

- Eva Lövbrand, Professor in Environmental Change, Tema, University of Linköping, Sweden
- Franziska Weder, Professor in Sustainability Communication, Vienna University of Economics and Business, Austria
- Leah Sprain, Associate Professor in Communication Science, University of Colorado, the US

4.3.6. WP leaders

WP leaders are responsible for leading the research, planning and fulfilling the objectives of their respective WPs. They report to and maintain regular contact with the programme directors regarding the progress of their WPs and ensure that WPs 1-5 contribute to the joint cross-cutting and synthesis work and outputs in the Commons. As part of the programme management, WP leaders also share responsibility for co-developing the programme. WP leaders include: WP1, Professor Jutta Haider (University of Borås); WP2, Professor Maria Johansson (Lund University); WP3, Professor Anke Fischer (EC-SLU); WP4, Researcher Martin Westin (EC-SLU); WP5, Researcher Sara Holmgren (EC-SLU). CVs are made available through the repository for evaluators.

4.3.7. Ethical guidelines and approval

M-EC follows the ethical guidelines established by the Swedish Research Council (Vetenskapsrådet), including their Good Research Practice guide, and has been granted ethical approval for the program's research activities by the Swedish Ethical Review Authority. M-EC collects and stores personal data according to the regulations of the Swedish National Register of Personal Information (Personuppgiftsregistret) and the EU GDPR (General Data Protection Regulation). Personal data is stored in such a way that only authorised personnel have access. All conversations, including stakeholder meetings and workshops, are preceded by written or oral (documented) informed consent from all participants. All data is pseudonymised, and results are published in a form that minimises reverse identification of research participants, unless we have the express agreement of the participant (e.g., a M-EC societal partner who is a co-author of a paper).

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5. Partners and networks

5.1 Academic partners

5.1.1 Swedish University of Agricultural Sciences (SLU)
SLU developed from separate agricultural, forestry and veterinary colleges and maintains its clear focus on the interaction between humans, animals and ecosystems. In its vision, SLU places sustainable societal development in the centre and views collaboration with society at large as key to this. As such, SLU is a fitting host for this programme. Participating from SLU are the Division of Environmental Communication (host), the Division of Landscape Architecture, the Department of Ecology, and a researcher from our societal partner the Swedish Centre for Nature Interpretation (SCNI).

5.1.2. Environmental Communication, SLU
The Division of Environmental Communication (EC-SLU) conducts research on themes such as meaning-making, participation, collaboration, learning, conflict and resistance in sustainability transformations, from an environmental communicative perspective. The research group has an interdisciplinary set-up of around 25 scholars from, e.g., environmental communication, gender studies, agronomy, political sciences, human geography, and science and technology studies (STS). The group addresses a wide range of themes such as food production, forestry policy and practice, climate change adaptation, collaborative governance, sustainable urban planning, people-technology-environment-interaction, and online environmental communication.

EC-SLU has developed a distinct reputation in the field of environmental communication, focusing on interactive and transdisciplinary methods where the connection to practice is central to our research on and for sustainable development and social change. EC-SLU is an attractive partner for a range of societal actors and is frequently contacted to provide expert advice and training in communication competence and conflict management related to environmental governance. EC-SLU hosts the popular international Master programme in environmental communication, and the alumni network WECAN.

Associate Professor Sofie Joosse studies how people use, and relate to the environment, how they talk about and make sense of their relation to the environment and what this means for social change processes for sustainability. She investigates this in contexts such as agriculture and fisheries, everyday social media use, art and urban planning. The environmental communication research group consists of Professor in Environmental Communication Anke Fischer (social representations, discourses and values in environmental governance), Senior Lecturer Lars Hallgren (conflict, dialogue, interaction in communication), Senior Lecturer Klara Fischer (science and technology studies, development discourse and practice, Africa), Assoc. Prof. Ann Grubbström (gender, forestry and farming), Dr. Hanna Bergeå (collaborative practices, agricultural extension), Assoc. Prof. Stina Powell (feminist theory and knowledge production), Dr. Martin Westin (deliberative planning, collaborative governance, framing and power theory), Dr. Sara Holmgren (knowledge co-production, imaginaries, discourse analysis), Dr. Camilo Calderón (participatory and collaborative planning), Dr. Malte Rödl (people-technology-environment interactions) and Dr. Amelia Mutter (imaginaries for sustainability transformations).

5.1.3. Landscape Architecture, SLU
The Division of Landscape Architecture at SLU is involved through Professor in Landscape Architecture Marcus Hedblom, who leads a subject group in landscape management. He contributes with his experience from working transdisciplinary in projects linking

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landscape ecology with policy implementation, landscape management and human perception of nature.

5.1.4. Department of Ecology, SLU

SLU's Department of Ecology combines internationally recognised research in basic ecology with applied research in nature conservation, wildlife management, forestry and crop protection. Professor René van der Wal contributes with his ecological perspective and his long-standing experience in inter- and transdisciplinary research on citizen science, biodiversity management and human-nature relationships. He contributes to WPs 1, 3 and 4 and to the Commons team, 'the e in environmental communication' (E in EC), and synthesis outputs that are useful for a range of environmental communication practitioners, including natural scientists.

5.1.5. CHS, Uppsala University

The Swedish government established CHS (then named SWEDESD) in 2008 to contribute to the UN Decade on Education for Sustainable development (2005-2014). Today, CHS – the Centre for Health and Sustainability – is an Uppsala University transdisciplinary research centre focusing on co-creation and implementation of knowledge and innovations to navigate wicked global health and sustainability challenges, e.g., climate change, biodiversity loss, (over-)consumption and malnutrition. Research efforts aim for increased equity and address issues of vulnerability and marginalization, while research project foci span from individual to societal, to planetary health and sustainability. CHS develops methodologies for knowledge co-production as a vehicle to support sustainability transformations in contexts characterized by high degrees of complexity and uncertainty. By embracing and integrating diverse ways of knowing and acting, our research seeks to enable policy- and practice relevant innovations to support transitions towards sustainable futures. CHS also hosts a popular international Master programme in implementation, transformative learning and sustainability.

Dr and Adjunct Professor Eva Friman's research focuses on equity, ecological sustainability and global exchange from ecological economic and political ecology perspectives. Her research interests include transformative learning, meaning-making and co-creation in relation to wicked sustainability issues. She is an elected member of the Royal Swedish Academy of Sciences' Committee for Global Environmental Change, and has a far-reaching leadership portfolio, including the directorship of four academic sustainability centres, membership of research evaluation committees and academic boards, and leadership of several inter- and transdisciplinary research projects. Neil Powell is Senior Lecturer at CHS and Professor in Sustainable Development at USC. His research and practice are aimed at exploring and co-creating governance practices that can harness diversity and co-exist with uncertainty. His focus is on co-design of nature-based approaches to reconcile diverse intersectoral societal interests and positions. Project Officer Thao Do has extensive experience of working in transdisciplinary research projects with focus on design and facilitation of co-creation processes with multiple stakeholders, and development of innovative methods to navigate wicked sustainability challenges. Specialist Alexander Hellquist has a background in environmental and development economics, and experiences in policy analysis from, e.g., the Swedish Environmental Protection Agency and the Swedish Water Authorities. At CHS Alexander primarily works with development and evaluation of participatory and collaborative governance. PhD student at USC, Australia in M-EC, Sanna Barrineau, researches the insights that relational approaches, futures thinking, and feminist methodologies bring to the context of agricultural transformations related to carbon farming and regenerative agriculture. Max Whitman, a graduated PhD student in M-EC, is working on fostering new human-fire and human-forest relationships in

wicked problem contexts through co-creation and co-design processes. Barrineau and Whitman, finishing their PhD theses in 2024, both contribute to M-EC as CHS Post-Docs.

5.1.6. Lund University
The Environmental Psychology research group was among the first of its kind in Europe. Since the 1970s, the group has held a leading position in the international environmental psychology community, heading the International Association for People-Environment Studies and hosting their international conference. The group has developed an extensive network of collaborations with society, including municipalities and industry and is part of the Lund University profile area "Nature-based future solutions" and the Agenda 2030 excellence programme for sustainable development. The group uses a wide range of methods, from surveys and field studies to highly controlled laboratory studies including physiological measures. Professor Maria Johansson heads a team studying human-environment interactions from the individual's perspective, addressing nature conservation, including environmental appraisal, emotion and communication around biodiversity and climate change, and evaluations of interventions aimed at more environmentally sustainable behaviour. The team also includes two early career researchers from environmental psychology, Marlis Wullenkord, post-doc with a focus on climate and emotions, and Johan Rahm, lecturer with a focus on the role of environmental contextual factors for sustainable behaviour.

5.1.7. University of Borås
The Information Practices and Digital Cultures research group is based at the Swedish School of Library and Information Science (SSLIS), which is widely recognized as a leading research and educational institution in Information Studies in Europe. The research group focuses on the social study of information, with a particular focus on people's information activities and the shaping of knowledge and information in contemporary digital culture. This includes the datafication of everyday life, media and information literacies, and environmental concerns. Professor Jutta Haider leads the research group. The following three early career researchers are involved in and funded through WP1: Elisa Tattersall Wallin, whose PhD was awarded in 2022; audio formats, mixed and digital methods), Björn Ekström, who defended his thesis in Information Studies in October 2024 (citizen science, information practices, digital methods and visualisation), and Carin Graminius, who defended her doctoral thesis on climate change communication in November 2023 (postdoc level, science and research communication; STS, qualitative methods). In addition, the research group includes doctoral students Camilla Lindelöw and Emma Román (since 2023, supervised by Jutta Haider), who are also included in relevant activities in WP1 and M-EC. Emma Roman studies the work of public libraries and librarians in communicating climate change information. This position is funded through VR, the Swedish Research Council in through the research school Re:Source, which includes an explicit focus on mis- and disinformation.

5.1.8. University of the Sunshine Coast (USC), Australia
The Sustainability Research Centre at the University of the Sunshine Coast, Australia, strives to solve persistent and emerging issues related to the social and environmental nexus at local through global scales, using innovative, transdisciplinary applications of social, economic, and environmental sciences to foster long-term environmental and social resilience. Senior Lecturer Marcus Bussey's work focuses on aspects of socio-cultural change. He uses futures thinking and a range of tools to stimulate co-creative processes. Areas of interest include embodied engagements with self and society, intercultural dialogue, spiritual pragmatics and anticipatory aesthetics to build bridges between emergent understandings and the practices that shape our lives. Both Professor

Tim Smith and Associate Professor Dana Thomsen are part of WP5. Neil Powell is Professor at USC, and together with the three USC researchers and Eva Friman, Adjunct Professor at USC, bridge collaboration between Sweden and Australia.

5.1.9. University of Texas at Austin, USA

The Moody College of Communication at the University of Texas (UT) at Austin is the most comprehensive college of its kind in the U.S. and one of the world's foremost institutions for communication research. Professor Shiv Ganesh brings a strong organisational perspective to M-EC WPs 1 and 4, with his research focus on civil society organizing in the context of globalisation and digital technologies. As former visiting professor at EC-SLU and former WP leader in M-EC, he has close links to the group as well as a good understanding of the Swedish context.

5.1.10. Loughborough University, UK

The Storytelling Academy at Loughborough University is an interdisciplinary research team with an international reputation for excellence, based at the School of Design and Creative Arts. Professor Michael Wilson brings a comprehensive competence into storytelling and its social and political applications. Dr and Senior Lecturer Antonia Liguori has since several years been involved in exploring the role of storytelling in digital contexts, and in investigating and trialing ways of using digital storytelling as a participatory methodology for interdisciplinary research. One early career researcher at Loughborough University – a postdoc – are involved in and partly funded through WP5.

5.2 Societal partners

M-EC consists of a broad range of societal partners (see Table 5.1). They are involved as consortium partners (category A), WP partners (category B) or programme partners (category C). As the programme evolves, partners' roles might change, partners may get involved in more activities than the ones indicated here, and new societal partners may enter the programme. The level of our transdisciplinary collaboration varies, from in-depth co-creation of research to cooperation where different partners play different roles.

Table 5.1 M-EC societal partners

Partner's sector	Partner	M-EC partner category	Programme parts that the partner contributes to
Public authorities and agencies	Uppsala Municipality (Uppsala kommun)	A	WP4, WP5
	The Swedish Environmental Protection Agency (SEPA; Naturvårdsverket)	B	WP1, WP3, WP4, WP5
	Swedish Forestry Agency (Skogsstyrelsen)	B	WP4, WP5
	Ovanåker Municipality (Ovanåkers kommun)	B	WP5
	Swedish National Heritage Board (SNHB; Riksantikvarieämbetet)	B	WP5
	Uppsala County Administrative Board (Länsstyrelsen Uppsala)	B	WP5
	The Swedish Association of Local Authorities and Regions (Sveriges kommuner och regioner, SKR)	C	Commons
Businesses	WSP Sweden/International	B	Commons, Collaborative strategic reserve project
	Nudie Jeans	B	WP1
	Dedicated	B	WP1
	Paskaia	B	WP5
	SLU as landowner	B	WP5

NGOs, including other membership organisations and research institutes	Swedish Centre for Nature Interpretation (SCNI)	A	WP2, WP3, WP4, WP5
	Swedish Library Association (Svensk biblioteksförening)	A	WP1
	Data and Society Institute, the US	B	WP1
	The Swedish Hunters' Association (Svenska Jägareförbundet)	B	WP3, WP4
	Greenpeace Sweden	B	WP4
	The Federation of Swedish Farmers (LRF, Lantbrukarnas Riksförbund)	B	WP3, WP5
	Carbon Action	B	WP5
	Svensk kolinlagring	B	WP5
	PlanVivo	B	WP5
Cultural institutions	Biotopia – the biological museum of Uppsala	A	WP3
	Wikimedia Foundation Sweden	B	WP1
	Museum of modern art in Stockholm (Moderna museet)	B	WP2
	The Swedish History Museum (Historiska museet)	B	WP2

6. The Commons

The Commons perform three interrelated roles, namely: delivering programme-wide infrastructure to support the work of all the parts of the programme; supporting creative communication and collaboration and ensuring scientific quality and impact by instigating collective and critical reflection, theoretical and conceptual integration across the five WPs and strategic reserve projects, and by producing and reviewing outputs for both academic and non-academic audiences. The Commons thus consolidate the insights developed in the programme and enhance the programme's impact and transformative potential.

This WP is led by Sofie Joosse (EC-SLU) and Eva Friman (CHS-UU), supported by coordinators Robert Österbergh (strategic communication & impact, EC-SLU) and Maria Nyström (organisation and communication, CHS-UU) and a financial officer (SLU).

In the Commons we also situate five working teams, each responsible for a larger strand of cross-cutting and synthesis work. First, we actively connect the work in M-EC to the larger field of communication research (The C in EC). This work involves participants from all WPs (Shiv Ganesh, Jutta Haider, Maria Johansson, Anke Fischer, Martin Westin, Sara Holmgren, Eva Friman, Sofie Joosse), is open to all programme researchers, and is led by Shiv Ganesh. A second team is responsible for the review and further conceptual reflection and development of the 'environment' in environmental communication (The E in EC). The researchers involved are René van der Wal and Hanna Bergeå. Third, we produce a textbook in environmental communication (contract with Routledge is signed). This work is done by Anke Fischer, Lars Hallgren, Malte Rödl, Camilo Calderon and Amelia Mutter. Additionally, the two strands NiLab and Impact node work across the programme. In all five components as well as in the overarching work of the Commons, additional researchers and societal partners may be included for the development of specific activities to further strengthen the methodological and conceptual development in M-EC.

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6.1 Background

To add further value to the work in the WPs, and to use their insights in terms of their wider applicability, the Commons uses a variety of methods and activities to support creative and collaborative work to:

- Share experiences and insights throughout the programme.
- Identify focal directions for synthesis and integration, developing higher-level insights (e.g., on meta-discourses) on overarching issues, and turn these into high quality research outputs.
- Perform cross-cutting work and synthesise findings.
- Critically reflect on the programme's assumptions, aims and development to ensure its transformative potential. This includes revisiting the five principles for reframed environmental communication, drawing on the empirical and conceptual work across the programme.
- Translate joint findings into outputs designed to shape communication practice, such as training courses and capacity building workshops.
- Support creative reflexivity, so that programme partners learn and improve their own environmental communication practice – in or outside academia.

These collaborative spaces, methods and activities are designed with ground rules for interaction for addressing tensions and emerging concerns and for ensuring that the complexity of our collaborative research is acknowledged and worked through. This minimizes the risk of producing knowledge hierarchies and reproducing structural inequalities through our own practices (Facer & Enright 2016, Mirowski 2018). Importantly, M-EC convenes collaboration not only around matters of concern (Latour 2004) but also matters of care (de la Bellacasa 2017, see Pezzullo 2020 for an application to environmental communication). Working with wicked sustainability issues such as climate change may be emotionally challenging. Therefore, the Commons creates specific co-inquiry and reflection processes as a means of working with the emotional as a core part of environmental communication.

6.2 Outreach

Often, communication and outreach are separate tasks in research projects and programmes, and meant to only disseminate the knowledge generated. Our programme, takes a different approach. As a transdisciplinary programme in Environmental Communication, communication and collaboration are integral to the research itself, and embedded in all levels, from smaller projects to work packages and programme-wide development. This section highlights our more traditional outreach activities.

Our outreach aims to ensure that research insights as well as practical tools and approaches generated in the program become wider known and used, by facilitating engagement with relevant actors, policy processes and networks. To this end we also work to place the programme as a trusted and recognised voice in the public debate on sustainability issues in Sweden. A set of key communications and outreach documents have been developed, such as a communication strategy, a LinkedIn strategy (to increase visibility, interaction and number of followers), and a work plan for external monitoring of current events, news and activities of relevance to the programme. These are further implemented in 2025.

During 2025, we will further develop the already existing platforms, such as the M-EC website and LinkedIn, including the M-EC blog, where M-EC partners and invited guests recount findings and reflections from the programme. We will undertake traditional and

targeted forms of research communication, such as policy- and practice briefs, debate articles, articles in trade magazines, blogposts and podcasts, and aim to participate in radio programs devoted to sustainability issues. This work is grounded in a frequently updated analysis and compilation of fora and channels fitting for M-EC's work. We will develop new formats for external communication to be featured on the website and our LinkedIn account. This includes commentaries on current events, podcasts and short videos presenting the programme in relation to timely key issues, and a series of portraits of participants in the program to present the research and the insights in an accessible way. Finally, we will evaluate our outreach to track impact regarding reach and effect.

6.3 Tasks and methods

The triple role of the Commons – delivering programme-wide infrastructure, supporting creative communication and collaboration and ensuring scientific quality and impact – is performed through six tasks run in parallel: (1) Management and administration, (2) Internal communication, (3) Monitoring, evaluation and adaptation, (4) Education, learning and external communication, (5) Creative cross-cutting collaboration, and (6) Synthesis and co-inquiry.

Task 1: Management and administration (Year 1-4) ensures that M-EC has and maintains structures that allow it to run smoothly. This includes a functioning consortium agreement, programme administration team with communicator and financial administrator, and the development, review and annual update of the programme plan and report. Further, the task includes liaison with the Programme Board, and reporting as required on activities, outputs and financial matters from the programme to Mistra. Finally, it includes forming the programme leadership and programme team, building and maintaining collaboration and meeting routines, including a jointly created annual collaboration and activity wheel.

Task 2: Internal communication (Year 1-4) ensures clear and transparent communication with and between programme partners to create optimal conditions to collaboratively work towards the programme aims. We organise several programme meetings and aim to include societal partners in early stages of the planning process to ensure relevance and ownership. These meetings include capacity building sessions and are combined with specific WP meetings and other events and include 'sharing the science' elements that explicitly focus on developing joint work. Every other programme meeting is organised jointly with the biennial EC conference (see further below). Our internal newsletter serves as a channel for invitations to meetings, activities and joint work within and across WPs.

Task 3: Monitoring, evaluation and adaptation (Year 1-4) ensures that we reach and assess the programme's impact and adapt our plans and processes when needed. Our transdisciplinary research process is central for this task and ensures that societal partners feel co-ownership and give feedback when the programme is (or is not) relevant for them and their wider networks. Partner dialogues (also a format for Task 2) are used to grasp and support a deepened understanding of social partners' experiences in the programme and to investigate the relevance of the programme for partner organisations, identify windows of opportunity and possibilities for synergies. The partner dialogues are annually analysed by the programme team and reported on for internal use only. Impact stories, showcasing intended and unintended impacts, are used as another of our impact assessment tools. ISAG will advise us what long-term impact frameworks are suitable, and we will put these into action for M-EC and beyond. The impact node, a collaborative strategic reserve project suggested by one of our societal partners, is another impact framework (see Section 4.2). In the impact node, research findings from M-EC will be used

in flexible workshops and sessions at environmental consultancies and beyond. In this task we also include an annual mapping exercise of the changing landscape of environmental communication, to ensure we reach and collaborate with relevant actors, through the right tools (e.g., policy briefs, or direct collaboration) and fora (e.g., through collaboration with larger networks of actors).

Task 4: Education and learning (Year 1-4) ensures M-EC's aspired impacts are achieved and contributes directly to the establishment of a hub for EC research, practice and policy. M-EC co-creates content together with other Mistra programmes to be shared with policy, practice, other researchers and the interested public. Furthermore, together with the program director for Mistra Food Futures, M-EC's program directors have initiated a discussion with Mistra about possible collaboration on constructive sustainable societal transformations among all Mistra programs. Through our annual EC days – the Programme Laboratory (see task 5) and *Miljökommunikationsdagen* in tandem – with research discussions, seminars and training events, we jointly discuss, and disseminate the latest insights and tools from the programme and foster networking between practitioners and researchers. *Miljökommunikationsdagen* invites all programme partners and societal actors beyond the program. In addition, we contribute to events at partner organisations.

A biennial EC research conference (as our Annual Program Meeting every other year) is organised as a 'programme meeting with friends', i.e., EC researchers from other universities in Sweden and internationally are invited, as well as researchers from other relevant research contexts and key societal actors. The intention with this conference is to form an informal network of EC-interested researchers and other societal partners, meeting regularly to share research insights, conceptual developments and debates, and thus to establish a transdisciplinary research community which involves societal actors and both early career and more senior researchers. Following the model of other such network meetings in Sweden, we envisage this research conference to become self-organising after a few years, with rotating hosts.

The programme has a unique opportunity to test, develop and integrate findings into EC-SLU's and CHS-UU's Master programmes, through lectures, seminars and Master thesis projects. We will tailor practice-oriented training courses in relation to the focus areas of environmental communication, to be run at societal partner organisations and available to wider audiences, develop and deliver capacity building and reflection sessions in environmental communication for non-specialists, and develop strategies for transforming environmental communication in contexts relevant to M-EC's partners, e.g., developing input into organisational strategies for communication. We also develop approaches for communication capacity building and reflection using insights and lessons learned from across M-EC, also for audiences that have not previously been included. Within the Commons, we develop approaches and carry out sessions for non-specialists in communication (such as academics, or staff of governmental bodies), to engage scientists (and others) in a broader reflection on how they communicate with non-scientists about the environmental issues covered in their work. Our knowledge is shared in international and national networks. Methods and reflexive tools that are developed, trialled and tested in the programme, are made available as tangible programme artefacts and/or online as a programme legacy for long-term external communication.

Finally, we establish a visiting researcher scheme (called M-EC fellowships), inviting scholars (1-2 months) from non-partner organisations, ideally with a background in communication research to strengthen the programme's connection to this research field, to visit M-EC and contribute to relevant analysis and writing projects. Similarly, we have applied for a Mistra Fellowship for one of our researchers and will apply for a Mistra Fellow

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to come work with us. Based on this experience, we will evaluate the possibility for a visiting researcher programme to be included in the future EC hub.

Task 5: Creative cross-cutting collaboration (Year 1-4) develops and puts into operation creative spaces and formats for the programme to flourish. We develop creative research communication, EC-days, a nature interpretation lab as well as co-creation projects funded by the strategic reserve. Each of the above projects emerged as an interest of a range of participants across the programme. The projects will all make new connections among programme participants, across WPs, or between focus areas of environmental communication.

Beyond what is stated under outreach, we experiment with, and design creative research communication activities and outputs based on recent insights from within communication research and science communication, to look for ways we can even better present the programme.

The annual EC-days focus on cross-cutting themes, such as power or emotions, that are of key interest for research and practice. The first day is a research-focused Programme Laboratory, while the second day is the practice-oriented *Miljökommunikationsdagen* (task 4). The laboratory focuses on research, i.e., discussions, mappings and development of important questions, concepts and understandings within the theme, also together with non-researcher participants in the program. The programme laboratories are co-organised by the programme leadership with the focus areas and strands in the Commons. These laboratories gather participants from across the programme. We use inspiring and activating workshop methodologies, which are process-oriented but also produce more tangible outputs., e.g., book sprints, short stories, debate articles, and other (academically speaking) non-traditional outputs, as well as one practice/policy-oriented research brief per laboratory.

The nature interpretation lab is an open arena and workspace where research and practice meet in a mutual learning and development process to work and learn together. A smaller core group of professionals from the nature interpretation field is invited to take part in the hub as a reflective sounding board for the WPs and for emerging research questions. The lab adapts to such questions and potential needs for connecting with practitioners and disseminate research results from the programme.

Co-creation projects funded by the strategic reserve are the continuation of our Think/do tanks. They are projects where space is available for societal partners' own initiated practice-relevant transdisciplinary work, with focus on doing and with agile outputs. In M-EC, collaboration between societal partners and researchers is still core for these projects, while researchers too can initiate them. The projects also offer a place for new partners and their interests, and for partners whose questions do not have a given home in the WP structure. This framework serves to address the theory-practice gap in environmental communication, and to initiate synthesis work covering lessons learned from across the programme. Like Think/do tanks, this framework allows societal partners and researchers to translate and challenge context-bound research insights, and to co-create guiding principles and methods for transformative environmental communication.

Task 6: Synthesis and co-inquiry (Year 1-3) develops a synthesis approach, building on approaches like co-inquiry (Banks et al. 2014) and structured reflection in practitioner inquiry (Stevens et al. 2016). The task provides a forum for discussing substantive ideas, concepts and theories in relation to our work. Three large endeavours form the core of our synthesis activities:

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First, we will publish an EC textbook - A Critical Introduction to Environmental Communication (offer of contract at Routledge), drawing on and synthesising insights from the programme. It will position EC as a concept, a profession, and a phenomenon in society, placing particular emphasis on its omnipresent nature, and explicating the programme's principles for reframing environmental communication. The writing process provides space for structured reflection and explicit articulation of the relationship between M-EC's approach to environmental communication in relation to the wider field of communication research. More than an output, the textbook will also be an important vehicle for a programme-wide synthesis process with workshops and seminars inviting all participants.

Second, the E in EC project demonstrated how the environment foremost forms a background in much environmental communication research: it is a topic 'communicated about' in the flagship journal of the field of environmental communication. Informed by advances within environmental communication as well as in other fields, this project initiates and guides programme-wide (collaborating with WPs and societal partners) trialling of how the environment could be a more integral part in the theories, methodologies and analyses of environmental communication research, to support further inter- and transdisciplinary research, academic advances and societal relevance.

Third, in a strand of synthesis work coordinated by a communication scholar (to be employed), we review the ways in which environmental communication research – our own, but also the work of others – contributes to our understanding of communication, and how these contributions can be fed back into wider communication research ("the C in EC"). WP leaders as well as other programme participants, representing all the WPs, participate actively in this synthesis strand, which will include a literature seminar series on communication research related to M-EC's five principles. The team will work towards a special issue for a communication journal (initial target: *Environmental Communication*) that brings together articles by the different WPs as well as research by other, international scholars. Joint work on the special issue, as well as the writing of a conceptually oriented editorial, will facilitate direct contact with EC and other communication researchers outside Sweden, and act as a vehicle to articulate the contributions of a reframed understanding of environmental communication to wider communication research. Insights from this work will be presented in symposia arranged at international (environmental) communication conferences. These symposia will involve both M-EC and other contexts, to facilitate joint discussion. In addition, we will also consider writing a review article for a communication journal such as the *European Journal of Communication*.

Task 6 also includes revisiting the methods for discussing and critically reflecting on the inter- and transdisciplinary process, including ethical and emotional issues. Within this task, the choice of data to use and analysis approaches for synthesis projects will also be processed, and data collection and analysis be done. Depending on the data needs identified, the participants of integration projects, for example, observe and document relevant activities across the programme and compile, examine and summarise insights for shared outputs. Additional insights for these analyses could come from interviews conducted with actors in and around the programme. Outputs include manuscripts for peer-review international journals on research findings and theoretical/methodological developments, research summaries for various audiences, e.g., blogposts and practice/policy-oriented research briefs, contributions to international conferences, and summaries for non-specialist audiences of our synthesis work, jointly produced by researchers and societal partners.

Our synthesis work is further enriched and informed by insights and findings from other research programmes and projects on environmental communication, transformative learning and sustainability run by EC-SLU and CHS-UU, which are funded by, e.g., Formas, The Swedish Research Council, the Swedish Forest Society Foundation, Sida, Swedish Institute (SI), Vinnova, Kone Research Foundation, the Swedish EPA, NordForsk and the Swedish Energy Agency.

Table 6.1. The M-EC Commons outputs and expected impact

Outputs (by m=month; y=year)	Description	Impacts
Task 1: Management and administration		
Consortium agreement (M1)	Develop and ratify consortium agreement	M-EC has structures in place that allow it to run smoothly
Staff in place (M2)	Set up ways of working with the financial officer and the communicator	
Programme plan and reports (Y1-4)	Y1: Develop, review and annually update the programme plan and report, submit to MISTRA	
Collaboration and meeting routines (Y1-4)	Y1: Create and regularly update an annual collaboration and activity wheel	
Task 2: Internal communication		
International scientific advisory group (Y1-4)	Y1: WP-wise and programme-wide liaison with the international Scientific Advisory Group (ISAG)	Communication between M-EC partners is clear and transparent, allowing for active and creative debate, scientific advances, methodological innovation and productive work overall
Programme meetings (Y1-4)	Y1: Organise at least one programme meeting per year (via video conferencing where appropriate)	
Internal newsletters (Y1-4)	Biannual internal newsletters inviting to programme events and communicating progress and impact achieved (5 newsletters during 2024)	
Task 3: Monitoring, evaluation and adaptation		
Framework for long-term impact monitoring (Y1-4)	Develop and implement framework for long-term impact monitoring together with ISAG	M-EC is able to assess its impact over time and can use this information to adapt its plans and processes
Partner dialogues (M2, M14, M26, M38, M48)	Partner dialogues to map M-EC's impacts on the work in the partner organisation, to learn and adjust, and identify ways to increase impact	
Report on partner dialogues (Y1-4)	Annual internal reports compiling findings from partner dialogues to be used as input for revisions of the programme plan, adaptation of the work, and reflection in the WPs (especially the Commons)	
Impact stories (Y1-4)	Connected to partner dialogues, develop and implement framework for impact stories as a system to record evidence of impact	
External evaluation (M10-M36)	Co-design and execute longitudinal evaluation process together with consultancy	
Strategic communication impact framework (Y1-4)	Y1: Develop and implement framework for tracking the impact of our strategic communication	
Impact node (Y1-)	Organize workshops and seminars at environmental consultancies (see Section 4.2) (Depending on strategic reserve funding	
Task 4: Education, learning and external communication		
Digital platform (Y1-4)	Y1: Further develop and curate our digital platform featuring training material, practice/policy-oriented research briefs, blogs, short films, news releases, events calendar, and any other digital outputs produced by M-EC	M-EC achieved its aspired impacts, and has laid the foundation for an active EC hub as a legacy
LinkedIn account (Y1-4)	Curate our active LinkedIn account	
Blog (Y1-4)	Coordinate and curate a blog with contributions from M-EC partners and invited guests	
Practice/policy-oriented research briefs (Y1-4)	Publish at least 5 practice/policy-oriented research briefs, as outputs from the Programme Laboratories	
Debate articles (Y1-4)	At least 3 debate articles (Y1: 4 debate articles)	
Almedalen political week (Y2-4)	Co-create content with other Mistra programmes, and share with policy, practice, and other researchers	

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Annual EC gathering (Y1-4)	Y1: Organize *Miljökommunikationsdagen* annually, providing seminars and training modules that translate findings into practice	
EC research conference (Y2, 4)	Organize a biennial conference for EC research, and develop approach for continuation after Year 4	
Training courses and workshops (Y2-4)	Develop and organize practice-oriented training courses in connection to each of WPs 1-5. These will be run at partner organisations but also be available to wider audiences	
Capacity building and reflection sessions (Y3-4)	Development, piloting and delivery of capacity building and reflection sessions for non-specialists in communication in at least three different contexts	
Input into communication strategies (Y2-3)	Co-developed input into communication strategies for at least three different organisations	
M-EC Fellowships (Y2-3)	Invite one communication researcher annually (1-2 months) to visit and collaborate within the programme, contributing to e.g., research articles	
Mistra Fellow (Y2)	Y1: Apply for an exchange within Mistra Fellows programme	
Integration of M-EC findings into Master's pro-grammes at EC-SLU and CHS-UU (Y1-4)	Y1: Provide input to and integrate findings into EC-SLU's and CHS-UU's master's programmes, through lectures, seminars and thesis projects	
Career development sessions for young researchers (Y1-3)	Y1: Annual sessions to support postdoctoral and early-career researchers within M-EC in their development	
Knowledge sharing through national and international networks (Y1-4)	Y1: Identify ways to involve and share M-EC insights and approaches with existing networks such as IECA and the EC-SLU alumni network (WECAN) – both with academics and practitioners as members	
Material and methods (Y1-4)	Y1: Methods and reflective tools in written, artifact and digital form shared as a M-EC and beyond legacy	
Task 5: Creative cross-cutting collaboration		
Creative research communication (Y1-4)	Y1: Design and organize innovative activities and outputs to present our research	M-EC is characterized by creative collaboration as a legacy for the EC hub
Programme laboratories (Y 1-4)	Y1: Organize 5 programme laboratories, one for each of WP1-5, championing each of the five principles	
Nature interpretation lab (Y1-4)	Y1: Develop a nature interpretation lab in collaboration with SCNI and WPs 2-5	
Co-creative projects (Y1-3)	Y1: Revisit the modus operandi for co-creative reserve projects (M2) and support individual projects	
Book sprints/short stories (Y2-4)	A total of 5 of any of these outputs – one from each Programme Laboratory	
Other non-traditional outputs from our transdisciplinary research process (Y3-4)	Currently unspecified	
Task 6: Synthesis and co-inquiry		
EC textbook (Y1-2)	Y1: Write textbook with Routledge for broad international audience (print as well as digital open access, with supplementary online material)	M-EC shapes future academic debate on transformative EC in relation to the five principles
Peer-reviewed paper "E in EC" (Y1-3)	1 article for a peer-reviewed international communication journal (draft ready)	
Conference sessions (Y2-4)	Arrange 2 symposia at international (environmental) communication conferences on the contributions of environmental communication to our understanding of communication (with participants from M-EC and beyond)	
Special issue (Y2-3)	Edit special issue and write editorial on the contributions of environmental communication research to our understanding of communication (with contributions from M-EC and beyond)	
Peer-reviewed papers (Y2-4)	4 co-authored manuscripts on synthesis and cross-cutting work for peer-reviewed international journals. Each manuscript led by a different researcher from our partnering universities	M-EC shapes future academic debate on transformative EC in relation to the five principles
Conference contributions (Y2-4)	At least 3 conference presentations that share insights from the Commons with national and international audiences	
Summaries for non-specialist audiences (Y3-4)	4 summaries from the synthesis work for non-specialist audiences, produced by researchers in collaboration with societal partners	M-EC reframed EC policy and practice

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7. The Focus Areas

7.1 WP1: Information cultures, data and technology in environmental communication

7.1.1. Summary

WP1's overall goal is to improve our understanding of how information technologies and data are involved in the formation of environmental concerns and to recognise associated opportunities and challenges for environmental governance and communication. WP1 centres the negotiation of data and information technologies in the emergence of environmental concerns among a range of actors and examines how they acquire meaning as well as materiality, in the process making information both instrumental and constitutive. Specifically, this means that research in WP1 examines how data —as an imaginary and in concrete terms — is created, shared and (re)assembled across applications, services, people, organisations, and other actors to identify and understand potential opportunities and challenges for environmental meaning-making and governance. This includes clarifying how data-driven practices embed specific types of knowledge and control at the expense of others (Benjamin 2019; Haider & Rödl 2023; Singh 2023) and thus invariably shape environmental governance (Loring et al. 2021). To support the methodological, empirical and conceptual elasticity needed to understand what is happening at the intersection of datafication and the environment, research in WP1 is informed by a socio-material, relational understanding of information, technology and data (Faraj & Leonardi 2022) and a hybrid analytical approach that considers how the integration of digital ubiquity and material culture affects research design (Ganesh & Stohl 2020).

WP1 is convened by Jutta Haider (SSLIS, HB) and includes Elisa Tattersall Wallin (SSLIS, HB), Björn Ekström (SSLIS, HB), Carin Graminius (SSLIS, HB), Malte Rödl (EC-SLU), René van der Wal (SLU), and Shiv Ganesh (UT Austin). Partner organisations are – at the moment – the Swedish Library Association, Wikimedia Foundation Sweden (John Andersson), the Swedish Environmental Protection Agency (Stina Söderqvist), the Search Studies Research Group (Germany, Dirk Lewandowski), and Nudie Jeans.

7.1.2. Background

The number, sophistication, availability and use of data-driven information technologies is constantly increasing. Already, they are involved in most areas of society and many aspects of everyday life. Its impact on environmental communication will increase and intensify in the coming years as large language models and generative AI rapidly gain traction (e.g., Haider & Rödl 2023; Machen & Nost 2021). WP1 offers urgently needed inter- and transdisciplinary research to address the challenges related to these information technologies, and to identify ways to leverage data and information technologies to reshape environmental communication in research, policy, and practice, to effectively support and promote sustainability transformations (Hoolohan et al. 2021).

In WP1, the notion of 'data' is understood as a situated, relational concept that needs to be adapted to the research interest at hand (Borgman 2015; Feinberg 2022; Gitelman 2013). Data can be conceptualised as constitutive and instrumental: as a cultural imaginary shaped by notions of perpetual technological progress, universal quantification and fragmentation of information; and as snippets of digital information that are constantly changing in loops from observation to evidence that is then fed back into the loop. Both views inform the way data is operationalised in WP1: Currently, more and more aspects of our social, political, and other systems are transformed into data and undergo processes

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of quantification, referred to as the datafication of society (Schäfer & Es 2017; van Dijck 2014). The notion of datafied information cultures then describes the complex interplay between datafication and information cultures (Oliver et al. 2023), i.e., the various co-constitutive relations of norms, values, practices, materialities, technologies, and information that contribute to and situate the creation of meaning.

WP1 combines perspectives from three interrelated research areas: environmental communication, information studies, and critical data studies. Qualitative, critical research on the role of data and information technology in environmental meaning-making is still in its early stages. Yet, as society is increasingly pervaded with datafication processes and data imaginaries, developing a more comprehensive and critical perspective on this topic is urgently needed. Conversely, an understanding of environmental communication as constitutive and environmental information as socio-material and entangled across practices can contribute a valuable perspective to critical data studies and knowledge mobilisation (Nicolini et al. 2023). This presents an important opportunity for interdisciplinary research that can shed light on the complex relationship between (environmental) communication, information, and data. Such work will nuance understandings of increasingly data-supported environmental governance practices in view of the ever more unsettled status of accountability, evidence, and trust (Crawford 2021; Haider & Sundin 2022; Marres 2018).

7.1.3. Aims and research questions

To meet the overall goal of WP1 to improve our understanding of how information technologies and data are involved in the formation of environmental concerns and to recognise associated opportunities and challenges for environmental governance and communication, we have two subsidiary aims: The first is to provide insights into environmental meaning-making in situated practices that involve data-based technologies. The second is to provide critical analyses of the constantly changing socio-technical conditions for environmental meaning-making in datafied information cultures and to help identify areas for potential regulatory or educational interventions. These aims are addressed through the following research questions.

1. In what ways do information technologies and data shape environmental meaning-making in different contexts and situations and how are they implicated in sustainability contestations and information disorders in society?
2. How are conflicting notions of evidence co-constituted by information technologies and data, and what types of challenges can this pose for environmental governance and communication?
3. In what ways is environmental meaning-making afforded by infrastructural conditions, and how can insights into this relationship inform policy, including regulatory and educational interventions?

These high-level research questions are further operationalised in empirical questions in relation to individual tasks and cases.

WP1 supports early career researchers and finances one postdoc (Carin Graminius) during Years 1 and 2 and provides funding for a newly employed lecturer (Elisa Tattersall Wallin). In addition, WP1 includes one doctoral student as a partially funded participant (Björn Ekström). The research group further includes doctoral student Emma Román (since 2023, supervised by Jutta Haider), as an associated participant. She is also involved in relevant activities in WP1 and M-EC. She researches the work of public libraries and librarians in communicating climate change information. This position is funded by VR, the Swedish Research Council through the research school Re:Source, which includes an explicit focus on the crisis of information, incl. mis- and disinformation. By combining existing grants

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with M-EC funds, WP1 facilitates the possibilities for collaboration between researchers at different career levels, with a view to provide opportunities for early career scholars.

7.1.4. Tasks and methods

WP1 consists of four tasks. Tasks 1-3 (year 1-3,5) seek to provide insights into environmental meaning-making based on three cases of situated practices that involve data-based, algorithmic information technologies. Task 4 (year 1-4) is planned as an observatory and contributes with critical analyses of the constantly changing socio-technical conditions for environmental meaning-making in datafied information cultures, and through this to identify potential areas for regulatory or educational interventions.

WP1 is built on work from M-EC in the following ways: Task 1 was formulated based on findings from WP5-Phase 1 and the strategic reserve project 'Networked Silences'. Task 2 is based on and continues work from WP4-Phase 1. Task 3 is informed by insights from two strategic fund projects: 'Fighting Windmills' and 'Just Google It!'. Task 4 responds to insights from Phase 1 WP4, WP5, and the mentioned projects, which indicated that society's datafication is accelerating and intensifying at a rate that necessitates new forms of responsive and adaptive strategies for monitoring, method development, and analysis that are specifically attentive to environmental communication.

WP1 draws on the overarching methodological frames of data journeys (Bates et al. 2016, Beaulieu & Leonelli 2021) and digital forensics (Flyverbom et al. 2023 forthcoming), integrating computational and qualitative methods with visualisation techniques (Ekström 2021, Geiger & Ribes 2011) into mixed methods approaches. It also pays attention to audio and audio-visual formats and associated platforms. Focus is on how data move between and across contexts, organisations, and people; as well as how data from different sources converge or collide, are transformed into evidence, and acquire meaning differently in different situations and practices. Mapping the trajectories of data and dissecting their provenance and relations — and thereby transgressing dualities such as digital/analogue, quantitative/qualitative or universal/ specific (Ganesh & Stohl 2020) — can provide a basis for understanding how different forms (and understandings) of data intersect everyday life, public engagement and business organisation and join global and local agendas. Paying attention to these trajectories is a means to study how relations between evidence and trust are configured in ways that either strengthen or challenge a position. Tasks 1 – 3each focuses on a different aspect of the role and place of data in how evidence and trust relate, i.e., to connect everyday live with environmental measurements (Task 1); to communicate transparency and signal accountability (Task 2); or to (de)stabilise knowledge claims and ownership of issues (Task 3). All three, but certainly Task 3, potentially manifest as information disorder, giving rise to mis- and disinformation (e.g., Wardle & Derakhshan, 2017) or as closely connected to conspiracy ideologies (Moran & Prochaska, 2022). WP1 combines case-based research with review methods, proof-of-issue approaches, and adapts media monitoring strategies for research purposes. To reach academic audiences in both information studies and communication WP1 output is submitted to high-impact journals relevant for both communities: e.g., *Information, Communication & Society; Big Data & Society; New Media & Society*.

Task 1: Everyday life concerns how environmental apps produce and acquire meaning in people's practices and everyday lives, sometimes intersecting with work life. They are designed by companies, NGOs or government agencies, and build on scientific evidence, and data produced through surveys or by citizens. Such apps create flows that users experience in their daily lives, and which are shaped by complex agency-structure interplay presenting opportunities for exploring the dynamics of socio-environmental

continuity and change. In focus are apps related to environmental monitoring, e.g., concerning hazards such as floods, pollution or weather events. After an overarching exploration of such apps and underlying data, we focus on 2-3 case studies, combining digital forensics approaches with user interface analysis, observations, interviews, document analysis, supported by visual methods (mixed methods). The case studies are decided on in conversation with the Swedish Environmental Protection Agency. Conceptually, Task 1 ties in with WP2 (Meaning-making) and collaboration are initiated via at least one co-creative workshop in Year 2.

Task 2: Environmental social governance (ESG) focuses on the communication practices that arise when emerging data technologies are embedded into supply chains to increase trust and accountability in sustainability certification systems. In partnership with Nudie Jeans, we examine how engagement with blockchain, and similar emerging technologies creates both opportunities and challenges for sustainable practice, including how conflicts and power dynamics are negotiated. The study will progress through interviews with a range of stakeholders including managers, designers, artists, activists, and workers in Sweden and elsewhere in the supply chain. These are combined with mapping techniques to outline data trajectories and elucidate how data and data sources are enlisted as evidentiary tools for the production of transparency. Team: Shiv Ganesh, research assistant.

Task 3: Advocacy issues examines data journeys in the context of advocacy coalitions, i.e., groups of actors promoting shared societal or policy aims. In the digital realm, these groups inevitably leave data traces that can be used to study environmental meaning-making and in particular contestations over sustainability transformations, including climate change denial or obstruction. As information is embedded in recognisable practices, such as use of ideological dialects, topic markers, copy-pasting, memes, or the replication of claims, data become traceable through combinations of digital methods, qualitative discourse analyses, and visualisation techniques (mixed methods). These traces help make visible the formation of issues and the mobilisation of actors, and their various interconnections. We investigate renewable energy (wind and solar), and food production (agriculture), and climate change mitigation and adaptation more broadly, three advocacy issues in which sustainability transformations are couched in goal conflicts and power struggles. Conceptually, this task connects to WP3 (Knowledge), and empirically to WP4 (Governance) and we will develop insights through collaboration, aiming at co-authoring at least one publication.

Task 4: Observatory to monitor trends in data and information technologies of relevance to environ-mental communication is in partnership with the Swedish Library Association, the Wikimedia Foundation Sweden, and the Search Studies Research Group at Hamburg University of Applied Science (Germany).

We intend the observatory to work as a platform to gather and interrogate insights on the involvement of data and information technologies in environmental meaning-making and governance in a way that is considerate of the specific communication dynamics in the current political landscape. To engage with actors centrally positioned at the society/government nexus in Sweden, we collaborate with the Swedish Library Association. Libraries and librarians are assigned new roles in the reassessment of civil contingency and in addressing problems related to mis- and disinformation. By bringing together findings from tasks 1–3 and observations from wider technological and societal changes the observatory serves to engage with a broader spectrum of non-academic stakeholders and actors than those already included as partners in the programme. The monitoring strategies are regularly reviewed and updated, and examples of methods to keep track of

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and identify relevant developments in this fast-moving area include stakeholder mapping, expert interviews, social media analytics, search engine and event monitoring. Here the expertise of the Search Studies Group and that of the Wikimedia Foundation is of great value. In addition, and inspired by the co-creational turn in strategic communication (Johnston & Taylor, 2022), regular high-level workshops bringing together stakeholders and experts will help to contextualise, nuance and situate developments. These insights are also be created in brief, exploratory mixed-methods investigations that lead to proof-of-issue that are shareable with wider audiences, including e.g., professional groups, policy makers, but also civil society and the general population (via WP societal partners). The observatory will foster alliances and expand its reach by creating transdisciplinary opportunities for momentary collaborations (e.g., in hackathons, unconferences, data jams) as well as for establishing long-term partnerships (e.g., formal workshops in cooperation with the WP societal partners) between researchers, practitioners, and policymakers. This requires a strong network, which the programme and responsible researchers have established during M-EC's earlier years and which will be expanded and further formalised here.

A long-term goal of Task 4 is to establish cross-sectoral networks involving a wide spectrum of academic and non-academic actors that enable sustained monitoring and commenting of society's ongoing digital transformation in relation to environmental challenges in ways that transcend the usual focus on the energy consumption of technical infrastructure (e.g., data centres, blockchain) and on mis- and disinformation. These are important concerns; however, they miss much of the profoundness and sheer magnitude of the datafication of society. Therefore, we aim to highlight considerations related to wider social and environmental dimensions and implications of datafication, such as issues of power, visibility, and values, or control over knowledge, but also access to economic or legal resources.

Table 7.1 Outputs and expected impacts

Timeline (Y/M)	Tasks	Outputs	Expected impacts
Year 1-4 (M1-48)	Over-arching	2 public lectures or other appearance (e.g., at Almedalen, Gothenburg Book Fair, Internet days…)	Increased awareness of datafication in environmental communication and governance by relevant actors and the public.
		2 activities designed for Environmental Communication Days	Increased public understanding of and support for policy in the area.
		Regular and strategic use of M-EC's and partner organisations' social media channels and press releases.	
		Supervision of 1-2 Master theses.	
Year 1-3,5 (M1-42)	1,2,3 (M1-42)	2 blog posts or similar with international reach (1 by M12, 1 by M24)	Refined terminological tools and analytical concepts will advance interdisciplinary development of theories and methods to (a) better understand implications of the ongoing datafication of environmental meaning-making and governance; and (b) advance the theoretical development of critical information literacies relevant for environmental communication. The empirical basis and analytical results will serve as a resource for relevant actors (policymakers, private sector decision-makers, educators, and civil society organisations) seeking to identify areas and/or suggest means for regulatory and educational interventions associated with the
		1 debate article in Swedish media	
	1 (M1-42)	2 manuscripts for international, peer-reviewed journal (1 by M24, 1 by M42) 1 conference presentation/panel participation, e.g., at ASIS&T (Association for Information Science and Technology) or ECREA (European Communication Research and Education Association) conferences	
	2 (M1-36)	1 manuscript for international, peer-reviewed journal (by M36)	
		1 conference presentation/panel participation e.g., at NCA (national Communication Association), ICA (International Communication Association) or ECREA (European Communication Research and Education Association) conferences	
	3 (M1-42)	1-2 manuscripts for international, peer-reviewed journals (1 co-authored with WP3, WP4) (by M30, M42)	

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		1 conference presentation/panel participation, e.g., at ASIS&T (Association for Information Science and Technology) or EASST/4S (European Association for the Study of Science and Technology) conferences	datafication of environmental meaning-making and governance.
Year 1-4 (M1-M48) Observatory	**4 (M1-48)**	2-3 rapid communication contributions to scholarly journal	Improved hybrid and mixed methods adapted to the area will provide researchers and other stakeholders with the means to investigate the datafication of environmental meaning-making as a fast-moving and high-risk societal issue. Increased public engagement and awareness of how datafication and environmental meaning-making interrelate. New ideas, approaches, and solutions to environmental communication challenges and transdisciplinary approaches to address them. Opportunities for resource sharing and networking will expand reach and impact to secure funding for observatory current awareness initiatives.
		1 high-level workshop (M36)	
		2 contributions to the public debate through science communication outlet with international reach (e.g., The Conversation; data & society report or blog, Wired, Nature opinion)	
		2 contributions to Swedish media (e.g., debate article in national or regional media, relevant professional journals)	
		Min. 1 public facing event in a format responsive to datafication (e.g., hackathon, unconference, edit-a-thon) – in public library maker space or similar (by M30)	
		1 practice/policy-oriented research brief (by M36)	
		Application for network funding (e.g., NordForsk, RJ, or COST action) (M42)	

7.2 WP2: Processes of meaning-making in environmental communication

7.2.1. Summary

Environmental communication scholars increasingly take the role of emotions into account (e.g., Myrick & Conlin 2021, Goldberg 2023). Much of this research is approached from an instrumental perspective, focusing e.g., on the impact of messages triggering different emotions in audiences. WP2 builds on this research, but also broadens the approach to a constitutive take on emotions to account for the complexity of emotions in environmental communication, and addresses: How do individually felt emotions – such as climate anxiety or shame – relate to societal discourse on responsibility and action? How do people deal (individually and collectively) with emotions related to these existential environmental crises? And can communicative interventions support people in dealing with these emotions?

WP2 thus sets emotions at the heart of its investigation and digs deeper into the relation between people's environmental experiences and individual and social processes of meaning-making to understand emotions in relation to climate change and biodiversity loss. This way, WP2 aims to produce knowledge that is of importance for sustainable transformation processes, academically relevant as it contributes to clarifying the role of emotions in EC, and practically relevant for environmental communication practitioners who are interested in designing interventions that take emotions into account. Ultimately, WP2 serves to highlight the multiple and complex ways in which emotions play a role in environmental communication.

WP2 includes an interdisciplinary group of researchers, who collaborate with societal partners and a reference group. The research group consists of WP leader Maria Johansson, Johan Rahm (early career researcher), Marlis Wullenkord (post-doctoral researcher), all from Environmental Psychology, Lund University - Hanna Bergeå and a to-be-recruited senior communication scholar (Environmental Communication, SLU) and Jasmine Zhang (SCNI, SLU). The societal partners are the Swedish Centre for Nature Interpretation (SCNI), the Museum of Modern Art in Stockholm, and the Swedish History Museum. The reference group consists of practitioners in nature interpretation, environmental education, and museum pedagogy.

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7.2.2. Background

Climate change and biodiversity loss are intertwined, existential crises (IPBES 2019; IPCC 2022) that evoke a plethora of emotions in people. Climate change in particular, induces emotions such as anxiety, fear, and worry (Böhm 2003; Pikhala 2020), grief (Cunsolo & Ellis 2018), guilt (Rees et al. 2015), hopelessness (Norgaard 2006), shame (Myrick and Conlin 2021), or melancholia (Lertzman 2015). These emotions relate to the (expected) physical impacts of climate change (Evans 2019), but also pertain to threats to identity, ontological security etc. (Norgaard, 2006). When involved in climate *action* people also may feel more positive emotions, like optimism and hope (Ojala 2022a, Geiger et al. 2021).

As climate worry and anxiety are on the rise (Sciberras and Fernando 2022; Wullenkord & Ojala 2023), scholars have called for (creative) spaces for reflecting on and processing emotions related to environmental crises (Ojala 2022b, Wullenkord et al. 2021, Sundqvist 2021, Milstein 2023). Such spaces can be offered by a very broad range of organisations, such as schools, film clubs, museums etc. WP2 turns to established organisations - the Museum of Modern Arts in Stockholm, the Swedish History Museum and Swedish Centre for Nature Interpretation (SCNI) - with years-long experience of working with both physical settings and emotions to investigate how they in their exhibitions and activities draw on and impact visitors' emotions and understanding of environmental crises, and to explore how settings and artefacts (such as a nature reserve, an exhibition or an artwork), and conversation may alter the visitor experience. Interactions between conversation participants (e.g., between museum or nature guide and a visitor) can be regarded as both the enactment and constitution of the social as well as an expression of the individual. We are here particularly interested in empathy because of its significance from both psychological (e.g., meaning-focused coping, see below) and communication perspectives (e.g., the role of social interaction and discourses, see below).

WP2 draws on and combines environmental psychology (EP) and environmental communication (EC). While EP focuses on emotions as intra-individual processes and experiences, communication perspectives highlight emotions as a result of social interaction, societal/cultural norms and as political, mobilized in discursive struggles (Lockwood 2016). Combining these perspectives, WP2 will generate a better understanding of the relation between individual and social meaning-making in relation to major planetary crises. Moreover, EP contributes to WP2 and the development of the field of EC with its established theories and methods for studying the role of place e.g., the physical settings and artefacts in meaning-making processes. Also in EC increasingly acknowledge the importance of the relation between the material and discursive, e.g., that place matters for strategic communication, and that strategic communication is a socio-material practice (Cassinger & Thelander 2022), that engaging in activities with or in nature (e.g., food, gardens) can contribute to "positive environmental communication" (Milstein 2023); how VR nature experiences may enhance environmental awareness (Oh et al. 2021); and the importance of place-based research for understanding how communication mediates nature-human relationships (Carbaugh & Cerulli 2013).

7.2.3. Aims and research questions

WP2 aims to further the understanding of the multiple and complex ways that emotions play a role in environmental communication about environmental crises. To this end the perspectives of EP and EC together address the following research questions:

1. How do organisations design their environmental communication, and how do visitors experience, feel about and understand this environmental communication?

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2. In what ways can place – here the physical setting and artefacts – as an integrated part of environmental communication shape experiences, meaning-making and emotions in relation to environmental crises?
3. What role can communicative interventions, e.g., characterised by empathy, play in visitors' meaning-making and processing of emotions in relation to environmental crises, and how does this relate to action?
4. In which ways do places and interactions (including expressions of empathy) between conversation participants connect the individual and the social in environmental communication?

WP2 is based on and further develops the five programme principles. WP2 contributes to Principle 1, as it focuses on instrumental EC by organisations, but broadens the perspective to a constitutive understanding when analysing the broader role of emotions in individual and social meaning-making processes. WP2 applies Principle 2 through its investigation of EC as performed in different places and by and between different actors (e.g., curators, artists, visitors, as well as institutional actors), and how this shape meaning-making and emotions. Specifically, we are interested in how conversation participants with different roles (e.g., museum and nature guides, visitors) interact in the different contexts, and the role that expressions of empathy have on processes of meaning making. WP2 also contributes to principle 2 with an understanding of environmental communication as multisensory, involving individual and social processes in which people's environmental experiences and emotions play key roles. WP2 looks into the interplay between agency and structure, and the material and discursive, and further develops Principle 3 through interdisciplinary insights from combining EP with focus on intra-individual processes in response to place – the material (especially in Tasks 2.2 and 2.3), and EC with focus on social interaction, and broader discourses (especially in Tasks 2.2 and 2.4). Linking Principles 3, 4 and 5, WP2 highlights the interplay between the individually felt emotions and the cultural prescription of emotions, such as feeling rules (norms about what emotions are appropriate for whom and when, Hochschild 1979) and 'public feelings', that are discursively mobilized in public spheres to support dominant political agenda's (Lockwood 2016). The question 'whose knowledge counts' then becomes important and WP2 explores power in terms of authority and legitimacy in the analysis of the organisations' communication.

7.2.4. Tasks and methods
Working across EP and EC as well as with actors outside academia, brings together individual and social approaches and a breadth of experience in working with emotions in environmental communication practice. This is both highly productive to better understand the complexity of emotions in environmental communication, but it is also challenging. WP2 works with shared cases (boundary objects, Mollinga 2008) as its transdisciplinary method: studying the same cases from our different EP, EC and practice perspectives facilitates discussion, understanding and integration of research insights. The cases are situated with the collaborating organisations and allow the study of how the organisations through their use of place represent different settings and artefacts (i.e., a natural setting, history exhibitions and art exhibitions). The empirical cases have been selected together with the societal partners and form the basis of collaboration with the societal partners. The theoretical and methodological integration and the empirical studies are outlined in five tasks, where Tasks 1 and 2 initiate and prepare for Tasks 3-5.

Task 1: Setting the (inter)disciplinary research framework
In, Task 1 (Y1-4), WP2 researchers work through differences and complementarities in concepts, theories, methods and analyses of EP and EC perspectives on place, meaning-

making and emotions. Through this work we ensure that we can execute and combine the parallel EP and EC empirical analysis on the boundary objects and thereby integrate research findings. During the first 6 months, this work is foremost conceptual and serves to detail WP2's interdisciplinary research framework. However, this work continues throughout the four years to discuss (inter)disciplinary findings and development and are expected to impact the way individual and social processes are considered within the programme at large and in communication by cultural organisations and others.

WP2 is informed by EP theories on human-environment transaction (Küller 1991), coping (Lazarus & Folkman 1987), and empathy (Davis 1983) focusing upon the intra-individual psychological processes. In this perspective a person who encounter a situation considered to be stressful, such as gaining insight of the extent of climate change (Ojala 2013) go through a process of evaluation (called appraisal), evoking emotions. This so-called emotional response gets regulated by the person using various (coping) strategies focusing on the emotion felt per se (i.e., emotion-focused coping) or the stressful situation (i.e., problem-focused coping), or through attempts to find meaning and purpose in challenging situations that the individual person on his/her own cannot change (i.e., meaning-focused coping, Folkman 2008). Especially in the latter empathy may play a role. The EC side on the other hand, views the social as the location where people make meaning of the world. The work is informed by theories of social interaction (Blumer 1969, Garfinkel 1967): we understand people to negotiate meaning and understanding of the world in interaction. It is also informed by theories about the relationship between social interaction and broader discourses (Hajer & Versteeg 2005): we understand people to draw on discourses, to understand, interpret and explain their thoughts and actions. Such discourses are not neutral but represent specific understandings of reality, from which some actors gain and others loose. These discursive structures may not always be apparent to the people drawing on them, and in research they require us to pay attention to the historical, cultural and political context in which the discourses become important (Hajer & Versteeg 2005). As such, WP2 also considers emotions as social, political and cultural phenomena.

Task 2: Exploring environmental communication practices with societal partners
Task 2 broadens the collaboration to include the three societal partners. This task involves several steps, bringing EP and EC approaches together. First, the EP and EC teams organise a series of workshops together with the partner organisations to discuss how they currently address emotions in their practices, what they are interested in developing further through this research, and what would be relevant to introduce as interventions to be evaluated with regard to possible effects on the visitors in the different cases. Second, the EP team leads the design of the evaluation of the effect of the interventions, to which all contribute from their competences and perspectives: e.g., the EP team contributes with the development of the quasi-experimental part of the study, involving collection of baseline data among visitors, followed by a format for systematic variation of interventions in settings, artefacts and/or conversation format. EC contributes with a qualitative study targeting communicative interaction in methods and analysis, while the partners contribute with in-depth knowledge of the cases. The outcome of Task 2 serves as the foundation for any ethical review that may be required prior to introducing a systematic variation of the cases in the following tasks.

Task 3: Studying the role of physical setting and its artefacts in environmental communication
The collaborating organisations have unique opportunities to integrate place-based experiences of settings and artefacts in their communication about environmental crisis.

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In Task 3 (Y2-3) we investigate how the intended (and unintended) use of place influences the experience, meaning-making and emotions of the visitors.

Task 3 draws on previous research in both EP (Maslow & Mintz 1956, Miwa & Hanyu 2006, Eklund et al. under review, Gifford 1988, Mattsson 2015) and EC (Carbaugh, 2013) suggesting that the setting and its artefacts have a role in meaning-making and may play into emotions and spark conversation. The EP team will systematically document the settings and artefacts referencing to climate change and biodiversity loss for all cases. Visitors' experiences will be collected by so called observer-based environmental assessments using established questionnaires and interviews addressing emotions. The EC team will perform qualitative (group) interviews with the actors engaged in the design and execution – guides, curators and artists – about how they imagine the role of the setting and artefacts; and with visitors and participants about their experience of the interventions. This work draws on and contributes to the M-EC strand on the E in EC (see Commons).

The EP and EC team explore differences and commonalities in findings and bring initial disciplinary and interdisciplinary findings to the societal partners for further discussion and development.

Task 4: Studying the role of conversations and empathy in environmental communication
In Task 4 (Y2-3) we investigate in what ways different communication interventions can support people in processing their emotions in relation to environmental crises, facilitate meaning-making and action. To this end, the EP and EC teams will, together with the partners, design communication interventions around the participant's experiences of global environmental change and in the different exhibitions. This work builds on the earlier explorative work on communicative interventions in the Uppsala Art Museum and on the concept of empathic conversations, i.e., conversations designed to support meaning-making processes by validating the expressed concerns, problems and feelings of the conversation/discussion partners. Empathic conversations have been argued to validate the speakers' feelings, regardless of their nature, meet basic psychological and social needs, and create opportunities for less defensive, more open ways of thinking. This is of critical importance to deal with the stress associated environmental crises (Wullenkord & Reese 2021, Wullenkord 2022).

The EP team will observe and describe the participants' experiences of empathy in these conversations and assess how the participants' thoughts and feelings contribute to constructing meaning, and ultimately intentions to act. The EC team will analyse the empirical material through conversation analysis (Hutchby and Wooffitt 1998), combined with a discourse analysis. In the analyses EP and EC focus on how the participants individually and collectively share worries, collectively process or create meaning about e.g., the exhibition, and about broader environmental crises, responsibility and action (Milstein et al 2023b), and how these relate to societal discursive struggles (Principle 4).

Task 5: Synthesis and outlook
Task 5 synthesizes the outcomes of the four preceding tasks to provide an integrated theoretical understanding of EC and EP perspectives on emotions and meaning-making in communication about environmental crises. The synthesis work will also more practice-oriented knowledge for cultural and other organisations, about emotions in communication interventions.

In Task 5, we will conclude our work on the shared theoretical framework based on learnings from the preceding tasks. The framework will be refined based on the empirical outcomes and discussed with the partner organisations and M-EC consortium at large.

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Together the EP and EC teams will use samples of the analyses from Tasks 3 and 4 comparing the intentions of guides, curators and artists – in their selection of setting and artefacts with evaluations of visitors' environmental experiences and emotions, as well as how the empathic conversation comes into play. Here, the observations and analyses based on conversation analysis will provide an important basis for discussion and joint exploration and the partner discussions will serve as validation of results and recommendations.

Table 7.2 Outputs and expected impacts

Timeline (Y/M)	Tasks	Outputs	Expected impacts
Year 1-4	1	Internal report: Draft shared conceptualization and theoretical framework	Organisations have increased knowledge about the multiple and complex ways in which emotions play a role in environmental communication. Novel insights into the way individual and social processes are considered in communication by cultural organizations and others. Including access to practical examples of cases addressing emotions in environmental communication
		Blog post for M-EC webpage	
Year 1-2	2	Paper I for international interdisciplinary journal: Current communication practice for climate change and biodiversity loss – setting and artefacts 2 presentations at international conferences e.g., COCE (Conference on Communication and the Environment)	
		Session at Environmental Communication Day	
		Paper II for international communication journal: Current communication practice for climate change and biodiversity loss – conversation and empathy	
		2 presentations at national-level conferences (e.g., environmental psychology)	
Year 2-3	3	Paper III for international environmental psychology journal: Place experiences for emotions, meaning-making and action Session at Environmental Communication Day Presentation at national/regional fora for cultural organisations Presentation at international conference	Increased knowledge about the role of place and communication practices that support people's efforts to process their emotions and make meaning in the face of environmental crisis
Year 2-3	4	Paper IV for international environmental psychology journal: The role of empathic conversation for emotion, meaning-making and action Presentation at national/regional fora for cultural organisations Presentation at international conference with communication focus	Increased knowledge about the role of place and communication practices that support people's efforts to process their emotions and make meaning in the face of environmental crisis
Year 4	5	Paper V for international communication journal: Integrated theoretical framework on emotions in environmental communication Open workshops for environmental communication practitioners Practice/policy-oriented research brief on emotions in environmental communication Blog post for M-EC webpage	Organisations have increased knowledge on how they can take account of emotions in their communication interventions in relation to biodiversity loss and the climate crisis

7.3 WP3: The constitution of knowledge and truth in environmental communication

7.3.1. Summary

In WP3, we examine the constitution of knowledge in environmental communication. We engage with both constitutive (how is knowledge being made and used? how is its role conceived vis-à-vis emotions and values?) and instrumental perspectives (in which ways are knowledge, emotions and values purposefully combined to convey certain ideas, to persuade, maintain the status quo or create change?) on environmental communication (see Section 2.1, Principle 1). The work also addresses disagreement within society over the meaning and use of knowledge, emotions and values in decision-making and examines the ways in which contestation of environmental and sustainability-related ideas and policies

draws on the interactions between different knowledges, values and emotions (Principles 4 and 5).

The WP is led by Anke Fischer (EC-SLU), and includes Lars Hallgren (EC-SLU), Klara Fischer (EC-SLU), Amelia Mutter (EC-SLU), Martin Westin (EC-SLU), Jasmine Zhang (SCNI-SLU), René van der Wal (Ecology-SLU), and a postdoc (2 years) to be recruited. Key societal partners include the Swedish Environment Protection Agency, The Swedish Centre for Nature Interpretation (SCNI-SLU), Biotopia, and the Swedish Hunters' Association.

7.3.2. Background

WP3 starts from the observation that the role of scientific knowledge in decision-making about environmental issues is contested in manifold ways and from multiple directions. Our governmental programme partners articulated the fundamental role of knowledge in their activities, on which the legitimacy of their work was grounded. They experienced the validity of this knowledge as increasingly contested, undermining the authority's legitimacy, and expected this trend to accelerate as pressure on natural resources increases over the coming decades. A programme partner from a large environmental NGO described how they saw traditional communication channels (such as press releases) as becoming obsolete as public trust in such news was decreasing.

Contestation of knowledge claims is inherent to pluralistic democracy (Wynne & Lynch 2015). However, contestation might also be underpinned by a more fundamental, anti-scientific attitude (Sundqvist 2021, Rekker 2021) that is ultimately anti-democratic. In concrete situations, these distinctions are often difficult to make as the constellations of actors, their motivations and aims, governance contexts and knowledge claims are complex. WP3 unpacks some of this complexity to our understand how knowledge and action are connected (see call text) through a better understanding of the complex roles of knowledge in societal-level decision making and the construction of meaning. We focus on the ways in which knowledge and its role in environmental communication are challenged, looking also at the relationships between knowledge, values and emotions.

WP3 engages with the constitution and contestation of scientific knowledge (as suggested by Irwin et al. 2018) as a crucial part in today's environmental communication and governance practice (Smallman 2020), but also in the context of other epistemic cultures (Knorr Cetina 2007), e.g., traditional knowledge from different cultures (Irwin et al. 2018, p. 8). We do so in an inter- and transdisciplinary way, integrating insights and concepts from e.g., sociology, psychology, STS, ecology and environmental governance and intercultural nature interpretation practice into the field of environmental communication.

7.3.3. Aims and research questions

WP3 aims to examine the role of knowledge in environmental communication through both conceptual and empirical work to arrive at considerations that can be usefully applied in EC practice as well as in further research. It addresses three key problems.

First, building on existing research such as Rekker (2021) and Korstenbroek (2022), and responding to explicit calls for more research on these issues outside the US-American context (Rekker 2021), we explore the tension between post-truth relativism and a critical engagement with science and knowledge that is democratically legitimate and desirable, along these research questions:
1. How is the role of knowledge in environmental debate and decision-making perceived and discursively negotiated by different actors in society?

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2. Where are the boundaries between a legitimate and necessary critique of scientific method and science-driven environmental practice, and a relativist post-truth approach that regards scientific knowledge as irrelevant? Do the intentions of communication participants play a role in this differentiation?

Second, we examine the ways in which knowledge relates to emotions and values in environmental communication (see Irwin et al. 2018, Corner et al. 2017). Emotions and value-based judgements are often portrayed as the antitheses of knowledge and evidence, but knowledge, emotions and values are closely connected, as e.g., scientific activity as well as the application of research-based knowledge imply judgements of what is important and what is not (Hodgson et al. 2019), and emotional engagement is crucial to focus attention and select knowledge that is seen as relevant (Petty & Cacioppo 1986, Fischer & Glenk 2011). We pose the following research questions:

3. How are emotions, values and knowledge used and pitted against each other in public discourse on environmental decision-making, and with which aims and implications?
4. How are knowledge, values and emotions connected in environmental communication? Is the widespread perception of emotions and values as inferior to knowledge dependent on the ways in which emotions and values seem to correspond to specific forms and content of knowledge – and conversely, emotions and values that seem to match accepted knowledge are by implication seen as acceptable, too?
5. What are the implications of an exclusive claim of knowledge and evidence to validity and legitimacy as the basis of environmental decision making?

Third, we investigate how knowledge, emotions and values are brought together in the crafting of stories, which we define here (building on earlier work in M-EC; Joosse et al. forth.) as narratives that are developed and told intentionally. WP3 focuses on stories to convince or persuade. We consider the crafting, telling of, and listening to stories and ask:

- How do knowledge, values and emotions combine to form stories in environmental communication? How are these stories constructed, and with what intentions?
- Who is said to be the author of the story, and what are the implications?
- What opportunities for environmental communication do such stories open-up, and which ones do they close-down?
- How do storycrafters in different contexts deal with the boundaries of storytelling, with different realities and experiences, democratic encounters and pluralism?
- How can participants in EC be empowered to assess the structure of and intentions behind such stories, and to reflect on the ways in which they want to engage with these?

7.3.4. Tasks and methods

WP3 addresses these three sets of research questions through a combination of case-based empirical work and broader analyses and reviews of scientific and popular debate. Cases cover a diversity of relationships between knowledge and publics (see Sundqvist 2021) and include: nature interpretation, which aims to encourage public engagement with nature-related knowledge; transition governance for a fossil-free society, which struggles to mobilise broad public support for policy change (Sundqvist 2021); and the development of CRISPR biotechnology in food and agriculture, where own previous research suggests that knowledge producers deliberately try to avoid a strong public engagement with the subject at hand (Sundström & Fagerström 2019). WP3 thus also explores aspects of strategic communication (van Ruler 2018), covering a variety of organisational actors who intentionally adopt different approaches in relation to their interactions with non-expert

audiences as well as their use and references to knowledge, emotions and values in debates on environmental topics.

Much of our work is transdisciplinary, as it starts from concerns and questions formulated by societal partners together with researchers. A large part of our work draws on discourse theory (Hajer & Versteeg 2005, see Carpentier et al. 2019 for an analysis of the relation between discourse theory and communication studies) to unpack how knowledge, emotions and values are argued to work in environmental communication, both in ideal terms and in practice.

Working definitions include knowledge as "collectively sanctioned ideas about how the world is working" (Sundqvist 2021:339), while values are conceptualised as guiding principles in people's lives (Rokeach 1973, Fischer & van der Wal 2007) that can be individually held, socially shared as well as crystallised in institutions and norms, and emotions as complex entanglements of physiological and cognitive (including social) processes that help people to interpret their experiences and make sense of their world (Niedenthal & Ric 2017). While WP2 looks at the experience and interactive construction of different emotional responses, WP3 investigates how knowledge, emotions and values, and their respective roles, are discursively constructed and used in argumentation.

The WP is organised into 4 tasks. The first one transcends case-specific contexts and elaborates conceptual tools to engage with the three research problems described above. The three remaining tasks entail work on specific contexts of environmental communication, namely transition governance, CRISPR as a new biotechnology in agriculture and food production, and nature interpretation. Each case connects to all three research problems

WP3 builds picks up questions and concerns voiced by societal partners and gives explicit attention to some of the concepts and communication phenomena touched on in earlier Think/do tanks and strategic reserve-funded projects, such as storytelling and nature interpretation.

Task 1: Review, document analyses and synthesis combine conceptual work, sharing and developing insights from the literature on the role of knowledge in environmental governance and decision making, with case-transcendent analyses of public, scientific and policy debates regarding the three knowledge-related research problems. This might, for example, include a discourse analysis of material from social and other media on what counts as knowledge in environmental policy making, what knowledge is being trusted and why, and on the interactions between emotions, values and knowledge, from both 'is' and 'ought' perspectives. To ground the work well in the literature on the role of knowledge, emotions and values in communication over environmental governance, the project team engages systematically and in depth with key publications from communication research, STS and other perspectives. Based on the research conducted as part of this task as well as of other parts of this WP, we also develop activities for Miljökommunikationsdagarna (Environmental Communication Days) as well as for other audiences interested in the lessons learned from our work, e.g., at the Swedish EPA. Methods include qualitative analyses of documents, existing interview data and social media data.

Task 2: The role of knowledge, values and emotions in transition governance develops previous research on transition governance further by specifically examining how knowledge, values and emotions are pitted against each other in public and policy debates. The role of knowledge, emotions and values in governance of Sweden's transition to a low carbon society has been a focal point of heated public debate. Public and policy

debates around different energy sources (e.g., wind, nuclear) exemplify how scientific evidence is being challenged, and how the accusation of using emotions and values in the debate is employed to delegitimise an argument. Policies based on value-based guiding principles (e.g., the 'just transition') are, by contrast, often treated in a superficial way, and the values underpinning these are not discussed (Fischer et al. 2023). We employ qualitative analyses of documents, social media and other media, and interviews/workshops, and joint analyses together with WP1.

Task 3: The role of knowledge in the development of new biotechnologies in food and agriculture explores all three research problems, examining imaginaries of future food production to identify the roles of different knowledges (including different scientific knowledges), emotions and values in ideas and discourses of the future, including the ways in which these are cast and used in stories told with the intention to convince. We investigate how knowledge on new GM techniques is made available to the public for learning, critical engagement and scrutiny – or not; and how boundaries of public engagement with GM-related knowledge are being negotiated.

To do so, we analyse documents, existing interview data, and a series of dialogue workshops with a small group of relevant actors (crop scientists, farmer representatives, representatives of relevant public authorities).

Task 4: Story-crafting in nature interpretation engages with all three research problems through the lens of stories that are crafted and told in nature interpretation – a particularly interesting case as nature interpretation's declared aim is to engage with a broad public, with multiple ambitions, including relational, educational and normative ones. Specifically, we ask:
- How are knowledge, emotions and values used and combined in the crafting of stories to be told as part of nature interpretation?
- How are values, emotions and knowledge represented in a story?
- How are these stories received?

Addressing these questions includes a critical analysis of the role of evidence in nature interpretation stories, as well as an intercultural perspective, looking at nature interpretation engaging 'new Swedes', refugees and Swedish participants in nature interpretation.

We do mixed-methods (qualitative/quantitative; text/visual) analyses of nature interpretation and information material and artefacts targeting the public (leaflets, exhibitions, displays, scripts, webpages, guided tours etc), interviews, participant observation and online workshops. In a first step, the material is analysed through abductive manual coding, followed by quantitative context analysis. The work is embedded in the Nature Interpretation Lab (NiLab) (Section 6.2).

Table 7.3 Outputs and expected impacts

Timeline (Y/M)	Tasks	Outputs	Expected impacts
Year 1-4 (M1-48) 'Overarching'	1	At least 1 manuscript for an international, peer-reviewed journal such as Public Understanding of Science or Environmental Communication (M48)	Authorities'/decisionmakers' understanding of knowledge has been deepened, and includes an improved understanding of the limits of specific types of knowledge
		2 blog posts (1 by M24, 1 by M36)	
		Activities designed for *Miljökommunikationsdagen* (resulting from the work in the cases). Y1: Workshop on justice dilemmas in the climate transition at MK-dagen	Relevant actors feel more confident in negotiating the boundaries between democratic critique of
		Toolbox for dialogue methods that help facilitators of participatory and other processes to manage agonism in the discussion of challenging environmental and governance	

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		issues within a democratic framework, resulting from the work in the cases and building on existing toolkits	knowledge and relativism that harms democratic systems
		Supervision of a minimum of 2 Master theses addressing WP3's research problems in relevant case contexts (M48). Y1: One thesis that won the best poster award.	Relevant actors have a more nuanced understanding of the roles of knowledge, emotions and values in public debate and decision-making.
		1 practice/policy-oriented research brief (M36)	
Year 1-3 (M1-M36) Transition governance	2	1 manuscript for an international, peer-reviewed journal (M30) Y1: Two manuscripts. One on freedom as a value in transition governance, and one on what justice in a green transition is meant to be – a study of the allocation of the just transitions fund to the Swedish steel industry.	Relevant actors, e.g., in nature interpretation, engaged in the crafting, telling and listening to stories are encouraged and empowered to engage in reflective practice on the implications of these stories
		1 blog post (M24)	
		2 conference presentations for national/international conferences, of which at least 1 with a communication focus (M36)	
Year 1-3 (M1-M36) CRISPR	3	Debate article for a Swedish newspaper (M24)	
		1 blog post (M24)	
		1 manuscript for an international, peer-reviewed journal (M36)	
		Models to make sense of democratic engagement with science on complex technologies (M24)	
		KSLA seminar on public engagement in discussions on controversial technologies such as CRISPR (M36)	
		Activities designed to be conducted with the reference group, as well as with other relevant audiences (M1-36)	
Year 1-4 (M1-M48) Nature interpretation	4	At least 1 manuscript for an international, peer-reviewed journal (by M36)	
		Webinars, newsletters and thematic podcasts shared through SCNI's established platforms and networks (M1-48)	
		Input into the learning lab process, including the organisation of workshops (M1-48)	

7.4 WP4: Governance, collaboration and resistance in environmental communication

7.4.1. Summary

Collaborative governance can potentially make sustainability transformations more democratic and effective. However, tensions between opposing camps in sustainability debates and organised resistance towards sustainability policies portend an ongoing shift in power relations within collaborative governance, that makes the function and meaning of collaborative governance increasingly contested and uncertain. The aim of WP4 is twofold: to analyse how increased tensions around and resistance against sustainability policies influence power relations in collaborative governance; and to develop tools to make collaborative governance processes more capable of dealing with tensions and resistance. To reach the aim we conduct the following tasks: i) identify changes in the conceptual landscape of participation; ii) analyse how tensions and resistance influence power relations in collaborative governance practices; and iii) develop practically applicable tools for communication in collaborative governance in times of tensions and resistance. To ground the work in communication research, we engage with key publications that shed light on the communicative processes involved in reproduction and transformation of power relations.

WP 4 includes a core group of researchers – Martin Westin (EC-SLU) Camilo Calderón (EC-SLU), a senior communication researcher to be recruited (EC-SLU), René van der Wal (Ecology-SLU), Alexander Hellquist (CHS-UU) and Robert Österbergh (EC-SLU) who collaborate with a partnership, and a network. The partnership consists of the Swedish Environmental Protection Agency, the Swedish Forest Agency, the Hunters' Association, Greenpeace, Uppsala Municipality, and the Swedish Centre for Nature Interpretation at

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SLU. The network consists of collaborative governance practitioners who represent the users of research findings.

7.4.2. Background
In collaborative governance, actors seek to find common ground across differences in interests and world views. If communication is perceived as legitimate and effective, collaborative governance can play a constructive role in sustainability transformations. However, in today's societies, tensions between opposing camps in sustainability debates and organised resistance from political parties and social movements across the political spectrum, against sustainability policies are increasing. These developments portend a shift in power relations within collaborative governance as the authority of political leaders, experts and civil servants, as well as the legitimacy of political frameworks for sustainability and environment, are increasingly contested.

Contestations of transformation efforts are used by political groups to the right and the left to mobilise supporters and alter established power relations, leading to amplified antagonism and distrust between groups. In this political context, the distribution and exercise of power among actors in sustainability transformations is changing and the function and meaning of collaborative governance in transformation efforts is contested and uncertain (Stoker, 2019). Political movements to the right are increasingly questioning previously agreed policy frameworks for sustainability (SVT, 2022) and groups to the left are turning away from collaborative processes and instead furthering their causes in courts and through civil disobedience (DN.se, 2023).

In M-EC, we problematized the reductive treatment of power in communicative planning theory and in collaborative governance practice (Westin, 2021; Westin et al., 2021) and used the concepts of authority and performativity to provide a broader understanding of power (Mäntysalo et al., 2023; Westin et al., 2023). We now further develop this work by shedding light on how the increased tensions and organised resistance influence power relations within collaborative governance. We also draw on the findings from the pilot study into disinformation in environmental governance conducted.

7.4.3. Aims and research questions
The aims are twofold: i) to analyse how increased tensions around and resistance against sustainability policies influence power relations in collaborative governance; and ii) to develop tools to make collaborative governance processes more capable of dealing with tensions and resistance. Our research questions:
1. How is the conceptual landscape of participation shifting in times of tension and resistance?
2. How are tensions and organized resistance influencing power relations in collaborative governance?
3. How can insights, methods and tools for environmental communication enable collaborative governance processes that are responsive to social tensions and organized resistance?

7.4.4. Tasks and methods
WP4 addresses these three research questions in three corresponding tasks.

Task 1: Identify changes in the conceptual landscape of participation. In pursuit of RQ1, we study ideas of participation in three contentious areas within Swedish sustainability policy: large infrastructure projects, climate change interventions and preservation of

biodiversity. We analyse articulations of participatory ideas by actors who are critical of policymakers' actions or in-action.

The result of the analysis is identification of how emerging ideas of participation adhere to, but also deviate from the established deliberative, instrumental and interest-based logics of participation.

Task 2: Analyse how tensions and resistance influence power relations in collaborative governance practices. Through this task we pursue RQ2. We apply a mixed methodology that combines interviews, focus groups and participant observation to shed light on a selection of collaborative governance practices. In the selection, we assure variety regarding policy area, governance level and topic. This variety allows us to identify potential changes in collaborative practices broadly but also make distinctions between the influence of tensions and organised resistance in different areas of sustainability transformations. Potential cases include mini-publics in climate policy, contested dialogues on wind power, and participatory initiatives in biodiversity policy. Focus is on understanding if and how the participatory ideas, identified in the previous task, play out in the selected cases. The findings are examined in light of established principles of collaborative governance in theory and policy (Forester, 1999; Healey, 1997; Innes and Booher, 2018; SKL, 2019), to identify how the purpose and characteristics of collaborative practices might change as power relations are shifting. Additionally, we draw on recent work in communication theory by focusing on communication as an ongoing process of meaning construction (van Ruler 2018) and by using elements of Craig and Tracy's (2020) "Grounded practical theory" as part of the case study methodology.

The result is descriptions of how collaborative governance processes, as one important arena for the actualization of sustainability transformations, play out in times of shifting power relations.

Task 3: Develop practically applicable tools for communication in collaborative governance. Through this task we pursue RQ3. This task involves co-creation within the partnership of organisations and with the practitioner network. The intention is to make the research relevant and put research findings into use in collaborative governance practice. At the core of the task is to further develop The Reflection Cycle and a new tool intended to improve the public discourse in view of the increased destructivity of especially online communication. We incorporate new findings and conduct further tests and adjustments of the tools in view of making them capable of facilitating constructive collaborative governance processes in times of tensions and organised resistance.

The result will be two research-based tools for constructive environmental communication.

Table 7.4. Outputs and expected impacts

Timeline (Y/M)	Tasks	Outputs	Expected impacts
202405	2	Scientific paper in the Journal of society and natural resources: Negotiating Authority in Facilitation Practice – A Conceptual Framework to Describe Facilitators' Use of Power in Collaborative Governance	Increased understanding of facilitators' use of power in collaborative governance
202410	1	Conference paper: Procedural justice in sustainability transitions: mapping alternative understandings of collaborative governance	Novel insights into different understandings of the role of collaborative governance in times of tensions and organised resistance
202406 & 11	3	2 workshops with the partnership. Y1: one workshop	Research based tools for communication in collaborative governance are integrated into the

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			everyday work of leading environmental communication organisations
202410	3	1 meeting in the practitioner network	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202506	1	Scientific paper (target. *Journal of Environmental planning and governance*): Getting what you want – Analysing ideas of public participation in sustainability policy in times of political tension Y1: Paper on the sustainability walk	Novel insights into different understandings of the role of public participation in times of tensions and organised resistance
202506	1	Blogpost: Communicating across differences in times of tensions and resistance	Novel insights into different understandings of the role of collaborative governance in times of tensions and organised resistance
202501	2	Conference paper: Tracing the influence of organised resistance	Increased knowledge about how tensions and organised resistance influence collaborative governance practices
202506	2	Scientific paper: Tracing the influence of organised resistance	Increased knowledge about how tensions and organised resistance influence collaborative governance practices
202506	2	Blog post: Tracing the influence of organised resistance	Increased knowledge about how tensions and organised resistance influence collaborative governance practices
202506	5	Debate article in Swedish news outlet on communication challenges due to organised resistance	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202510		Practice/policy-oriented research brief on collaborative governance in times of increased tensions	Research based tools for communication in collaborative governance are integrated in the everyday work of leading communication organisations.
202506	2	Presentation at a conference for communication scholars: Communication between experts and local citizens in collaborative governance	Novel insights into how expertise and local knowledge is negotiated and used in collaborative governance in times of tensions and organised resistance
202510	2	Scientific paper: Participation in biodiversity policy	Novel insights into possibilities and constraints with collaborative governance in times of tensions and organised resistance
202510	2	Blog post: environmentalists' view of deliberation	Novel insights into environmentalists' actions in times of tension and resistance.
202504 & 10	3	2 workshops in the partnership	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202506	3	Courses and a tool to improve the public discourse in times of tensions and resistance	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202510	5	Training trainers to facilitate reflection based on the Reflection Cycle	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations

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202511	5	1 meeting with the practitioner network	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202601	2	Conference paper to be presented at a conference for communication scholars: Deliberation in times of tension and resistance	Increased knowledge about how tensions and organised resistance influence collaborative governance practices.
202606	2 & 3	Blog post: Communicative aspects of power relations in collaborative governance in times of tensions and organised resistance	Increased knowledge about how tensions and organised resistance influence collaborative governance practices, and novel insights into how expertise and local knowledge is negotiated and used in collaborative governance in times of tensions and organised resistance
202610	3	Article on communicative aspects of power relations in collaborative governance in magazine for professional facilitators	Increased understanding of shifting power relations in collaborative governance in times of tensions and resistance
202704	3	Meeting in the practitioner network	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202706 & 10	3	2 workshops with the partnership	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202705	3	Dissemination conference	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations
202706	3	Training to improve the public discourse	Environmental communication practitioners have gained insights and skills to improve the public discourse.
202710	5	Training trainers to facilitate reflection based on the Reflection Cycle	Research based tools for communication in collaborative governance are integrated into the everyday work of leading environmental communication organisations

7.5 WP5: Co-creating transformations through environmental communication

7.5.1. Summary

Nature-based transformations, such as regenerative agriculture, continuous-cover forestry or restoration of wetlands, in response to climate change and biodiversity loss are increasingly affecting land use worldwide. Using the processes of meaning-making that constitute these transformations as an entry point, WP5 explores the potentials and tensions emerging when collectively held imaginaries of sustainability transformations interact with place-based land use practices. Through co-creative methods, WP5 offers a wide range of actors the opportunity to engage in constructive and collaborative meaning-making processes, which seek to reconnect people and nature and foster meaningful and responsible relationships and practices. We are particularly interested in co-creating and facilitating travels of narratives that engage with a plurality of perspectives, that bridge the dichotomy between nature and culture, and that are locally anchored yet globally relevant. Based on empirical cases, WP5 enhances the understanding of how the

relationship between science, policy and practice can be reconfigured to foster the engagement, innovation and action needed to realize transformations.

The interdisciplinary research team draws on theoretical insights from systems thinking, futures studies, science and technology studies (STS) and feminist theory. WP5 is led by Sara Holmgren (EC-SLU) and involves Neil Powell (CHS-UU), Thao Do (CHS-UU), Eva Friman (CHS-UU), Max Whitman (CHS-UU), Sanna Barrineau (CHS-UU), Marcus Bussey (USC/CHS-UU), Tim Smith (USC/CHS-UU), Dana Thomsen (USC/CHS-UU), Amelia Mutter (EC-SLU), Stina Powell (EC-SLU), Ann Grubbström (EC-SLU), Marcus Hedblom (Landscape Architecture-SLU) and Michael Wilson (Loughborough University). Key stakeholders include SCNI, the Swedish National Heritage Board (SNHB), Ovanåker Municipality, the Swedish Farmers' Federation, the Swedish Forest Agency, Svensk Kolinlagring, Carbon Action, Paskaia, PlanVivo, the Swedish Environmental Protection Agency, Uppsala Municipality, SLU as landowner, and the Uppsala County Administrative Board.

7.5.2. Background

Several scholars emphasise the need to abandon politics as usual to realize sustainability transformations. But how? To explore this grand question WP5 systematically engages with the expanding critical literature on sustainability transformations with a communication, co-creative and/or socio-material focus. Recent publications stress the importance of paying attention to the interplay between imaginary futures, collective memories, and framing of place (Feola et al., 2023) and highlight the transformative role that narratives can play in this regard (Wittmayer et al., 2019). Other researchers emphasize the importance of fostering collaborative, inclusive and creative spaces in research, policy and practice (Welden et al., 2021), and the importance of speculative design for creating alternatives to eco-modernist imaginaries of sustainability (Wangel, 2021). Inspired by these literatures, WP5 uses nature-based transformations as entry point for exploring the 'how' of transformations. Starting from the principles underpinning M-EC, WP5 approaches nature-based transformations as inter-connected with constitutive, instrumental and procedural dimensions of communication across different sites (Principles 1 & 2); acknowledges that the conversation and action relating to nature-based transformations is shaped by, but also shapes competing discourses (Principle 3); and considers individual agency, together with the socio-cultural practices and structures to influence land-use (Principle 4). Above all, WP5 approaches science, policy and practice as integrated spheres of meaning-making that are imbued in power relations and conflicts (principle 5) (Holmgren, D'Amato & Giurca (2020).

WP5 considers knowledge co-production as a political act that, if practised with reflexivity and care, can alter the meanings, structure and processes of land-use in more sustainable directions (Wyborn et al. 2019, Whitman & Holmgren (2022). Co-producing knowledge for transformative purposes thus means that we need theoretical concepts that help us pay attention to injustices, power inequalities and possible effects of past, present and emerging land-use narratives on human and non-human lives. Theoretically, we draw on the relational turn in sustainability science and propose an approach that makes explicit the co-dependence of people and nature (West et al. 2020), addresses unequal power relations (Grubbström & Powell 2020), and allows pluralism and contestation of knowledge (Turnhout et al. 2020). Conceptually, we approach narratives as meaning-making devices emerging from interaction between humans and nature. Mediated through material elements (e.g., machines, plant material, trails), symbols, slogans, myths, and shaped by the materials carrying them (e.g., social media, videos, graphs, statistical categories, signs), narratives construct and negotiate worldviews, practices and identities. Whether small or grand, constructed bottom-up or top-down, narratives mobilize and connect dispersed

actors as they travel through time and space (Wittmayer et al. 2019). By engaging in and co-designing knowledge production processes, we are in the position to foster the emergence of new narratives, which can alter policies and practices.

7.5.3. Aims and research questions

Nature-based transformations are largely about envisaging and imagining alternative futures, about enabling people and situated practices to realize those futures and facilitating the spread of these efforts to new places (c.f. Malmborg & Wallin et al. 2022). To contribute towards that direction, WP5 addresses the following research questions:

1. How are nature-based transformations imagined, narrated and enacted in different contexts, in e.g., academia, governmental agencies, schools, land management organizations, and by farmers and forest workers)?
2. What type of innovations in policy and practice emerge as wider imaginaries of nature-based transformations are (re-)imagined and enacted in particular places?
3. How can co-creative methods be utilized in ways that foster regenerative relations between humans and nature?

The empirical research questions (1-2) are addressed primarily in case studies ongoing. Our response to the methodological question (3) is based on a synthesis of the different cases and as a result of interdisciplinary engagement and theorizing.

7.5.4. Tasks and methods

WP5 continues the collaborative research processes on wicked land-use issues. Case studies included efforts to incentivise transformation from conventional to regenerative farming (Barrineau, S. forthcoming) and from conventional to more diverse and multifunctional forestry practices in Sweden as well as efforts to promote biodiversity and resilience to climate induced risks in Honduras through economic compensation systems facilitated by new relationships between seemingly unconnected actors. We also draw on insights from the pilot study on disinformation in environmental governance (Holmgren et al., forthcoming). Accordingly, we conceive of disinformation as inherent part of contemporary environmental governance, shaping its content, structure and outcome. Consequently, to imagine and narrate more sustainable land-use futures we not only need power sensitive theoretical concepts. We also need to carefully design research that allow for plural ways of seeing and knowing, includes previously marginalised voices, enable contestation of knowledge claims, values and power relations. All without undermining the trust and legitimacy of scientific knowledge. Considering such tasks can be rather uncomfortable, the WP5 team facilitates methodological conversations across the WPs to share experiences and discuss the relevance of different theoretical concepts, their implications on research design, and the practical and scientific outcome of their application. The ambition is that this process results in a joint WP5 article that speaks to the wider field of communication research (Task 2).

Across our cases, we adopt a mixed methods approach, including traditional (individual and focus group interviews, discourse analysis, narrative analysis) and less conventional and co-creative (e.g., storytelling, transformative games, interactive trails, mobile exhibition, learning labs), which not only results in a rich and diverse empirical material. The mix of interpretive analysis with systemic co-inquiry, where practitioners (community members, civil servants, interest organizations, etc.) are important contributors to the design, implementation and evaluation of research (Heron & Reason 2001, Malmborg et al. 2022), allows us to continuously triangulate our analysis and in dialogue with our societal partners, and to swiftly adjust to unforeseen circumstances and events. Historicising the policy discourses, local stories and narratives identified, and illuminating their material

entanglements, is an important part of our analysis. It creates an understanding of the present situation (how we got here), and allows for critical exploration of alternative futures, including measures for reaching them. WP5 works closely with the Co-Creation Lab, which is hosted by CHS-UU. The Co-Creation Lab supports creative method development and process design to enable a safe learning space and meaningful collaborations within and across the different case studies (Bussey & Friman et al. 2023). To support creative and systemic co-inquiry, WP5 also works closely with the Storytelling Academy at Loughborough University – an interdisciplinary research team based at the School of Design and Creative Arts. By means of different co-creative methods, we offer a wide range of actors to engage in constructive and collaborative meaning-making processes, which seeks to reconnect people and nature, and foster innovations. We are particularly interested in co-creating narratives of sustainable land-use change that engage a plurality of perspectives, which bridge the dichotomy between nature and culture (c.f. Welden et al. 2021).

WP5 supports early career researchers and plans to co-fund three postdocs. One is located at Loughborough University and two in Uppsala at CHS-UU. By combining existing grants with M-EC funds, WP5 provides a platform for early career and more senior researchers to explore the 'how of sustainability transformations.

The work of WP5 is structured around the following tasks:
Task 1: Collecting land stories. Telling stories is a universal activity that does not require specialist knowledge. By collecting stories and by enabling their travel across different places, we intend to connect unheard actors and perspectives, and bring in new ways of thinking, knowing and doing into debates about past, present and future land-use. The stories collected may be short or long, grand or small, locally situated or have a global outlook involve the collection of land stories about land-use, landscapes and emerging relations between people and land to places and land use from people we meet in our different case studies.

Task 2: Narrating nature-based transformations. A conceptual and methodological investigation of the relationship between storytelling, narratives, discourse, and imaginaries; and experimentation of their possible role in co-creation processes. Based joint theoretical readings, sharing of experiences from the co-creation processes across the cases, we intend to develop a conceptualisation of and principles for how new meanings and practices can be co-created and enacted across different land-use contexts in ways that can better accommodate present and future human and non-human needs.

Task 3: Interactive trails explore how co-creation of interactive trails across landscapes can contribute to nature-based transformations. Trails' communicative components provide interesting sites not only for presenting stories, but also to collect additional stories related to sustainable land use, and for bringing stories into conversation. Trails are sites that allow us to explore people's impressions and relationships to landscapes they live in or visit, and how geographically and culturally embedded stories can enable or disable certain experiences, emotions, or imaginaries of sustainable land use futures. Trails (compared to meetings in a regular room) can thus function as an important site for reflection, questioning and learning about ongoing changes in the landscape, which may provoke the wanderers to search for new knowledge, meanings, and create new stories.

Task 4: Exhibition of land stories to display the land stories collected (Task 1), including imaginaries of past, present and future land use, to make situated knowledge explicit and visible in a non-academic format. By giving voice to perspectives little heard in public debates the goal is to spark and facilitate conversations about human-non-human

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relations, past, present and future land-use practices, and the possibilities of thinking and acting in new ways. The tentative plan is to construct a mobile exhibition to be shown in different venues, spanning rural and urban areas, and targeting a wide range of groups, including students, high-level decision makers and grass root organizations. The choice of venue is carefully considered as the venues themselves have implications for interactions and future imagination.

Task 5: Transformative game design building on insights and games designed in the context of regenerative farming earlier in M-EC, to continue the exploration of and learning about games as methods in wicked contexts. Game design puts an emphasis on exploration and experimentation, where knowing and acting can be tested in an inconsequential setting. It provides a safe space to stimulate participants to 'think outside the box' and that can bring about playfulness, reduce social distance and improve dialogue. The work involves playing the carbon farming game already developed with new groups (e.g., Svensk Kolinlagring, Finnish Carbon Farming partners, EU groups), and designing new games for application in other contexts (e.g., in forestry education, biodiversity incentive schemes).

Task 6: Learning lab sessions on biodiversity governance innovations. Despite the existing challenges and many controversies surrounding the commodification of nature, and converting biodiversity to tradable credits, biodiversity credits are gaining momentum and represent a potential innovation in Swedish biodiversity governance. Task 6 includes a series of 3 learning lab sessions, open to practitioners (e.g., government agencies, NGOs, businesses and landowners), aimed at eliciting opportunities and challenges associated with the development and implementation of voluntary biodiversity credits, and providing a space for identifying potential designs of biodiversity incentive schemes that respond to diverse bio-physical and socio-economic contexts, and result in equitable benefit-sharing with local landowners and stewards.

7.5.5. Outputs and expected impacts
The outputs and impact of co-creative research are not easily predicted or quantified. The impacts are often intangible and unfold over long time periods because of iterative cycles of interaction and meaning-making among diverse groups of people. For example, feedback from stakeholders suggests that participating in co-creative research activities helped them to expand their networks, take time to reflect, and have different kinds of conversations than those they would normally have. While difficult to measure, these outputs and impacts are key to the creation of new narratives and regenerative and responsible land use practices. WP5 aims to support outputs that are relevant to participants. In Honduras an output could e.g., be the establishment of a cooperative selling wood products. In Sweden, it could be a tool supporting individual forest owners to assess different nature-based forestry options, providing an inclusive forum for discussing and imagining sustainable forest futures, or organizing workshops aimed at co-designing compensation systems for biodiversity conservation. When it comes to outputs relating to WP5's scientific goals, 5 scientific articles are planned for. Apart from applying analytical concepts and methods typical for communication studies and interpretive analysis more generally (e.g., discourse interpretive analysis (discourse, narrative, storytelling, imaginaries), we are keen to bring our inter- and transdisciplinary work on transformations into conversation with the broader field of communication research, beyond the field of EC. To do so, we target journals with an explicit communication focus (e.g., N*ew Media & Society, Information, Communication & Society*, and *Public Understanding of Science.* In the spirit of co-creation, the content of Table 7.5 is thus to be seen as indicative since unexpected outputs and impacts may emerge.

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Table 7.5 Outputs and expected impacts

Timeline (Y/M)	Tasks	Outputs	Expected impacts
Y1-2 M1–24	**Task 1**: Collecting 'land stories'	Workshops, narrative interviews and storytelling events exploring local identities, land-use practices and human-nature relations. Cross-scale cultural events: sharing of collected stories at local sites important to the case studies. Popular writings in local newspapers or other landscape-related magazines Scientific article: Storytelling as, and for, Sustainability Thinking Debate article in a sector journal	Improved understanding of the tensions and possibilities emerging when wider imaginaries of nature-based transformations interact with local identities and practices. Co-created narratives of change that situates nature-based transformations in local contexts. Spark interdisciplinary conversation on how storytelling, as a means of capturing and communicating experiential knowledge,
		Conference session conveyed: Storytelling as, and for, Sustainability Thinking	can be brought into discussion with other forms of knowledge (scientific, technological, bureaucratic, legal etc.)
Y2-4 M24–48	**Task 2**: Narrating nature-based transformations	Internal WP5 theoretical and methodological conversations to tease out an analytical framework, synthesize findings and conclusions. Y1: 2 workshops on storytelling Scientific article: Narrating nature-based transformations from below - a co-creative approach Practice/policy-oriented research brief - a popular scientific summary of Tasks 1 & 2.	Better understanding if, how, where and when dominant socio-technical imaginaries of nature-based transformation may reproduce and/or challenge traditional land-use practice.
		Debate article in national media	
Y2–3 M12–36	**Task 3**: Interactive trails	Handbook for designing interactive trails Interactive walks inviting residents and stakeholders to share collected stories and develop new trails Simple brochures to introduce the trail. Podcast through SCNIs early morning seminar series. Conference paper: Trails, tales and sustainable future making Scientific article: Trails, tales and sustainable future making	Improved understanding of how trails can function as sites for reflection and learning about changes in the landscape and be used as a site for rethinking and articulating imaginaries of responsible and regenerative land-use futures.
Y3-4 M24–48	**Task 4**: Exhibition of land stories	Mobile exhibition of photos, maps, drawings and short stories illustrating past, present and future land relationships Conference paper: Communicating and enacting care for the non-human – towards a conceptualisation Scientific article: Communicating and enacting care for the non-human – towards a conceptualisation.	Expanded conversations around nature-based transformations in non-academic contexts. Developing a vocabulary for accounting for the non-human in in Environmental Communication studies.
Y1–2 M1–24	**Task 5**: Transformative game design	Playing the carbon farming game that we developed with additional stakeholder groups (e.g., EJP Soils, European Commission Carbon Removals Expert Group, Carbon Action platform's corporate partners.) New game potentially developed and played e.g., in forestry education, and in biodiversity governance settings.	Expanded conversations around nature-based transformations and the system of carbon credits being built up to incentivise actors to transform to regenerative land use practices. New constellations of stakeholders, new relationships, enhanced social learning.
Y1–3 M1–36	**Task 6**: Learning lab workshops on biodiversity governance innovations	3 Workshops including academic and non-academic actors exploring the potentials and synergies of different innovations in biodiversity governance. Blogpost: Fostering co-existence and innovation in times of precarity Conference paper: Co-creating innovations in biodiversity governance – a communicative perspective Scientific article: Co-creating innovations in biodiversity governance – a communicative perspective Practice/policy-oriented brief: Fostering innovations in biodiversity governance. Will target practitioners and	Social learning about governance innovations. Enhanced understanding of the potentials and synergies of different governance innovations (e.g., biodiversity credits) Expanded networks for participants involved Empirically grounded theoretical discussion of the possibilities and pitfalls of

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		policy makers in different land use sectors and include principles for how biodiversity governance innovations can be supported.	initiating transformative practices in the research process Development of principles for how biodiversity governance innovations can be supported in policy and practice.

8. Deliverables and time plan

Table 8.1 provides an overview of M-EC deliverables. Internal and procedural outputs, such as consortium meetings, internal newsletters and management structures, are not included. Table 8.2 presents the time plan that the different parts of M-EC follow.

*Table 8.1. Summary of M-EC deliverables. 'X' denotes unquantifiable amounts.   *Applied to min. 3 organisations. ** No specific number*

OUT-PUTS	SCIENTIFIC			POP. SCIEN-TIFIC	PRACTITIONER-ORIENTED					PLAT-FORM
	Scientific papers	Conference presentations & symposia	Serious game	Blogs, short stories, summaries, debate articles, other	Training programme and handbooks	Video clips/podcasts	Workshops and events	Practice/policy-oriented research briefs	Input to strategies	Interactive website, LinkedIn
Commons	7	5		**	5	**	**	5	Min. 3	**
WP1	5-7	3		7			3	1		**
WP2	5	5		3			6			**
WP3	4	2		5	1	**	1	1		**
WP4	4	3		6	4		7	1		**
WP5	5	4	1	6	1	1	3	2		**

Table 8.2. M-EC Time plan

WP TASKS	YEAR 1				YEAR 2				YEAR 3				YEAR 4			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
M-EC Commons																
1. Management and administration																
2. Internal communication																
3. Monitoring, evaluation and adaptation																
4. Education, learning and external communication																
5. Creative cross-cutting collaboration																
6. Synthesis and co-inquiry																
WP 1 Information																
1. Everyday life																
2. Environmental social governance (ESG)																
3. Advocacy coalitions																

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
4. Observatory	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
WP 2 Meaning-Making																
1. Exploring the role of emotions in meaning-making	▓	▓														
2. Emotion, and exploring interventions		▓	▓	▓												
3. Emerging environmental communication practice					▓	▓	▓	▓	▓	▓	▓					
4. Place-based exposure and experience					▓	▓	▓	▓	▓	▓	▓					
5. The empathic conversation					▓	▓	▓	▓	▓	▓	▓					
6. Synthesis and future outlooks													▓	▓	▓	▓
WP 3 Knowledge																
1. Review, document analyses and synthesis	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	
2. Transition governance	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓					
3. New biotechnologies in food and agriculture	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	
4. Story-crafting in nature interpretation	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	
WP 4 Governance																
1. Framings of collaborative governance	▓	▓	▓	▓	▓	▓										
2. Influence of tensions and resistance					▓	▓	▓	▓	▓	▓	▓					
3. Expert knowledge and local ecological knowledge							▓	▓	▓	▓	▓					
4. Power relations through authority & performativity					▓	▓	▓	▓	▓	▓	▓	▓				
5. Tools for communication		▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
WP 5 Transformation																
1. Collecting land stories	▓	▓	▓	▓												
2. Narrating nature-based transformations									▓	▓	▓	▓	▓	▓	▓	
3. Interactive trails					▓	▓	▓	▓								
4. Exhibition of land stories									▓	▓	▓	▓	▓	▓	▓	
5. Transformative game design	▓	▓	▓	▓	▓	▓	▓	▓								
6. Learning lab workshops	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓				

9. Budget

The total budget of M-EC is SEK 63 950 721 (Tables 9.1-9.4). Of this, SEK 10 123 497 (16%) is co-funding from universities and societal partners and SEK 53 827 224 is funding from MISTRA.

As part of this, a strategic reserve of 6 million SEK is available for the Programme Board to use for strategic research needs. Please note that in Table 9.1, the Commons budget is displayed together with the strategic reserve of 6 million SEK, in total thus SEK 24 865 024. The payroll costs of the Commons, include the programme directors (1 FTE; of which SEK 900 000 is in-kind co-funding from Uppsala University), programme coordinators, including communication (1 FTE), web and visual communication specialist (0.25 FTE), and a financial officer (0.25 FTE), as well as time for researchers to contribute to joint cross cutting and synthesis activities. Costs for open access publications are included in the budgets of WPs 1-5, and in the Commons and Synthesis WP. WPs receive funding from Mistra depending on

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their needs and role in the programme. All co-funding is in kind. Non-eligible overheads are not included in the in-kind co-funding amount and not shown in the budget tables below. Should any other partner be unable to contribute with the in-kind stipulated in the application, SLU is prepared to offer more in-kind co-funding.

Table 9.1 Budget overview – total budget

Total budget, SEK	Year 1	Year 2	Year 3	Year 4	Total	Whereof Mistra	Whereof co-funding in-kind
Commons	5 056 279	5 951 620	4 218 732	4 023 393	**19 250 024**	17 854 024	1 396 000
WP1 - Information	2 142 310	2 478 475	1 878 706	1 047 764	**7 547 255**	5 567 137	1 980 118
WP2 - Meaning-making	492 782	2 133 218	2 222 292	1 994 313	**6 842 605**	6 232 605	610 000
WP3 - Knowledge	2 696 924	2 850 307	1 805 283	1 067 689	**8 420 203**	5 621 202	2 799 001
WP4 - Governance	1 706 026	1 700 993	1 636 263	1 508 974	**6 552 256**	6 552 256	0
WP5 - Transformations	1 821 177	3 040 925	2 748 825	1 727 451	**9 338 378**	6 000 000	3 338 378
Strategic reserve	500 000	2 500 000	2 500 000	500 000	**6 000 000**	6 000 000	
Summa	**14 415 498**	**20 655 538**	**17 010 101**	**11 869 584**	**63 950 721**	53 827 224	10 123 497

Table 9.2. Funding per partner (Mistra- and co-funding)

Funding per partner, SEK	Year 1	Year 2	Year 3	Year 4	Total	Incl. co-funding in-kind
Mistra	**10 039 206**	**18 696 022**	**15 223 822**	**9 868 174**	**53 827 224**	
Universities and societal partners	**2 645 068**	**2 841 222**	**2 480 496**	**2 156 711**	**10 123 497**	**10 123 497**
Department for Urban and Rural Development, SLU	1 045 990	964 990	684 183	599 838	3 295 001	3 295 001
Department for Ecology, SLU	0	0	0	0	0	0
University of Borås	402 703	654 290	548 392	374 733	1 980 118	1 980 118
The Swedish History Museum	93 000	96 000	99 000	51 000	339 000	339 000
Modern Art Museum Stockholm	75 000	77 000	79 000	40 000	271 000	271 000
Lunds University	0	0	0	0	0	0
CHS, Uppsala University	597 390	609 338	621 524	633 775	2 462 027	2 462 027
Loughborough University	189 551	193 342	197 209	201 153	781 255	781 255
University of the Sunshine Coast, Australia	241 434	246 262	251 188	256 212	995 096	995 096
TOTAL	**12 684 274**	**21 537 244**	**17 704 318**	**12 024 885**	**63 950 721**	**10 123 497**
Mistra	10 039 206	18 696 022	15 223 822	9 868 174	53 827 224	
Co-funding	2 645 068	2 841 222	2 480 496	2 156 711	10 123 497	
Co-funding's share of total funding %					16%	

Table 9.3. Mistra funding per partner

Mistra funding per partner, SEK	Year 1	Year 2	Year 3	Year 4	Total
Department for Urban and Rural Development, SLU	5 617 097	9 777 515	6 083 845	4 804 321	26 282 777

Department for Ecology, SLU	1 216 367	1 120 675	776 587	522 331	3 635 961
University of Borås	574 494	1 679 395	832 057	515 854	3 601 800
Lunds University	198 157	1 547 469	1 660 001	1 477 642	4 883 269
CHS, Uppsala University	1 637 903	3 500 661	2 747 332	1 732 026	9 617 922
Loughborough University	212 188	216 231	0	0	428 419
Shiv Ganesh, Texas	563 000	524 000	524 000	236 000	1 847 000
Biotopia	20 000	100 000	100 000	80 000	300 000
Strategic reserve	0	230 076	2 500 000	500 000	3 230 076
TOTAL	**10 039 206**	**18 696 022**	**15 223 822**	**9 868 174**	**53 827 224**

Table 9.4. Mistra funding per work package

Mistra funding per work package, SEK	Commons	WP 1	WP 2	WP 3	WP 4	WP 5	Total
Number of full-time equivalents (FTEs)	10	4	4	4	4	8	34
Direct costs							
Payroll costs	10 839 843	3 997 509	4 101 930	3 574 779	4 387 312	4 062 746	30 964 119
Travel costs	0	44 500	0	63 000	120 000	0	227 500
Costs of materials	0	0	0	0	0	0	0
Equipment and other direct costs	3 763 800	234 000	695 000	639 890	380 000	600 000	6 312 690
Total direct costs	14 603 643	4 276 009	4 796 930	4 277 669	4 887 312	4 662 746	37 504 309
Contribution to indirect costs	3 250 381	1 291 128	1 435 675	1 343 533	1 664 944	1 337 254	10 322 915
Strategic reserve	6 000 000						6 000 000
Total costs funded by Mistra	23 854 024	5 567 137	6 232 605	5 621 202	6 552 256	6 000 000	53 827 224

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