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Applying the Environmental Humanities: Ten steps for action and implementation

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Films can be a slow medium that facilitates rich deliberations among scientists, students, artists, humanists and the public about environmental issues. At the Global Eco Film Festival in Zurich every film screening was followed by a panel discussion involving the film director and scientists or humanists. Different side events introduced students, scientists and artists to storytelling and film making as a way of engaging with their scientific questions and environmental issues (https://www.globalecofilmfestival.com/).

Summary

There is a growing perception in society and among decision makers that addressing environmental problems requires fundamentally new approaches. This report is based upon a survey of practitioners who work in the field of Environmental Humanities. Environmental humanists – by bringing together scholars from the humanities, social sciences and arts, natural sciences, affected people, and activists – can play an important role in broadening the range of voices and ideas in environmental deliberations. They might achieve this by presenting their ideas, and listening to and observing those who have little voice, be these disadvantaged communities, developing countries or indigenous people. International science and science-policy bodies are becoming more open to proposals for supporting environmental humanities.

Proponents of the environmental humanities have stressed the necessity of international networking, promoting interdisciplinarity, establishing multi-component research projects, and strengthening the voice of humanities in society and policy circles. But how can the humanities of and for the environment be strengthened? And how can it produce actual solutions on the ground? Can methodologies and concepts utilized by large natural science projects (e.g., inter- and transdisciplinarity, grand challenges, international institutions such as IPCC or Future Earth) be developed in, and in some cases transferred to the environmental humanities? What may be alternative methodologies and strategies for successfully applying insights of humanists who focus on the environment? The goal of this report is to highlight effective strategies for applying the insights from environmental humanities to environmental problem-solving. In so doing, we offer a sampling of current practitioners' views of research, teaching, and outreach in their field.

Environmental humanists emphasize that environmental problems are inherently human problems. Thus certain research themes are better situated in the environmental humanities than in the environmental sciences, for instance environmental justice, poverty, historical and cultural contexts of environmental problems, the differences between knowing, understanding and acting, and questions related to meaning and values. These themes are considered as central to addressing environmental problems as those addressed by natural scientists and so should be moved to the top of scientific and science policy agendas at national and international levels, amongst governmental and non-governmental funders (e.g., philanthropic, foundations, business world), and amongst knowledge users (e.g., government agencies, NGOs, civil society).

The perspectives of humanities and certain fields of the social sciences can differ substantially from existing natural scientific approaches to addressing environmental issues. Critical perspectives from the environmental humanities are important for further developing or replacing existing research paradigms, enabling unheard voices to speak for themselves, and reforming science-policy bodies such as the IPCC (for climate change) or

IPBES (for biodiversity and ecosystems). Environmental humanists should offer critique of existing paradigms as well as alternative and additional concepts and perspectives in ways that reach relevant experts and decision-makers. And it should be ensured that scholars from the humanities and arts are represented in the steering boards, councils and expert panels of academic and science-policy institutions, including organizations such as the Intergovernmental Panel on Climate Change (IPCC), Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), or Future Earth, as well as in expert groups at national and local levels dealing with issues such as biodiversity, climate change, energy, food security, soil protection, urban and spatial planning, or green economy to make these institutions intellectually more inclusive.

Environmental humanists already play important roles in advocacy and activism. There are many examples of the successful direct application of environmental humanities insights and expertise to environmental problem solving, for instance, in environmental ethics, law or communication. Humanists can also play an important role in complementing investigative journalists as has been demonstrated by uncovering strategies of climate change deniers and other interest groups that attempt to weaken scientific evidence and promote fake or alternative truths. At a more generic level, there is great interest from the public in books and magazines that delve into historical, social, cultural, political and economic dimensions of contemporary societal issues including environmental ones. Some environmental humanities scholars have been directly implicated in successful direct action, or they have contributed to a better understanding of effective forms of activism.

Environmental humanities represent a unique opportunity for the confluence of multiple epistemologies and methodologies ranging from the arts and indigenous perspectives to the natural sciences. Such a forum that brings different lines of research together and is less hostile to new ideas would promote creativity and risk taking for developing new scientific approaches that might be more appropriate for tackling major environmental challenges of our time. As a result, the environmental humanities can build on a number of current opportunities:

- There is a significant tradition and institutionalization in fields such as political ecology, environmental history, eco-critical studies; postmodern, gender, posthumanist and post-colonial perspectives; and science and technology studies (STS) that have helped to elucidate social, economic, political, cultural, and symbolic assumptions of scientific knowledge production and expertise in the heterogeneous world of contemporary democratic societies.
- Cultural and creative research in the arts, including doctoral programs, and artistic work that engages with contemporary environmental issues have gained in importance; amongst others through easier access to art museums and therefore the public.
- Higher education in the Global South has been strengthened, and the rights and voices of indigenous people in the North and South are sometimes better recognized,

contributing to more pluralistic visions and understandings of the natural world and human relations with our planet.

- Growing collaborations with natural scientists offer opportunities for integrating their approaches, e.g., quantitative analyses, experimentation, big data collection and analysis (e.g., through remote sensing or by scanning the internet), or computer modeling.
- Additional forms of knowledge production are enabled through growing experiences with new epistemologies and methodologies that emphasize aspects such as
    - o contextualization of knowledge and studies,
    - o relational knowledge that transgresses simplistic dichotomies, relativism, holistic and integrative studies,
    - o pluralistic and multi-methodology approaches,
    - o inclusive participation of indigenous people, affected peoples, marginalized scientific views, or non-human living beings and non-living actors, or
    - o subjectivity (e.g., listening, generosity, empathy and experimental creativity)
- There is a feeling that there is a need for new institutions that allow for more inter- and transdisciplinarity, openness and experimentation in environmental research.

A rapidly growing number of environmental humanities initiatives, centers and programs (including observatories, hubs, laboratories, and 'collaboratories') are experimenting with new forms of scientific analysis and co-production of knowledge, representing and communicating knowledge, and linking science and society. Important aspects for successful new forms of collaboration, learning and communication are to:

- create protected and respectful experimental spaces that are public and intimate at the same time,
- reserve sufficient time for slow scholarship,
- invite a broad mixture of people and perspectives,
- focus interactions on *questions* as much as *answers*,
- meet in the respective places of knowledge production and use: in the field, in scientific laboratories, as well as in artistic labs (which would include longer-term artists-in-residence or scientists-in-residence, respectively),
- use multiple mediums ranging from film, visual art, performance art, writing, song, to exhibitions, stories, journalism, design, social interventions etc., and
- build on expertise and skills of scholars from the humanities and artists in reflecting on semiotics and social, cultural, psychological, emotional, and aesthetic dimensions of knowledge production and communication.

Many environmental humanists and increasingly more environmental scientists agree that research has to be multi-perspectival, acknowledging multiple complexities, and reflexive. Such an ambition to keep perspectives complex, however, puts a heavy burden on knowledge production and use. There is limited capacity to collaborate across disciplines and issues without reducing complexities, and there is limited capacity of decision-makers

and actors to delve into many perspectives in full depth and thus use environmental humanities expertise as part of their decision-making and taking action. A common solution of environmental humanities scholarship to deal with this trade-off between complexity and usefulness is to focus on specific case studies. A growing number of programs network local case studies on specific issues at regional and global scales thereby up-scaling local research for international exchange of knowledge and strengthening an international voice, often through virtual platforms. There is thus a potential to align environmental humanities research practices with policy approaches at all scales.

Table of contents

Introduction

There is no doubt that humanity faces a barrage of multiple and major environmental crises and tipping points. Dangerous anthropogenic climate change is already happening, together with major losses of biodiversity, soil, water, phosphorus and other natural resources. With increasing resource use per person, continuing population growth and the parallel depletion of renewable and non-renewable resources, food production and provision of renewable energy are global challenges. The environment reaches its limit to uptake old and new pollutants and waste, and globalization brings humans, animals and plants ever closer together, increasing the risk of spreading diseases and pathogens. These environmental problems, although rooted in changes of the physical environment, are foremost entangled physical, social and cultural issues – due to their human roots, their implications for human livelihoods and lives, and their tight interconnections with all aspects of society including capitalism, justice, poverty, forced migration and refugee crises, financial crises, terrorism, globalization, and scientific and technological developments including new digital communication media. As a result, addressing these challenges will require social, cultural, symbolic, aesthetic and personal answers of individuals and social groups across all continents. Sörlin and Wynn (2016) formulate the search for solutions as follows:

> The sciences have provided evidence of these complex changes and identified some of the mechanisms behind them. They have shown that together we face a doomsday-like scenario with little time to react. Changes are needed – but the science we need to articulate the problem is not the same knowledge needed to change the way we live. Innovations in science and technology must be accompanied by social innovation. Taking necessary actions requires engagement with people, with their values, passions, routines, institutions, preferences, politics, culture, beliefs and incentives; with their sense of prestige, care and reason; and, perhaps above all, with their approach to questions of justice – justice between people, social groups, provinces and territories, between nations and states. This is where integrative humanities and environmental social science and humanities can help in finding solutions.

In the words of one environmental humanist responding to the survey in this study, putting humans at the center of problems is to place meaning at the central focus (italics by respondent):

> All research questions need to put *Meaning* in the center. Meaning always implies a human perspective (human perceptions, impact on humans). The problem of much of the scientifically oriented environmental studies is a loss of the human perspective. A case in point is big ice core science. We learn a lot about climate change but little about what this means for humans and for individuals. Giving environmental aspects a *Face* is central: human interest/ human worry. If we *focus on what environmental challenges mean for humans* – for individuals and collectives, for specific groups and classes (minorities,

environmentally deprived groups, privileged groups etc.) – then we can describe/ analyze/ interpret things and call for action. We can also use artistic means as an expression.

The environmental sciences have over the past decades made major advances in identifying problems and assisting with devising solutions toward resolving our environmental problems. The sciences rely on specific scientific methodologies and expertise. They frame environmental issues from the perspective of problems of the physical and biological environment. Environmental scientists have established occasional partnerships with experts in the social sciences – such as psychology, sociology, or economics – and sometimes engineering and planning, while other social, cultural and human scientists and artistic researchers have often been left out of environmental discourses – or else subsumed under existing frameworks and given only secondary roles as in communication, public outreach or education. The environmental sciences organize research into various applied (sub)disciplines that address specific problems and often aim to contribute concrete solutions in fields ranging from meteorology, hydrology, and soil sciences to invasion biology, restoration ecology, conservation biology, agroecology, forestry, and fisheries to epidemiology, toxicology, and other environmental health sciences. They do this by collaborating with each other and through division of labor on broadly accepted problem framings, concepts, and envisioned solutions.

There have been crucial environmental successes realized by the scientific community. For example, scientific frameworks emerging from the UN's 1992 Rio conference were helpful for alerting the public to sustainability and biodiversity loss, with governments, NGOs and social movements publicizing the need to take action. Another outstanding scientific success was the identification of dangers posed by chlorofluorocarbons to the earth's ozone layer, with subsequent policy recommendations being rapidly implemented through the Montreal Protocol to mitigate this worldwide threat. In 1995, a Nobel Prize was awarded to three atmospheric chemists to recognize their achievement in revealing this threat. University positions, foundation grants, and new research centers followed in the wake of these scientific advances under the rubric of *sustainability*, *global change* or *grand challenges*. And the environmental sciences have established institutions at the science-policy boundary such as the Intergovernmental Panel on Climate Change (IPCC, on climate change) or the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, on biodiversity and ecosystems) that define what counts as reliable and relevant expertise.

There has also been a long and rich tradition of research in the humanities and humanistic social sciences that addresses topics centered on environmental problems. Such research is often termed 'environmental studies' or at least it is subsumed within that term. To emphasize *other-than-science* contributions to understanding and resolving problems of the environment, fields in such areas as the arts, design, history, literary studies, ethics,

philosophy, and several others, are more recently gathering under the new umbrella of the ‚environmental humanities'. This term emphasizes the 'other half' of environmental research, fields which may be left out of discussions in board rooms, government divisions, and university departments. Oppermann & Iovino (2017) define the environmental humanities to be a field that *brings the social sciences, the humanities, and the natural sciences together in diverse ways to address the current ecological crises from closely knit ethical, cultural, philosophical, political, social, and biological perspectives*. Hall et al. (2015) add that the goal of environmental humanities is to *incorporate science within the humanities, while aiming to 'humanize' it by combining insights from many different fields* so as *to devise and implement an inclusive, ethical, sustainable, and equitable relationship with our planet*. The environmental humanities have become a growing movement with new institutions, funding schemes, journals, research initiatives and teaching programs in many countries (Heise et al. 2017; Lorimer 2017; Opperman & Iovino 2017; Holm et al. 2015; Bergthaller et al. 2014; Forêt et al. 2014; Mauch 2013; Nye et al 2013; Palsson et al. 2013; Rose et al. 2012).

Proponents of the environmental humanities have stressed the necessity of international networking, promoting interdisciplinarity, establishing multi-component research projects, and strengthening the voice of humanities in society and policy circles. But how can the humanities of and for the environment be strengthened? And how can it produce actual solutions on the ground? Can methodologies and concepts utilized by large natural science projects (e.g., inter- and transdisciplinarity, grand challenges, international institutions such as IPCC or Future Earth) be developed in, and in some cases transferred to the environmental humanities? What may be alternative methodologies and strategies for successfully applying insights of humanists who focus on the environment? The goal of this report is to highlight effective strategies for applying the insights from environmental humanities to environmental problem-solving. In so doing, we offer a sampling of current practitioners' views of research, teaching, and outreach in their field.

The report's methodology draws centrally on insights from the results of a survey of ca. 30 environmental humanities research experts, drawn from leading centers in the field, largely from Europe, but also from the USA, Canada, and Australia, with the Global South represented only cursorily because of sampling limitations (Annex A & B). The first part is devoted to the analysis of the current state of the field where we discuss key challenges of the environmental humanities in becoming an important fountainhead of environmental action (Part 1). Next we compile critiques of the mainstream approaches of the environmental sciences to address environmental issues, as echoed by the respondents of our survey (Part 2). The final part outlines ten strategies to deal with the challenges that have been identified (Part 3). Such strategies might be considered pillars of an emerging methodology of a policy-oriented and applied environmental humanities.

1. Collaboration and communication in the environmental humanities: Identifying needs

In order to strengthen the voice of environmental *studies*, the environmental *humanities* – as its newest manifestation and as an emerging international movement – aim to increase collaboration within the humanities, social sciences and arts as well as with natural scientists, engineers and planners, while improving linkages with policy-makers and the public. Indeed, there is a perception among scholars from environmental humanities that greater teamwork, greater collaboration with scientists, and greater communication with policy-makers and the general public are needed.

1.1. Greater teamwork needed

Many respondents of the survey acknowledged that humanists and artists often work alone. One respondent wrote that *there are rather a lot of soloists and fewer team players in traditional humanities disciplines, and so collective action is a big new challenge for the environmental humanities, and for those interested in global change, climate change and other 'wicked' problems.* One reason behind this is seen in academic incentives. A typical statement was that *the highest-ranking type of scholarship for promotion and career purposes typically involve single-authored books and single-authored articles in refereed journals. Recognition of collaborations of the kind we are talking about here is only slow to come.* Another obstacle is seen in the difficulty of engaging with other themes, methodologies, epistemologies and underlying assumptions. One person argued that

> Working as members of an interdisciplinary team requires the questioning of assumptions and habits, the desire to engage with topics far beyond an area of individual expertise, and the willingness to endure the disdain from the gatekeepers of the home discipline. These three qualities – self-awareness, curiosity, and resilience –, added to the joy of sharing what we learn from each other, turn interdisciplinary teamwork into a liberating experience that stimulates creativity in apprehending and solving environmental issues.

Many felt that more collaboration should be encouraged, and that this is one of the great promises of the environmental humanities. Such a sentiment is reflected in a blog where a scholar wrote that her close colleagues need to take up *collaborative and transdisciplinary dialogue not only with the natural scientists, but also, crucially, with other scholars in the human and social sciences: ecocritics, political ecologists, environmental sociologists, anthropologists, philosophers, and ecological economists* (Barca 2017). Although close teamwork is clearly not the only fruitful way for developing environmental humanities, since individual contributions can still be crucial, many of those working in the field feel that more group work is needed.

1.2 Greater collaboration with natural scientists needed

Group collaboration brings up the point that many of those surveyed felt that environmental humanists should be encouraged to work more often and more intensively with natural scientists (along with engineers, planners, etc.); although some and especially also artists do. It was noted that both sides should be encouraged to read each other's work, meet in workshops, visit conferences of the other side, and in particular engage with the research practices of the other side: *Generally speaking, it seems that humanists rarely go into the field to where most of the environmental research is happening nor do they attend scientific conferences on environmental issues. Likewise, I've observed that few scientists attend environmental humanities conferences and engage in genuine dialogue about these issues.* As with teamwork within the environmental humanities, interdisciplinarity with natural scientists is regarded as of great importance but also posing great serious challenges. In the words of one respondent:

> Of course it's important, extremely important, but is it realistic? Such collaborations are vital but time and time again I observe scientists impatient with having to watch dancers offer their take on an environmental issue and artists frustrated with scientists' attempts to convey an issue with a projected graph full of indecipherable acronyms and numbers. True interdisciplinarity is an enormous challenge […]. I think few people have the genuine ability to be able to move across the various disciplines and appreciate the detail and subtleties of both.

1.3 Greater communication with policy-makers and the public needed

There is a general agreement in the need for improving collaboration with and reaching out to policy-makers and the public. Respondents explained that environmental humanities scholars do not necessarily engage with the world outside of academia. While some respondents have emphasized that environmental humanities scholarship must not necessarily be presented as having direct application to pressing societal problems, at the other end of the spectrum, artists, environmental journalists, environmental intellectuals daily engage with policy-makers and the public, and some of them consider themselves activists. A typical statement calling for greater interweaving of academic work and the outside world suggested that *we must hire lobbyists, lawyers, journalists, and opinion-makers*. Regardless of the broad range of views on how best to engage with the world of activism and decision-making, there is the general belief that *collaboration with policy-makers is important for fundraising and to generate interest, with practitioners to do research, and with the general public to present and discuss research results*. It seems that many environmental humanists recommend taking part in activities at the science-policy interface. As another respondent noted:

> I think that social scientists need to just take a place at the table rather than waiting for an invitation. My experience is that we are quite welcome, but nobody comes looking for

us. The Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) is a good example. [At an IPBES event] maybe 250 people [were present], the total number of social scientists was 1. We knew about it. Nobody came.

Whether the work of environmental humanists should be of immediate use to decision-making and societal problem-solving is a contested issue. Some think it should; these bodies include the British Academy - UK's national body for the humanities and social sciences, which in a 2008 report stated *there is a need to recognize the importance of increasing the stock of useful knowledge from a wide range of relevant academic sources, in order to enable the UK to respond better to uncertainty. The humanities and social sciences have an important role to play here.*[1] Others think that the concept of applied research is an unjustified simplification of the role of knowledge and academics in society.

There was also a common mention of the need for better public outreach. A typical comment was that *personally I think all university research in the environmental humanities should have an outreach dimension. Humanities scholars have the potential to communicate their concerns but they often fail to do so. Ideally all university projects should be done in cooperation with art (theatre, music, exhibitions).* More generally there is a feeling that the humanities tend to remain too often within academic ivory towers: *They must be open and approachable to help the public overcome all residues of prejudices against ivory tower attitude and jargon; these might still be more prominent than many are aware of*. Another reason for including art in, for example, climate change communication is that the artwork offers not only a different imaginative experience but also *localizes and materializes climate change*, bringing the epic narratives of the science to a situation closer to home.

2. To what extent can environmental sciences serve as a model for the environmental humanities?

A number of cornerstones of the research and outreach strategy of the environmental sciences make it a model that is not easily applicable to the environmental humanities. In general, it can be said that the framing of environmental problems by environmental sciences does not align with the perspectives of environmental humanities. The environmental sciences define environmental problems as problems of the environment. However, as one respondent stated: *Problems of the environment are essentially problems of and between people, so that addressing our most intractable environmental problems requires improved justice, better equality, and attention to the rights and needs of everyone.* Many respondents mentioned that humanities are at best considered junior partners of the natural sciences. One respondent for instance wrote: *I have been invited to join projects in which the hard scientists were doing the research and we, the humanists, were supposed to popularize the results or looking into the 'perceptions'. This is not the right way to go. The challenge is to define the research questions together*. Another respondent similarly feared

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[1] http://www.britac.ac.uk/sites/default/files/wilson.pdf

that *interdisciplinary collaboration between social and natural sciences will automatically align the research, which means that the prioritization will be guided by the competences of the natural sciences*. The framing of knowledge production as promoted by the environmental sciences affects not only research questions, but also how they are analyzed and structured, how the sciences are seen as part of society, how the knowledge and action and policy are related to each other, and how knowledge is represented and communicated. Some go so far as to propose reversing the relationship between environmental sciences and studies: *Maybe our own division of the arts/humanities from the sciences is more imagined than real, so that environmental sciences is just a subset of environmental humanities.*

2.1 A call for relational and pluralistic knowledge instead of disciplinary thinking

Many of the commenters suggested that the environmental humanities perspective is one that attempts to gain a holistic and context-sensitive view of problems instead of dividing it up by disciplines into sub-problems. One statement was for instance: *The sciences could profit from a culturally and historically more contextualized and epistemologically more reflexive attitude towards their work as well as being engaged within a more experimental if not speculative and artistic setup*. One aspect of this critique is that the environmental sciences are often viewed as insufficiently pluralistic in their concepts, methodologies, forms and representations of knowledge, inadequately cultural, social and historical in their approaches, and oblivious to social, gender, cultural, and ethnic issues in their research teams. In contrast, many environmental humanists emphasize the context of knowledge production and use while reflecting on inherent biases of analytic thinking, so as to provide a different dimension to the complexities of perceiving the natural world and offering solutions to our environmental crises. One respondent concluded:

> There has been a lot of talking about inter/multi/trans disciplinary. Although I think it is a great aim, we should also start to interrogate ourselves why it did not work. I believe that it is not enough to put together several disciplines, finding some kind of Esperanto in order to communicate. I believe it is time to go to the very roots of that failure and understand what is wrong with the disciplines. I think that interdisciplinarity does not work unless one explores the ways in which disciplines boycott that very idea.

Inter- and transdisciplinarity might contribute to reducing rather than increasing pluralism if the goal is an overarching synthesis of knowledge or finding directly applicable solutions. In contrast, a recent meeting proposed that environmental humanities should *undiscipline* the study of the environment.[2]

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[2] http://www.ces.uc.pt/undisciplined-environments/

2.2 Are environmental problems solvable?

Humanists view scientists as sometimes too uncritical and unreflective as by seeking immediate solutions: *The key challenge […], though, is to avoid the technoscientific conviction that this is intrinsically fixable.* Another respondent added:

> The challenge we face is that we are drawn to complexity and stress the intractability of the environmental crisis, which is not what policymakers want to hear—and is not information they can use. But they nevertheless need to hear it. A key component of working with policymakers will involve stressing the deep complexity of the problems we are facing and identifying humanities-based targets that begin with understanding the nature and scope of the problem rather than pointing to solutions.

Another respondent extended this analysis as follows by proposing as an alternative a culture that acknowledges and accepts more risks, potential failures and ambiguity:

> We must learn to better tolerate risks and ambiguity, welcome incongruity and accidents, create a new vocabulary, be more participatory, and let us travel through the gray areas of transfrontier science where nothing is certain forever. These processes that we must invent together would differ sensibly from the processes articulated by the Enlightenment.

Environmental problem solving, from this view, might be better understood as an open, wandering, experimental process with the end product not yet known, rather than being a process for efficiently producing knowledge and solutions that are in some cases already thought to be known. This latter strategy, now widespread, might lead to optimization of existing solutions and reinforce existing institutions and power relationships, but not enable the transformative processes and radical changes that are needed.

2.3 Science for whom?

The environmental sciences do often not ask themselves explicitly for whom their science is produced and in particular who should implement actions. The simplistic idea of 'speaking knowledge to power' has been recurrently proven wrong. Facts are not enough to clarify disputes or enable action. They cannot moderate between different worldviews and they don't tell us what to do. Also, different knowledge speaks to different actors – knowledge users can be policy-makers as well as people protesting in the streets or trying to change policies. But they need different knowledge, rooted differently in culture and society, and differently framed. There is also the more fundamental question whether knowledge production should work within contemporary power relationships and institutions or challenge them.

One respondent challenged the relationship between scientists and decision-makers and the public as follows:

> Could it be instead that we need not to cooperate but to refuse to cooperate, perhaps even to sabotage certain machineries producing inequalities, hierarchies, imperial oppressions? I must add that this might even apply to the general public, when the challenge might be to disturb or question some mainstream assumptions.

A more critical analysis might even ask whether it is appropriate to put humans at the center of environmental research, or whether this excludes all other beings. Cosetta Veronese wrote in a recent blog[3]:

> One might argue that the label 'Environmental Humanities' is itself problematic: in my understanding of the term, it makes the environment relate primarily (if not exclusively) to a human / humanistic sphere; it almost suggests that the environment is, as it were, a function of man, rather than man a function of the environment. It seems to imply that the consequences of environmental changes are, in the first place, relevant to humans (regardless of where they are geographically located, and whether they belong to a minority, exploited or under represented cultures) rather than equally important for the rest of the living world.

2.4 Integrating and representing different forms of knowledge

The environmental sciences use a restrictive range of forms of representation of knowledge and its integration. Often scientific evidence is presented as quantitative statistical data, or else as outputs of computer simulation models or more generally systems science based analysis, or as some sort of formal decision-making frame. Environmental humanities seeks a broader range of knowledge forms and representations including comprehensive case studies, stories, artistic work, and qualitative data (represented in different languages and symbolic forms). One respondent stated that *environmental humanists should stand by the conviction of their disciplines and engage with data framed in narratives that speak directly to policymakers' quandaries.* Environmental humanists acknowledge, or hope to acknowledge, different types of insights and learning that may be incommensurable, contradictory or based on different value systems, which means they cannot be easily integrated into one overall framework.

2.5 ,Grand challenges and Big Science' paradigm

A strong narrative of contemporary environmental sciences is that there are grand challenges that require Big Science to address them. Big challenges are usually framed as global problems, such as climate change, that are addressed through political coalitions at an international scale. In the latest international environmental research program – Future

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[3] http://environmentalhumanities.ch/cosetta-veronese-are-environmental-humanists-all-too-human/

Earth – this perspective is taken one step further and applied not only to managing environmental systems but also social systems. According to its 'Strategic Research Agenda 2014' it wants to build *a new generation of integrated Earth system models to deepen our understanding of complex Earth systems and human dynamics across different disciplines, and to underpin systems-based policies and strategies for sustainable development in order to develop scenarios for transformative development pathways that enable global sustainability, to help evaluate different strategies and options.*[4] In other words, it attempts to be Big Science that produces global-scale models of the coupled sociopolitical and environmental Earth system as a basis for global-scale decision-making and action. Such a framing of grand challenges and Big Science can lead to a great loss of complexity and diversity of the understanding of the issues, and a loss of representation of diverse perspectives and people. As one respondent pointed out, there is also a risk that mostly trivial knowledge is produced:

> There is no doubt that anthropogenic climate change is dangerous, that biodiversity loss requires action, similarly as there is no doubt that wars are bad. At this resolution of analysis problems are evident and so are solutions: stop using as much resources as we do, stop wars. Symptomatic might be the current situation of the IPCC and climate change: it is evident that dangerous global CO_2 emission limits have been or soon will be reached. What shall IPCC do now? Adapt its limits or say that it is too late? (longer statement shortened and paraphrased).

The question then is pertinent who acts upon such knowledge, how democratically legitimated are decisions based on such 'big knowledge', how accepted is such knowledge and decisions taken upon it, and how adaptable are solutions for grand challenges through big science to the manifold contexts where the actual action must happen.

3. Solutions – making the voice of environmental humanities heard despite complexities

There is a consensus among many scholars of the survey about the need for more teamwork, greater interdisciplinarity across the different scientific cultures, and improved orientation towards the general public and decision-makers. But strategies of the natural scientists are seen as somehow too simplistic. It is however also evident that decision-makers will not be attending many university seminars or reading libraries of books, much less spending hours reconciling multiple scholarly perspectives or attempting to distill the best advice from scholarly work. There is also not enough capacity, neither scientific nor societal, to prepare new analyses and devise novel solutions for every new case and context. Moreover, complex problems cannot be understood in their entirety by lone scholars, nor will they often be heard by influential politicians or business leaders. How can environmental humanists remain truthful to their legitimate belief in addressing complexity in analysis and searching for solutions that are context-dependent and pluralistic, while

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[4] http://www.futureearth.org/media/strategic-research-agenda-2014

complementing insights offered by the environmental sciences? This is the overarching question that the ten solutions proposed below seek to answer.

3.1 Solution 1: Resetting the agenda in science policy to emphasize human needs

Environmental humanities frame environmental problems differently, use different forms of knowledge representation and interaction between the academic and non-academic world, and consequently their perspectives can substantially differ from dominant scientific paradigms and science-policy institutions in the environmental sciences. Environmental problems are seen by environmental humanists as inherently human problems. Thus different research themes are relevant, for instance environmental justice, poverty, forced migration and refugee crises as a result of environmental degradations, or laws on the environment, questions related to meaning and the historical and cultural context of environmental problems, but also questions related to modes of knowledge transfer, conditions for assimilating knowledge, or differences between knowing, understanding and acting. Also often mentioned was a need to enable coordinated action of many different people despite the problem of free riders; and more general to understand complex socio-cultural behaviors. A focus on humans and meaning also involves different ways of producing and representing knowledge (see below).

These alternative themes and ways of doing research must be moved to the top of scientific and science policy agendas at national and international levels, among governmental and non-governmental funders (e.g., philanthropic, foundations, business world), and among knowledge users (government agencies, NGOs, civil society). Why new framings, new methodologies, new forms of knowledge representations, and new forms of scientific collaborations are needed, must be explained to decision-makers und funders in the science realm. Funding schemes, academic incentives, career paths, and institutional settings should be adapted accordingly, and new forums of interaction among scientists and between scientists and the non-academic world must be established and promoted (see solution 5 and following).

Such lobbying might involve publishing position statements in mainstream leading scientific journals (e.g. Castree et al. 2014) and targeting science policy bodies (Kueffer et al. 2015). It will also require establishing new programs, for instance the Transformations to Sustainability (T2S) programme[5] of the International Social Science Council that promotes in particular so-called ‚Transformative Knowledge Networks'.[6] Another initiative is the International Panel for Social Progress (IPSP)[7], modeled after the Intergovernmental Panel on Climate Change (IPCC), and led by Nobel Prize-winning economist Amartya Sen. Such lobbying will profit from liaison with grassroots and non-governmental organizations in complement to government and industry as funders and supporters of research.

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[5] http://www.worldsocialscience.org/activities/transformations
[6] http://www.worldsocialscience.org/activities/transformations/transformative-knowledge-networks-2/
[7] https://www.ipsp.org

3.2 Solution 2: Challenging dominant scientific paradigms and science-policy institutions

Changing the academic agenda can also mean that specific dominant scientific approaches or institutions at the science-policy nexus are being challenged based on an environmental humanities perspective. This can involve criticizing particular aspects of existing research paradigms, for instance anthropocentrism and human exceptionalism, a simplistic systems analysis approach (Kull et al. 2017), biased problem framing (e.g., in invasion biology, restoration ecology, or of the Anthropocene concept), or making unheard voices heard (e.g., those of indigenous people). The notion of the Anthropocene, for instance, has attracted many critical voices from the environmental humanities (e.g., Lorimer 2017; Emmett & Lekan 2016; Todd 2015). It can also mean that existing science-policy bodies are being critically analyzed, e.g., the IPCC for climate change or IPBES for biodiversity and ecosystems (e.g., Turnhout et al. 2012). Such critique must be written in a way and published where the relevant scientists and decision-makers can read and understand it.

It is also important to make sure that scholars from the environmental humanities and arts are sufficiently represented on steering boards, councils and expert panels of all of these institutions, including in organizations such as IPCC[8], IPBES[9], Future Earth[10], WBGU[11], but also in expert groups at national and local levels dealing with issues that are often left to natural scientists and some social scientists (e.g., biodiversity, climate change, energy, food security, soil protection, urban and spatial planning, green economy, or sustainability). Such better representation will require an increased preparedness from the environmental humanities to engage with real-world policy issues and processes, and an increased preparedness from the relevant organizations to share influence with a broader range of experts (that are also better balanced in terms of gender, age, and cultural and socioeconomic backgrounds) and epistemologies.

3.3 Solution 3: Strengthening the voice of the Environmental Humanities

The environmental humanities have developed a rich body of conceptual ideas, and build on an even richer tradition of environmental studies with long-established fundamental work ranging from political ecology, post-colonial studies, critiques of capitalism, feminist perspectives to eco-criticism. However, in comparison to the very influential theoretical paradigms from the environmental sciences or economics, a more visible integration of pluralistic environmental humanities perspectives remains to be developed. What are adequate strategies that might help enabling coordination of research interests and strengthening of environmental humanities perspectives in society at large? Certainly, the term 'environmental humanities' in itself has the potential for changing perspectives. As one respondent said: *I think the term 'environmental humanities' is a key message that needs to*

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[8] http://www.ipcc.ch
[9] http://www.ipbes.net
[10] http://www.futureearth.org
[11] http://www.wbgu.de

be publicized, whether as self-proclaimed groups, journals or lecture series. Placing environment next to human is an eye-opener that suggests we people are part of our natural world, for better and worse, for helping steward it, while realizing our limits in our ability to do so. There are the first anthologies of environmental humanities (e.g., Heise et al. 2017) and also concepts that have become fundamental to the environmental humanities, for instance the concept of ‚slow violence' (Nixon 2011). But to gain a stronger voice more shared concepts that can re-shape environmental discourses at a fundamental level might be crucial.

A promising strategy might be that environmental humanists ask themselves how their perspectives might alter, complement, or replace existing and emerging bodies of environmental theory, for instance in the case of sustainability or societal transformation. How can societal transformation towards a sustainable society be anchored in society, the cultural and social preconditions for directional change, and their historical roots? This can mean that such environmental questions are related to long-established thinking in the social sciences and humanities. One humanist on her blog states:

> I believe that this politicization of environmental history requires us to revive interest in the historical agency of the working classes, potentially capable of leading the ecological revolution that we desperately need today. For this to succeed requires a critical revision of the definition of working class—one that is nonorthodox and which includes ecological interdependencies, feminist standpoints, and environmental justice. I am convinced that neither technology nor technocracy can save us. We need a profoundly new vision of human destinies that eliminates the dominant western-centric and ultimately racist narratives of human "progress," and which makes space for new, multiple, and profoundly ecological visions of what the word should mean to us. What we need are not only decolonial, antiracist, antisexist, and class-conscious histories of what went wrong in humankind's relationship with the planet, but also tales of liberation: emancipatory collective memories of how common people—working-class women and men, indigenous people, racialized social groups—have been capable of envisioning and fighting for nondestructive and nonexploitative relationships with their environments. (Barca 2017).

A KTH Stockholm project, "Towards 'just sustainability' - Grassroots initiatives to merge social and environmental justice," works on redefining sustainability by challenging it through the lens of environmental justice. The project goals are defined as follows: *JUSTAINABILITY focuses on grassroots organizations and local communities worldwide, who resist contamination, expropriation, and exploitation while experimenting with alternative sustainabilities. […] JUSTAINABILITY aims (a) to recover and understand the envisioned alternative sustainabilities, (b) to catalyze the interaction of their proponents, and (c) to legitimize and incorporate grassroots knowledge and experiences in the collective search for*

transformations to sustainability. Ultimately, this project aims to profoundly change the concept of sustainability to champion issues of socio-ecological justice.[12]

Societal change or transformation has become an important topic in the social sciences, and there is also a growing interest in societal transformation from a critical and interdisciplinary environmental humanities perspective. One attempt towards an alternative perspective on societal transformation (from an artistic perspective) is Aviva Rahmani's theory of ,trigger points'.[13] She explained in her response to the survey: *Survival is conditioned by our analyses of systems that can identify what I have called "trigger points", locations that could effect a domino transformation with minimal resources and maximum attention*. Another example of rethinking societal transformation is given by the Canadian ,After Oil' project that is *a collaborative, interdisciplinary research partnership designed to explore, critically and creatively, the social, cultural and political changes necessary to facilitate a full-scale transition from fossil fuels to new forms of energy*.[14] The core assumption of the project is that we need *a wholesale transformation in contemporary petroculture: those political structures, built environments, social dynamics, educational systems, discursive modes, values, practices, habits, beliefs and affects that, seeming unrelated to energy, exist as they do because of the shaping force of oil.*[15]

3.4 Solution 4: Experimenting with new epistemologies and methodologies

Many scholars in the environmental humanities are experimenting with new epistemologies and methodologies, or with integrating existing ones in new ways. In contrast to the environmental sciences, environmental humanists emphasize aspects such as contextualization of knowledge and studies, relational knowledge, situated knowledge, relativism, holistic and integrative studies (e.g., case studies) and relationships between far-apart themes, pluralistic and multi-methodology approaches, qualitative data, reflection on the historical, cultural, social and symbolic underpinnings of particular concepts, or inclusive participation of indigenous people, affected people, marginalized scientific views, or non-human living beings and non-living actors. One respondent for instance stated:

> Broadly, we should be studying relationships and the accompanying ramifications that are enacted as relationships modify through time and space. This work should be framed in accordance with a contextual and pluralistic based relativism that seeks to act from the best-known situated knowledge achievable in order to meet desirable outcomes for a wide range of actors/agents, including animals, plants, and non-living matter.

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[12] https://www.kth.se/en/abe/inst/philhist/historia/ehl/justainability/justainability-1.568479
[13] http://ghostnets.com/projects/trigger_points_tipping_points/trigger_points_tipping_points.html
[14] http://afteroil.ca/
[15] http://afteroil.ca/resources-2/after-oil-book/

Another respondent specified:

> This means favoring relationality, i.e., bringing concepts or ideas closer to each other rather than making them consequential. Traditional epistemological dichotomies (such as Nature / Culture, Rationality / Emotionality, Humanities / Sciences and the like) can be overcome only by giving priority to rhyzomatic relations, i.e., exchanges and synergies that challenge disciplinary boundaries, replace vertical and hierarchical relations with horizontal relations and break with linear logic and movement in order to achieve approximation.

This requires individuals to learn to respect and value each other's epistemology and standards of evidence, be prepared to not just talk, but to challenge each other's opinions instead of sitting in their own bubbles with their own groupthink. As one respondent emphasized: *Listening, generosity, empathy, and experimental creativity are ways to integrate knowledge across groups*. Empathy can also mean that non-human perspectives are considered. In the words of Cosetta Veronese: *But how can we think animal? Is this possible at all? Perhaps a reflection on the means of communication of the most abstract arts (music in particular, which, incidentally, is the language of birds and, one could argue, of dolphins too) could help us move in the direction of reflecting about different non-human ways of approaching, relating, experiencing or understanding the world.*[16] The field of post-humanism is developing new vocabularies, epistemologies and ontologies that confront traditional notions of the human and non-human (Braidotti & Hlavajova 2018).

Collaborations with artists further broaden the range of methodologies, for instance: *The performativity of the gesture, its capability to show, to put on scene what has been put out of the scene (ob-scene, in Rancière's words), it's what makes the artistic act politically valuable. This is even truer for environmentally concerned performances, in a time when the visualization and the visual are becoming more and more powerful*. One respondent proposed the following functions of science-art collaborations:

> The logic of accountability points to the need for increased public understanding of science and socially robust science. The logic of innovation points to the value of art in boosting creativity in science and technology. The logic of ontology argues that if artists and scientists collaborate, they will be able to create a new understanding of the nature of art and science.

Equally, perspectives from the Global South and locally-rooted and indigenous scholarship are an important compound of environmental humanities not only because they add key expertise but also because they challenge existing epistemologies and ontologies and help to overcome a century-old dominance of Western thinking including in environmental

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[16] http://environmentalhumanities.ch/cosetta-veronese-are-environmental-humanists-all-too-human/

studies (e.g., Whyte 2017; Kealiikanakaoleohaililani & Giardina 2016; Todd 2015; Green 2012; Green 2008) – a dominance that stabilizes power relationships and marginalizes the views of the poor, weak and excluded (Baviskar 2011). Lastly, collaborations with natural scientists offer opportunities for integrating their approaches, e.g., quantitative analyses, experimentation, big data analysis and collection (e.g., through remote sensing or by crawling the internet), or computer modeling.

Environmental humanities might thus be considered an opportunity for the confluence of multiple epistemologies and methodologies ranging from the arts to the natural sciences, and as such a forum – that brings different lines of research together and is less hostile to new ideas – it might allow for creativity and risk taking for developing new scientific approaches that might be more appropriate for tackling the environmental challenges of our time. Overall the aim might be to develop methods that are *less discipline-specific and more problem-specific* as one respondent stated. One respondent went as far as stating that *these processes that we must invent together would differ sensibly from the processes articulated by the Enlightenment.*

As a meta-field that crosses many disciplines the environmental humanities are a unique place to innovate, test, validate, debate, and compare emerging new approaches. Such a methodological and epistemological discourse should be explicitly encouraged, e.g. through special sections or methodology-oriented articles in the various emerging environmental humanities journals, through methodology-oriented workshops and conferences, and maybe most importantly by ensuring that new methods, project types, and research strategies are documented and formally evaluated and these documentations are shared.

3.5 Solution 5: Up-scaling local case studies to regional and global scales

A common focus of environmental humanities scholarship is put on specific case studies. Such a focus ensures that research leads to thick descriptions and holistic integration of multiple issues, themes, perspectives and ways of representation, the participation of local voices, and allows being truthful to the specificities of the context – all aspects that correspond to the research strategies typical for the environmental humanities. Many respondents thus emphasized the values of place-based, local research and case studies. For instance: *Place-based, local research is often the best way to get people with different expertise – including practitioners like national parks managers and artists – to approach issues together.*

There is a growing number of programs that connect local case studies on particular issues at regional and global scales thereby up-scaling local research for international exchange of knowledge and strengthening an international voice; often through virtual platforms. For

instance, ENoLL has established a network of so-called open living labs.[17] Humanities for the Environment (HfE) launched a network of observatories called 'Archive of Hope and Cautionary Tales' *that builds on a storytelling approach*.[18] The EU-funded program ejolt has produced an online 'Atlas of environmental conflicts'.[19] Another example is 'world of matters'[20], which is an *open access archive on the global ecologies of resource exploitation and circulation*. Equally, policy organizations increasingly use networks of local nodes of innovation (for instance the UN Sustainable Development Solutions Network [SDSN][21], the World Environmental Hubs of IUCN[22], or the Regional Centres of Expertise on Education for Sustainable Development RCEs[23]), and so do grassroots movements (e.g., the Transition Network[24]). There is thus a potential to align environmental humanities research practices with policy approaches, even at an international level.

3.6 Solution 6: New forums for knowledge exchange

There is no doubt that diverse conversations within the humanities, across the two culture divide within academia, and between academics and people of all walks of life is essential. Such conversations are however difficult because different theories, epistemologies, worldviews, concepts, narratives, life experiences, languages, and specialized expertise have to be bridged. There is a need for fora that are open to experimentation, free from having to be effective (immediately), protected and respectful, and allow for enough time and energy to intensively engage with each other. One respondent formulated this as follows: *What seemed important for many of the people that participated […] was to have a protected, 'safe' space for this experimental mode, an exploration that begins as something that is free from having to be effective*. Shared experience and personal encounters are often considered important. One respondent said: *Our experience was that creating an eye-to-eye situation, a space of experience among disciplines, methods, and career levels can be an incentive for building long-term collaborations if not cordial friendship.* Also central is that different methodologies and epistemologies are made explicit and transparently reflected. Involving policy-makers and stakeholders can also have value but leads to a different dynamic: *While it is essential to directly involve policy makers, stakeholders and people coming from educational policy to reach a level of systemic transformation, our experience was that this needs careful preparation in so far as these positions can put the protected, non-hierarchical atmosphere at risk*. The most simple and basic need might be to reserve time together and arrange for incentives to do so: *Academics from different aisles usually don't get to collaborate because they rarely have social interaction nor incentives to produce something together in an unrestricted atmosphere*.

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[17] http://www.openlivinglabs.eu/node/1283

[18] http://hfe-observatories.org/about

[19] http://www.ejolt.org/

[20] http://www.worldofmatter.net

[21] http://unsdsn.org

[22] https://www.iucn.org/regions/europe/projects/world-environmental-hubs

[23] http://www.rcenetwork.org/portal/

[24] https://transitionnetwork.org

Such conversations require that academics from the two cultures meet more often and engage in dialogues that are facilitated through the use of multiple communication forms and media. Several respondents emphasized that such in-depth conversations require going out into the field together to experience the local case together and first hand, for instance: *The best settings for expert exchange are field workshops. […] having them read nature from their perspective would be an effective way of a dialogue*. Equally it has been proposed that visits – including long-term ones – in each other's research places (e.g., laboratories of scientists or artists) are productive. The 'Artists in Labs' Program in Zurich has for instance enabled for many years longer-term visits of artists in scientific research groups.[25] One can of course envision the reverse whereby the scientifically-minded spend time in the workshops of artists. Such interactions can also lead to public events such as the Zurich Laser series where artists and scientists engage on a common topic[26], including shared publications (e.g., Scott 2016). Museums have also been proposed as ideal spaces that enable in-depth engagement with a rich theme, especially for the public (e.g. Rees 2017, Robin et al. 2014).

In a joint effort the Haus der Kulturen der Welt (HKW) and the Max Planck Institute for the History of Science in Berlin have for several years been running a project titled Anthropocene Curriculum that already convened two larger-scale Anthropocene Campuses, whereby over 300 scholars and students from both scientific cultures (including the arts) have met and interacted through different formats for an extended period of nine days each. This project also led to other initiatives at the intersection of Anthropocene research and education elsewhere and a web platform that works as a hub for a growing network of connected projects as well as a resource for teaching and engaging with broader Anthropocene questions.[27] The HKW defines its role as follows: *We see ourselves as a forum in which relevant questions of our time are being negotiated and – most importantly – being experienced between actors from different fields of civic engagement, academic disciplines, the arts etc. After an extensive curatorial process, we invite a variety of individuals and teams (a general open-mindedness is certainly key here to produce something meaningful) coming from different academic or artistic backgrounds and together create specific experimental formats that are public and intimate at the same time. The idea is to infect research and education practice with the concrete experience of trans-disciplinary forms of engagement (in a non-academic space) and thereby provide seeds to establish a true commonality amongst the different disciplines, methods, and approaches and an Anthropocene adequate culture of knowledge production.*

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[25] http://www.artistsinlabs.ch; www.groundedvisions.net
[26] www.laserzurich.com
[27] http://www.anthropocene-curriculum.org

3.7 Solution 7: New research teams and institutional structures

Besides shorter term interactions through fora of knowledge exchange, there is also a need for more longer-term interdisciplinary research teams and institutions. Many respondents agreed that teamwork is essential and must be further promoted, e.g.: *Teamwork is crucial. There is something in environmental humanities which is actually leading in that direction, if one thinks of the proliferation of settings different from the usual humanities departments (observatory, hubs, laboratory, collaboratory). Those settings are also made in order to offer the opportunity for scholars to aggregate without a too strong institutional frame*. Indeed, there are now many environmental humanities centers[28] that are all experimenting with different institutional forms for facilitating teamwork of a diversity of thinkers, styles, and attitudes. Such initiatives attract increasing funding from national science funding bodies, for instance the Swedish Foundation for Strategic Environmental Research (MISTRA) that launched an environmental humanities program in 2015[29], or the Research Council of Norway with its SAMKUL program on the cultural conditions underlying social change.[30]

Activities in environmental humanities research teams or at such research centers can range from a joint dinner to joint research projects, co-authoring articles, and joint events. Such institutions ideally allow for different forms of teamwork from continued single person projects to teams adapted to a particular purpose. Indeed, there are also risks involved in teamwork. There are also increasing opportunities for digital networking: *Given the cost and environmental burden of transnational travel, the node teams must be assembled virtually, based on interest grouping, without reference to geographic locations. […] Funded annual in-person conferences for nodal participants, augmented by virtual participation where necessary for those who cannot attend in person, could take the work in nodes and between*

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[28] Examples of environmental humanities institutions include amongst others the **Australian Environmental Humanities Hub** (http://www.aehhub.org), the **Rachel Carson Center for Environment and Society in Munich** (http://www.carsoncenter.uni-muenchen.de/index.html), the **Environmental Humanities Laboratory at the Royal Institute of Technology (KTH) in Stockholm** (https://www.kth.se/en/abe/inst/philhist/historia/ehl), the **Science Policy Research Unit at the University of Sussex** (http://www.sussex.ac.uk/spru/), **Aarhus University Research on the Anthropocene** (AURA, http://anthropocene.au.dk/), **UW-Madison's Center for Culture, History and Environment** (http://nelson.wisc.edu/che/), **UC Davis Humanities Institute's Environmental Humanities Supercluster** (http://environmentalhumanities.ucdavis.edu), **The University of California, Los Angeles Institute of Environment and Sustainability** (https://www.ioes.ucla.edu), the **Center for Environmental Futures of the University of Oregon** (https://blogs.uoregon.edu/uocef/), the **Center for Creative Ecologies at UC Santa Cruz** (https://creativeecologies.ucsc.edu/), the **Stony Brook University Environmental Humanities Bachelor's Program** (http://www.stonybrook.edu/commcms/sustainability/majors/ENVhumanatiesmajor.pcf.html), the **University of Utah Environmental Humanities Graduate Program** (http://environmental-humanities.utah.edu), the **University of Pennsylvania Program in the Environmental Humanities** (https://www.sustainability.upenn.edu/partners/penn-program-environmental-humanities), or **Environmental Humanities at Princeton** (EHP, https://environment.princeton.edu/ehp/about/).

[29] www.mistra.org/en/mistra.html

[30] www.forskningsradet.no/samkul

nodes further. An interesting example of a research as well as training network is the European Network of Political Ecology (Entitle[31]).

3.8 Solution 8: New forms of engaging with the public and the world of practice

One respondent stated that *we (both humanists and scientists) need to 1) seek to distill and communicate the most important parts of our messages, and 2) admit and explain that our messages are complicated, and not so easily understood, 3) continue to try to bring our messages to readers that are not confined to universities*. This statement illustrates how many respondents acknowledge a need to engage with society at large while recognizing the challenges of doing this in a way that is sensitive to the ways of knowing that can be offered by the environmental humanities. There was a broad consensus among respondents that a great diversity of different strategies, settings and forms of engaging with society should be employed that are adapted to the research project and products, the context of knowledge production and use, and the intended audience (e.g., the public, decision-makers, stakeholders, affected people, etc.). It was also repeatedly emphasized that engaging with the public and practice should be done in a critical and reflective way, in other words, an understanding of values and interests will provide better venues for scientists (or artists) becoming involved in advocacy or activism.

This can mean that a ‚product' of academic work might focus on *questions* more than *answers*. One respondent asked for 'Socratic dialogues'. This also means that a dialogue with society is expected to influence (and improve) science: *My own experience is that practitioners like to be invited to academic events. They ask questions that we would never ask*. Another respondent proposed more concrete considerations: *I wonder could we ask how we will bring in knowledge created by others, outside the academia? I can think now of a few music videos which I consider excellent pieces of environmental humanities scholarship. What can we learn from them? And how can we legitimate that kind of knowledge production? Can we publish them in our journals? […] We are now working on a new guerrilla narrative project on Toxic Stories which again goes back to the idea of hybrid research collective and breaks the division between we communicating and someone receiving. In that case, people produce their stories even if in the large majority of the cases they would have not [done so] without us, which means that we are co-producing those stories*. An experiment for more interactive publishing is Bruno Latour's 'mode of existence' book project – which is also published virtually for people to comment on it[32].

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[31] http://www.politicalecology.eu/
[32] http://modesofexistence.org

Indeed, the research process itself, as in action research, might be considered the main way of engaging with society, exchanging knowledge, and the place where situated and social learning happens:

> For me the solution though is not to write 'policy' texts, as very often, that kind of research is not aiming at these kinds of texts. The solution is rather to move into the direction of complex visualization practices and various collaboration practices. Many ethnographers collaborate in very complex ways with their interlocutors, but the texts they write do not adequately show this. But this does not mean that their policy/field relevance should be ignored, it just means that it is difficult to see from the outside. Whenever I have done an ethnography, I was asked to write some kind of report. I always felt that these reports were not my main legacy in the field, they were often ignored, and probably mattered little to the people [with whom] I worked. What mattered far more were the various discussions I had with all the people [with whom] I interacted, but none of this is visible to the outside.

Thus, to develop concrete solutions, it might be particularly interesting to collaborate early on and intensively with different types of practitioners and designers (or engineers, planners etc.). Sometimes longer term social learning processes are not possible, but reciprocal interactions can nevertheless be facilitated for instance through interactive webpages or at workshops. One respondent proposed: *Every academic workshop should have a practitioner dimension. Perhaps in a final panel practitioners should reflect on what they've heard*. And, the mass media should not be ignored even if they restrict the possibilities for conveying complex thoughts and in an interactive way: *The media (television in particular) are key to how people think about environments and the natural world, so maybe this should be a focus for environmental humanities work*. Some think that embracing modern communication could even go further: *We also need to use media that the public uses to educate the populace. The rise of Twitter as a news medium and the use of Wikipedia as an encyclopedia should be something that should be embraced and used. How can we craft 140 character messages about these complex subjects? Should we edit Wikipedia entries?*

Most respondents emphasized that scholars from the humanities and artists are specialized in representing and communicating ideas, thoughts, experiences, knowledge, meaning, and relationships through different media and in different settings; and they can also profit from their expertise in reflecting on the semiotics and social, cultural, psychological, emotional, aesthetic dimension of communication. Environmental humanists – and not just environmental humanists – therefore have multiple mediums at hand ranging from film, visual art, performance art, writing, song, exhibitions, stories, journalism, design, social interventions etc. Humanists need to use their wide array of tools and expertise and experiment with them: *I do believe that the environmental humanities have a unique opportunity to experiment with new ways of communicating knowledge*. These media can

reach out in ways that scientific data and writing cannot: *Artworks and films can cause post reflection and raise environmental questions in a different way*. A setting that might be prone to enable slow, deep and rich forms of engaging with an issue are museums; films and film festivals are another opportunity[33]. One innovative format that environmental humanists have been experimenting with is the 'Anthropocene Slam', such as the one at Madison in 2014[34,35]. Bruno Latour has been involved in two theatre plays that reflect on climate change policies ('Gaia Global Circus' and 'Cosmocoloss: A Global Climate Tragic Comedy'). Besides performative interactions, visualizations (not meant as illustrations but rather as visual interpretations of scientific products) are another tool. Such visualizations can be artistic, but also involve latest technologies.[36] There is also an increasing use of comics for representing complex issues (e.g. La Revue Dessinèe[37]).

The value of stories for empowering and involving people was mentioned repeatedly, for instance: *Engagement goes together with empowering storying practices.* […] *For example, bottom-up architectural and artistic practice have contributed to the definition of the Tempelhofer Feld statute as park in Berlin. Similar practices have contributed to the successful candidacy of former industrial and mining sites in Belgium to the Unesco World Heritage Status. That said, I do not think that art alone can stand a chance to change the present state of things, but it must work side by side with other movements or any other organized forms of political struggle*. Another project that was mentioned as an innovative way to explore the interconnections between a city and its stories is the 'A People's Guide Series'.[38] In addition to these suggestions, there was for instance the 2017 'Stories of the Anthropocene Festival' at KTH Stockholm[39], while Naomi Oreskes and Erik Conway have written up their warning of dangerous climate change as a science fiction story (Oreskes and Conway 2014). A further example is 'Climate Garden 2085', a public experiment in Zurich in 2016, designed to engage the public in local stories about climate change[40]. A future-garden installation was accompanied by talks from scientists, art performances and theatre for young children. The accompanying book includes essays from ecologists, artists and art historians, written for a general audience (Schläpfer-Miller and Dahinden 2017).

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[33] At the Global Eco Film Festival in Zurich, for instance, every film screening was followed by a panel discussion involving the film director and a scientist or humanist, https://www.globalecofilmfestival.com

[34] http://nelson.wisc.edu/che/anthroslam

[35] http://recollections.nma.gov.au/issues/volume_10_number_1/papers/slamming_the_anthropocene

[36] e.g., http://www.medialab.sciences-po.fr

[37] http://www.larevuedessinee.fr

[38] http://www.ucpress.edu/series.php?ser=apg

[39] https://www.kth.se/en/abe/inst/philhist/historia/ehl/stories-of-the-anthr/stories-of-the-anthropocene-festival-1.664943

[40] https://blogs.ethz.ch/klimagarten/

3.9 Solution 9: Consultancy, advocacy and activism

There are certainly good examples of successful direct application of environmental humanities insights and expertise. For instance, there is a need for specific expertise on environmental law and regulation, environmental ethics and the valuation of environmental goods, risks and costs, governance, environmental rhetorics, communication and ecomedia, geopolitical, cultural and emotional dimensions of mitigation of and adaptation to the impacts of climate change, or the design of effective and just participatory research and policy processes. Such applied research can go beyond adding expertise to an existing body and can help reframe understandings and solutions at a very concrete and specific level, e.g., by *developing criteria to triage global emergencies for the greatest good for the greatest numbers*, or else by *reconsidering legal and policy definitions of 'public good,' the 'commons' and the application of earth rights*.

Environmental humanists can also play an important role in complementing investigative journalists as has been demonstrated in uncovering strategies of climate change deniers and other interest groups that attempt to weaken scientific evidence and promote fake or alternative truth (e.g., Naomi Oreskes and Conway 2010). There can also be value in simplifying insights for actors – for instance for grassroots movements – in the form of manuals, guidelines, toolboxes, etc. A few examples include the policy briefs and handbooks of the Entitle Network[41], or the 'Ecological Economics from the Ground Up' handbook and online course of ejolt.[42] Some respondents went one step further, proposing that consultancies and start-up companies emerging from the environmental humanities should be facilitated. Successful application of environmental humanities expertise can also mean serving on expert panels in the policy realm.

At a more generic level, there is a great interest by the public in books and magazines on topics such as history and philosophy as indicated by the many such printed media appearing on the market. A few such German examples include 'NZZ Geschichte', 'Spiegel Geschichte', or 'Philosophie Magazin'. There are also blogs targeting a broad audience such as 'Geschichte der Gegenwart (History of the present)'.[43] Publications focusing specifically on an environmental issues' human dimensions or human interest can be particularly successful and effective, or else stories about one special individual, such as Julia Hill who brought enormous attention to the plight of the Redwoods. Certainly there are many examples of books geared for a general audience that have had lasting success and influence. A few recent examples of such books include Naomi Klein's *This changes everything: Capitalism vs. the climate* and some of works by Harald Welzer about transforming societies. Rachel Carson's classic, *Silent Spring* (1962) is regularly held up as

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[41] http://www.politicalecology.eu/publications
[42] http://www.ejolt.org/2013/05/ecological-economics-from-the-ground-up
[43] www.geschichtedergegenwart.ch

having launched the modern environmental movement. Films can of course also send far-reaching environmental messages across the land.

Some exponents of the environmental humanities go one step further: they want humanists and artists not only to bring their expertise to the field as public intellectuals but also to get involved in advocacy and activism. Indeed, even as humanities deal with political issues, they cannot be value-free or independent of interests. The line between expertise and activism (or advocacy) can be narrow. Typical statements about activism are partly rooted in the current political situation, e.g.: *It is impossible to disentangle my current experience in the United States. I am greatly concerned with the lack of productive engagement among policy makers and the scientific and artistic community. Many of us, myself included, have taken to activism and direct action in various forms in order to communicate our views. It seems to be the only effective measure at this point*. But other respondents are also more generally motivated by the severity of the environmental crisis, e.g.: *We need a five-year plan for global biological stability and a media campaign to outreach to a wide public. This must bypass industries and governments that might stand in the way of change. In his "Repressive Tolerance," Herbert Marcuse posited fifty years ago that by normalizing false or pejorative information, such as the fossil fuel industries or right wing movements, we erode the very basis of human civilization. Rather, we must stay focused on identifying the greatest freedoms from oppression for the greatest numbers with wisdom and moral integrity.* Activist research not only means getting involved in activism but also helping understand how such strategies have or have not been effective in the past, e.g. by researching earlier successful social movements and by bringing together ecocritics, political ecologists, environmental sociologists, anthropologists, philosophers, and ecological economists (Barca 2017).

Such examples of activist research would be the Militant Research program at New York University[44], Aviva Rahmani's blue trees symphony interventions[45], or the Children's Trust's project – the children's lawsuit against the federal government.[46] In this case complex scientific information had to be simplified for the specific setting of a court. Another example of activist research is the urban gardening project 'Allmende Kontor'[47] which is accompanied by a research program. The Dakota Access Pipeline struggle was also accompanied by the work of artists and filmmakers[48,49], and the forms of protest employed can itself be seen as an activist form of nuanced, reflexive and strategic performative intervention similar to art.

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[44] http://www.visualculturenow.org/wp-content/uploads/2013/09/MRH_Web.pdf

[45] http://www.ghostnets.com/projects/blued_trees_symphony/blued_trees_symphony.html

[46] https://www.ourchildrenstrust.org/

[47] http://www.allmende-kontor.de/index.php/kontor.html

[48] https://www.nytimes.com/2016/12/16/movies/standing-rock-sioux-tribe-filmmakers.html?_r=0

[49] https://www.nytimes.com/2017/01/31/magazine/the-youth-group-that-launched-a-movement-at-standing-rock.html

3.10 Solution 10: Teaching

Lastly, humanists like all academics are also teachers. There is great potential for teaching. At many universities, students in the humanities, arts and sciences do not yet have access to training in environmental humanities scholarship – or humanities or environmental sciences training in general. Some of these subjects and ideas should be introduced and made compulsory for students not just in the natural sciences and engineering, but also for those engaged in the social sciences and humanities.

This is how the environmental historian McNeill sees teaching as one crucial way through which environmental humanities can be applied:

> It is even more indirect, and open only to those of us who are teachers: our students. Some of them seek to exercise power, and a few may succeed. To the extent that I can shape their outlook, their priorities, I can hope to wield some indirect influence upon global problems…. Moreover, thousands of my former students are citizens and consumers, and it is possible that by exposing them to environmental history I have helped shape their behavior in ways that, however small, address global problems.[50]

Teaching can build on a great variety of different formats such as those discussed in previous sections on engaging with society at large: films, storytelling, theatre, situated and social learning, or activism. One innovative example is the simulation of the COP 21 climate conference in Paris in 2015 with 200 students taught by Bruno Latour and his team.[51]

A specific training focus can be on teaching students and young academics about how to communicate differently to society at large, for instance through story-telling and film-making.[52] The Experimental Programme in Political Arts (SPEAP), a one-year Master's program at the French SciencesPo aims to be a *full-time programme [that] brings together architects, designers, academics, public servants, managers, researchers, administrators, activists and curators who wish to enhance their skills, develop inventive tools and give a new momentum to their career.*[53]

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[50] 'The Uses of Environmental History' by John McNeill; https://seeingthewoods.org/2017/03/01/the-uses-of-environmental-history/

[51] https://vimeo.com/143874181

[52] https://naturalsciences.ch/organisations/bio/events/rigi_workshop/63222-rigi-workshop-storyboarding-science-interdisciplinary-workshop-for-scientists-and-filmmakers

[53] http://www.sciencespo.fr/public/en/programme-political-arts

Conclusions

'Environmental studies' have existed formally for several decades; in some ways the *Environmental Humanities* may simply represent a new manifestation of an old tradition. However, there are new opportunities for innovation in the social and human sciences and arts that address environmental problems. The following is a short list of some of the main opportunities identified here:

- There is a growing recognition that old solutions and scientific advice mostly rooted in economics and environmental sciences have achieved only partial successes. International science and science-policy bodies are therefore getting more open to the proposal of supporting environmental humanities.

- Environmental studies can build on a significant tradition and institutionalization especially by incorporating such promising fields as political ecology, environmental history, or eco-critical studies. This can happen both within their home departments and in cross-university programs, be they environmental studies, literature and cultural sciences, sciences studies, sustainability studies, or environmental law, philosophy and ethics.

- Artistic research in the art world, including doctoral programs, can promote and encourage stronger links between the arts and sciences worlds. Artistic work in its many forms that engages with contemporary societal issues gains easier access to open exhibition and display and therefore the public.

- Postmodern, gender-sensitive and/or post-colonial perspectives have helped enrich modernity and enabled new approaches, as have science and technology studies (STS) for reflecting social, economic, political, cultural, and symbolic assumptions of scientific knowledge production and expertise in the heterogeneous world of contemporary societies.

- Higher education in the Global South has been strengthened, and the rights and voices of indigenous people in the North and South are sometimes better recognized, contributing to more pluralistic visions and understandings of the natural world and human relations with our planet.

- Internationalization and the rise of the Internet, are presenting new communication tools for networking and divulging messages to a broader audience. Environmental humanities must seize the new opportunities brought on by our new digital age.

- There is a rising need for new academic institutions and projects that allow for more interdisciplinarity, openness and experimentation while developing and presenting environmental research.

- New and creative ways should be sought for linking environmental activism with university research. Researchers represent untapped expertise for becoming involved in community issues, at the same time that community members can become more involved in university projects.

- Greater affirmation of the basic role that universities play in educating students about environmental problems, and the range of solutions that might be taken to mitigate

them. Rigorous research is still crucial, but it must be better integrated into pedagogy as by involving more undergraduates, since it is often through students that key environmental messages are spread.

- More generally, there is a growing perception in society and among decision makers that environmental problems require fundamentally new approaches. Environmental humanists are ideally positioned to play key roles in ushering in a broader range of voices and ideas to the forum while developing keener sensitivities to listening and observing those who have muffled voices, be these inner cities, disadvantaged communities, developing countries, or other places where food is grown, energies produced, and daily necessities of life produced.

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Annex B – Methodology

The scoping of the study was based on a previous study that identified the opportunities, challenges and priorities of developing the Environmental Humanities in Switzerland (Kueffer et al. 2015). Discussions with speakers of an Environmental Humanities lecture series entitled "Ringvorlesung Surviving the Anthropocene" that took place in the fall term 2016 at the University of Zurich further helped substantially in the preparation of the survey (https://tube.switch.ch/channels/8570152b). The framing, conduction and interpretation of the survey was done in collaboration with the working group "Environmental Humanities"[54] of the Swiss Academic Society for Environmental Research and Ecology (SAGUF).

A qualitative questionnaire with open questions was sent to a selected group of representatives of Environmental Humanities research centers (see below for the questionnaire). After compilation of the responses a draft of the report was sent to the same respondents for review before a final version was produced by the editors. The report is not meant to be a comprehensive or quantitative survey of the field, but rather should serve as an exploratory compilation of selected key initiatives and novel ideas in the field that might inspire further developments. We attempted however to present diverse and sometimes conflicting perspectives in a balanced way.

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[54] https://naturalsciences.ch/organisations/saguf/projects/environmental_humanities?_ga=1.202826771.384627 139.1427476943

Questionnaire:

How can the humanities and arts become more relevant? for addressing environmental challenges? A Survey

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In recent years, artists and scholars from the humanities have shown an increasing ambition to enhance environmental thinking and outreach for addressing major problems confronting the Anthropocene, be they *poverty and inequality, climate change, exploitation of natural resources,* or *loss of biodiversity,* to name a few. The growing field of environmental humanities, now involving thousands of researchers within and beyond academy, is a reflection of this development.

Yet, environmental policies are still mostly framed and shaped by natural scientists or technocrats, with humanists rarely being asked to serve on environmental policy bodies and institutions at the local or global scale (e.g., IPCC, Future Earth, German Advisory Council on Global Change). While other researchers collaborate intensively on common issues (e.g., by way of networking, division of labour, team science, structured synthesis reports) and engage with society in ways that are meant to enable concrete action, humanists have not yet gained an equal platform for participating in, and steering, current environmental debates, especially among decision-makers.

This survey aims to better understand how humanists and artists can strengthen their role in assisting society to address pressing problems.
Which strategies, practices and methodologies (e.g., interdisciplinary, transdisciplinary, participatory research, problem orientation) have already been developed and/or might be further developed by artists and humanists in order to enhance their relevance and impact for society, specifically with regard to major environmental challenges of our time and the range of perspectives and expertise demanded to confront them? Are strategies developed in the humanities and arts different from those employed by natural scientists, and if so, why are alternative strategies and practices for knowledge framing, integration, representation and communication needed to strengthen humanities perspectives and expertise?

As someone who researches environmental issues, we are asking you to offer candid insights into each of the domains listed on the next page, endeavouring to show how—in your experience—the humanities and arts might become a stronger presence in environmental conversations. We are particularly interested in relevant experiences from humanities and arts projects, activities, centres or networks with which you have been involved.

Completing the full survey is most useful to us, but only partially completed surveys or short responses are also welcome and much appreciated. If at all possible, please return your responses by the end of February 2017 to Christoph Kueffer (kueffer@env.ethz.ch), co-chair of *Environmental Humanities Switzerland* (www.eh-ch.ch), which is funded in part by the *Swiss Academy of Humanities and Social* Sciences (http://www.sagw.ch/en/sagw.html). We sincerely thank you for your time and will be pleased to inform you about the outcomes of the survey.

Your contact details (Name, Institution, Email address):

Please indicate whether your responses should remain anonymous:

Framing and prioritizing research

Please mention a few of t key environmental problems that humanists and artists should address? How should research be prioritized and framed for addressing these problems? By whom? Are there any particular methodologies or processes that can be employed to improve the framing and prioritization of arts and humanities research on environmental issues?

Fostering collaboration and team science, and enabling knowledge integration

Given the complexity and multidimensionality of contemporary environmental problems, how important is teamwork and interdisciplinary collaboration among humanists and artists – either between themselves, or with natural and social scientists and engineers – for addressing environmental issues? What are appropriate forms and purposes of such collaboration? What are effective ways of integrating knowledge across these groups?

Engaging with policy-makers, practitioners and the public

For environmental humanists, how important is collaboration with policy-makers, practitioners and the public during the research process? What are the purposes of such participation? What are appropriate forms and representations of knowledge for engaging policy-makers, practitioners and the public with relevant scholarship from the humanities and arts? And what are appropriate settings for such knowledge exchange?

Benchmark projects

If you are aware of any benchmark projects that have dealt particularly effectively with complex environmental issues and in ways that have been of immediate social or political relevance, please list them, ideally with key references (e.g., webpages, literature) and a brief commentary on the particular value of each project.

Relevant literature

Please mention three or four titles in the literature relating to the questions raised above.