White Paper

Operationalising knowledge on and for societal transformations in the face of climate change

Authors: Jennifer West (NO) and Elisabeth Worliczek (AT)

Contributors: Andrea Bigano (IT), Peter Driessen (NL), Marja Järvelä (FI), Kevin Noone (SE), Alexandra Revez (IR), Denis Salles (FR), Marta Bruno Soares (UK), Åsa Swartling (SE)

Inputs and advice: JPI Climate Governing Board and Transdisciplinary Advisory Board

Initiated by the JPI Climate Action Group "Enabling Societal Transformation"

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Introduction: Goals and purpose of the White Paper

This White Paper has been developed by the JPI Climate Action Group "Enabling Societal Transformations in the Face of Climate Change", with the aim to provide recommendations and insights for connecting and mobilising key social science and humanities (SSH) research perspectives on and for societal transformations in the face of climate change. Despite mounting scientific evidence affirming the damaging onset of climate change, as clearly expressed in the Special IPCC 1,5 °C report (IPCC, 2018), concerted societal actions to address this global challenge remain elusive. Research indicates that there is now a critical need to move beyond a focus on describing the climate change challenge, towards devising effective societal solutions and actions and connecting and operationalising knowledge that can help to prevent, reduce, prepare for and address catastrophic climate change-related impacts (Fazey et al., 2018). This White Paper provides an overview of the current state of play, knowledge gaps and research priorities for enabling societal transformations in the face of climate change across all levels of society in line with the goals of the Paris Agreement. To do so, we draw on and connect findings from a number of previous scoping efforts conducted within and beyond JPI Climate in the areas of societal transformation, climate services and climate related decision-making and summarise previous efforts made in JPI Climate to prioritise research themes and frame research questions and calls in the climate area with clear SSH focus and relevance. Based on this analysis, the White Paper:

a. Identifies thematic priorities / areas for future joint calls for proposals
b. Articulates framings of research within these thematic areas and identifies cross-cutting issues and desirable outcomes that will attract a diversity of SSH and interdisciplinary perspectives
c. Provides guidance and visualisation on requirements for transdisciplinary research approaches that can help to overcome disciplinary silos and science-society divides, and encourage more critical and reflexive knowledge production processes

Section 1 briefly reviews the extensive scoping process involved in developing the JPI Climate 2013 Joint Call on Societal Transformations, and recommendations from the selected scoping and synthesis documents.

Section 2 outlines cutting edge ("Horizon issues") research areas that require attention over the next 2-5 years. In line with the Action Group's mandate, and the reviewed documents, the suggested thematic areas are ones that are particularly well-suited to be led by SSH researchers, but that can attract wide interdisciplinary and transdisciplinary engagement, in line with the JPI Climate Strategic Research and Innovation Agenda (JPI Climate, 2016). They are areas that, across the reviewed documents, have been identified as being essential for pursuing inclusive, effective, democratic and sustainable societal transformation processes and outcomes within and beyond Europe. They are also areas that endeavour to be policy-relevant, and that invite transdisciplinary inquiry, and are thus firmly in line with JPI Climate's strategic aim to connect people, problems and solutions and to support science with and for society (ibid).

Section 3 provides a visualisation of key thematic areas, cross-cutting issues, and outcomes that research in the prioritised areas should aim to address. This section also provides guidelines on the types of transdisciplinary approaches that are required to facilitate a step-change in research on and for societal transformations. The matrices referred to in the text are provided in the Appendices.

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1.   Analysis of previous prioritisations

We have reviewed three previous efforts to crystallise out and prioritise key interdisciplinary topics and thematic areas for climate research for which the SSH community has the capability and even responsibility to frame research initiatives. These are: i) the Call Text for the JPI Climate 2013 Joint Call[1] entitled "Societal Transformation in the Face of Climate Change"; ii) the priorities identified in: "Societal transformations in the face of climate change; research priorities for the next decade" (Driessen et al., 2013); and iii) The International Social Science Council publication: "Transformative Cornerstones of Social Science Research for Global Change" (Hackmann & St. Clair, 2012). We have supplemented this approach with a review of broad research priorities identified in JPI Climate scoping efforts conducted since those papers were written, in the areas of climate-related decision-making and social science and humanities perspectives in climate services research and innovation. For the former, we draw on the report from the JPI Climate workshop "Improving knowledge for enhanced climate change response and decision-making", which was held in Brussels in April, 2015 (JPI Climate, 2015). For the latter, we draw on scoping efforts undertaken as part of the ERA-NET Consortium "European Research Area for Climate Services" (ERA4CS), including the report from a webinar (ERA4CS, 2017a) held with researchers and practitioners working on the social, behavioural and communications aspects of climate services, which was held in March, 2017, the ERA4CS Task 7.4 report: "Research and Innovation for Climate Services: Report on the synergy and mismatch analysis" (ERA4CS, 2017b), and the Final Report from the JPI Climate "Expert Workshop on Social Sciences and Humanities in Climate Services Research" held in Venice in October, 2017 (West et al., 2019, forthcoming).

Table 1 (appendix) summarises the overlap between the five topics that were prioritised in the 2013 Joint Call text, the ten "Research Priorities for the Next Decade", and the six "Transformative Cornerstones of Social Science Research". Note that there is a great deal of substance behind these simple labels in the source documents; they are intended here to be indicative of the main ideas and concepts in each of the areas. The colour coding in Table 1 represents our subjective analysis of the overlap or commonality among these three different attempts to prioritise areas for climate-related social science research.

Another dimension of identifying future areas for research that JPI Climate may want to consider supporting, is to assess the degree to which the projects funded under the 2013 Joint Call address these thematic areas. Table 2 assesses the alignment between the five 2013 Joint Call topics, the ten research priorities (Driessen et al., 2013) which formed the basis for the development of the 2013 Joint Call text, and the funded projects.

Table 2 indicates that five of the six funded projects from the 2013 Joint Call primarily address Topic 3: 'Societal capacity and governance of societal transformations to respond to climate change'. In addition, three projects partially addressed Topic 2: 'Knowledge and risk perceptions connected to climate change', and one project directly addressed Topic 5: 'Integrative studies on societal transformation, visions and

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[1] 2013 Joint Call

pathways under climate change'. Returning to our commonality analysis (Table 1), we find that there are four general thematic areas that are common to all three attempts at prioritisation:

1. Governance and agency in societal transformations
2. Operationalising visions and scenarios for transformative change
3. Social justice and participation in climate actions
4. Sense making, cultural meaning and climate risk perceptions

In addition, the role of Economy and Finance in mitigation and adapting to climate change was specifically identified by two of three efforts and has gained prominence during the time since these reports were written[2]. Hence, we propose the inclusion of a fifth thematic priority: "Transformative finance and economies".

2. Selection of thematic areas for further research

Here we describe the five thematic areas in more detail, drawing on key words, concepts and questions raised with respect to each of the thematic areas across the reviewed background documents, supplemented by expert judgement.

Thematic area 1: Governance and agency in societal transformations

Key terms: Deliberative and integrative governance; transformational leadership; roles of public, private and civil society actors, promoting grassroots innovations; responsible governance of adaptation and mitigation technologies; policy innovation and experimentation; Europe's responsibility for climate change governance

Climate change is a difficult and complex issue requiring integrated and coordinated adaptation and mitigation approaches by many different societal actors across space and time. Negative emission technology (NETs) promoted to target 1,5°C (IPCC, 2018) could have very important effects on society's welfare and wellbeing (e.g. carbon capture and storage or afforestation). This is likely to require a substantial restructuring of existing governing regimes. Indeed, research suggests that new forms of governance are needed that can produce both the knowledge necessary to achieve sustainability, and the social dynamics to act on it (Miller & Wyborn, 2018). Scholarly papers on governance suggests the need for a much more dynamic partnership between the state and stakeholders (economics actors, Non-governmental organisations and citizen organisations) to enable legitimate and effective societal transformations. Public participation and deliberative modes of governance that attend to issues of inclusion, participation, power and voice are frequently highlighted in this respect. While states remain key players in global climate governance post-Paris, many of the processes behind policy development related to climate and global environmental change remain poorly understood.

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[2] See for example, the 2018 report by the EU High-level Expert Group on Sustainable Finance entitled "Financing a Sustainable European Economy": https://ec.europa.eu/info/sites/info/files/180131-sustainable-finance-final-report_en.pdf

As a long term policy issue, climate change governance nowadays does not respond appropriately in the light of today's action with uncertain future effects as a consequence. At the same time, sub-national coalitions, actions and initiatives promoted by local authorities (cities, regional communities…), economic actors and NGOs are playing an increasingly important role in driving climate action. There is increased interest in the potential for transformative change arising from below, through grassroots innovations, and new forms of social and policy experimentation. Assessing the skills and capacities of individuals and communities in their transformational capacities and identifying gaps and opportunities within existing (multi-level) governance structures will provide the means to develop governing systems that can contribute to sustainability in a proactive manner. More broadly, there is a crucial need to develop climate change related skills across all sectors and scales of society. Considering interdependencies between the global north and the global south, climate change governance emphasises the need for research into the distributional effects of climate policies on the regional, national and global scales. One underexplored aspect of governing societal transformations is that of leadership, in particular the idea of transformational leadership, as a critical component in piecing together a vision that could inspire climate action across different communities. Research within this thematic area addresses the need for interdisciplinary knowledge linking various disciplines in social sciences and humanities in order to enhance forecasting visions which can draw on history, narratives, inclusive organisation, decision making processes, economic issues and policy tools, while creating links to other priority thematic areas.

Empirical research is needed to analyse the effects of public participation in environmental impact assessments, on decision-making and societal change. What are the effects of different ways of framing climate issues on policy makers and practitioners and how do research and evidence-based knowledge interact with emotion, values, identity and other issues that are important for individual and collective decision-making processes? How are decisions made under uncertainty and conflicting agendas and ideologies? Understanding who has access to decision makers (and through them to power) and determining appropriate relationships between research, policy and practice, are additional areas addressed within this theme.

Thematic area 2: Operationalising visions and scenarios for transformative change

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Key terms: Anticipation science; change pathways; integrated visions; co-constructed narratives, storylines and scenarios; social experimentation; global interconnectedness; futurity and justice, contested futures; subjective and marginalised voices; innovation systems

Imagination is a critical component in developing new ideas, concepts, narratives and scenarios for effecting societal transformation and change. Social sciences, arts and humanities have many branches of knowledge that can be leveraged to design desirable futures, imagine new technologies and contribute to empower and generate actionable visions and scenarios for transformative change (Yusoff and Grabys, 2011). Research addressing this thematic area calls for inclusive, reflexive and integrative approaches to knowledge production processes with societal actors, to co-produce shared storylines of societal transformation that are salient, credible, legitimate and actionable. Novel forms of social innovation, experimentation and innovation efforts are encouraged that bring to light and challenge inherent normative assumptions, processes, structures, behaviours, and development paradigms that either

prevent innovation, enable change or encourage system deadlock in different social, geographic and political contexts. The development and assessment of integrated scenarios tools, "futuring / foresight" techniques, lessons learned from the past or from other world regions, and practices for engaging marginalised voices and stakeholders in efforts to imagine and operationalise transformative pathways, will be given due attention. For instance, archaeological findings, historical records and narratives associated with communities that are currently displaced by climate and other factors can be leveraged. Practical and theoretical insights into the pre-conditions for co-producing effective and actionable visions and pathways, and attention to the potential biases and blind spots that such visions may contain, are further needed.

Thematic area 2 responds to the need to embed local visions and scenarios for sustainable societal transformations in an understanding of interconnected social, economic, ecological, cultural, political and other change processes that co-occur over time and space. It also encourages a connected and integrated view of the future which considers climate change in the context of other major challenges facing society such as threats to biodiversity, and artificial intelligence and increased digitalisation (Castells, 2011). In this context a number of questions remains largely unanswered. For instance, how can appealing transformation visions grounded in local realities, knowledge, values, motivations and priorities be framed, recognising that the drivers and societal consequences of climate change in particular places are increasingly tied to complex global social and environmental change processes? What are the potentials and limitations of applying integrated scenarios, tools and services in support of climate action in different social, geographic, and political contexts and at different scales? To be useful, anticipation studies must provide relevant as well as sensitive scenarios that integrate natural and social-scientific data, coupled with an understanding of relevant societal knowledge and decision-making contexts.

Thematic area 3: Social justice and participation in climate actions

Key terms: Climate ethics and ethical action; moral obligations to the poor, vulnerable and future generations; participation, democracy, social justice and co-production in climate policy, actions and services; distributional effects and legitimacy of climate policies; ethical aspects of climate services

It is widely recognised that those who are least responsible for causing global climate change will shoulder a disproportionate burden in dealing with its consequences. Poor and vulnerable populations around the world are already feeling the impacts of climate change, and future generations are implicated in the everyday choices of governments, citizens and corporations, and the extent to which these facilitate or hamper climate change adaptation and mitigation now and in the future. The inequalities associated with historical, current and future emissions and the distribution of climate impacts underscore the fact that climate change is a moral and ethical issue, and an issue of human rights and social justice. Actions taken to address climate change within and beyond the borders of nation states reflect political priorities and interpretations of obligations, rights and responsibilities. Such actions may have costs and benefits for different actors, and hence, it cannot simply be assumed that all actions taken to prevent or mitigate climate change as part of transformations to sustainability will be inclusive or ethically sound. The social justice and ethical consequences of efforts to offset national emissions through payments and investments in mitigation efforts in distant regions, and to develop a market for climate services in

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developing countries, are examples of areas requiring further study. Further research on how climate actions can attend to diverse social, cultural, geographic, faith and value systems is moreover needed. Research should also tackle the unbalanced socio-economic development in Europe and the consequent social equality concerns as a contextual point of reference with regards to the legitimacy and political acceptance of future climate policies.

There is growing recognition of the potential role and importance of public participation in science and policy domains. Participation can be addressed from two different perspectives, firstly as an issue of democratic decision making (stock taking) and secondly from the perspective of social justice, fair distribution, and social equity. Participatory processes aim to give a voice to the community and citizens – including even those who are normally excluded from policy-making. If conducted in a legitimate way, public participation can promote collective decision-making and increase feelings of local ownership as well as foster trust and social learning and facilitate the uptake of environmental policies at the local scale (Pahl-Wostl, 2006). However, the scope for more popular and democratic decision-making in the governance of climate change at national and international levels remains limited. When climate policy penetrates public policy sectors (for example housing, energy supply, passenger transport and the food chain) more thoroughly, there will be potential winners and losers of climate policies even in developed countries. More knowledge is therefore needed about how the voices and interests of poor, vulnerable and disenfranchised populations, as well as present and future generations can be included in actions and decision-making concerning climate change. Furthermore, there is a need to develop adequate methodological tools to assess social impacts (including potential trade-offs and distributional impacts) of climate policies and actions on different regions and social groups. The potential need for compensating for both the losses and damages associated with climate change, and the social costs of climate action to those most vulnerable, ought to be considered as a part of the public climate action framework.

Thematic area 4: Sense making, cultural meaning and climate risk perceptions

Key terms: social and cultural meanings of climate change; role of concepts, language, narratives and discourses in shaping how we think and act in relation to climate change; perceptions and framings of risk and uncertainty; communicating complexity; individual and collective values, beliefs, motivations, interests and worldviews; transformational learning

This thematic area addresses aspects related to how problems and solutions for effective climate action are understood and framed, and with what consequences. While various disciplines access and make use of different concepts for understanding the societal implications of climate change, there are multiple ways of knowing, understanding, living with and ascribing meaning to past, present and future climate variability and change. A key question addressed by this thematic area is how and why individuals and societies can remain indifferent to the potentially cataclysmic risks of climate change, and what interventions may convert apathy into action. What individual and collective values, beliefs, assumptions, interests, worldviews, hopes, needs and desires underlie people's experiences of and responses – or lack of responses – to climate change? What social, political, geographical and cultural contexts (priorities, values, interests, capacities, barriers) can help us to avoid the "value-action gap" (favourable values to climate policy with no consequent action) and identify feasible entry- points for climate action? What can

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we learn from past experiences and different societies across the world in terms of sustainable living in order to address the challenge of climate change?

Research within this thematic area addresses the need to better understand the nature and role of transformative learning models and methods in challenging particular mindsets and motivations, as well as the reasons for societal indifference, scepticism and denial about climate change. The sense of urgency of climate action may prevail in one part of society while action may be blocked by scepticism in another part. Actual and potential polarisation of public perceptions concerning the risks of climate change hamper the progress of innovation and sustainable management seriously. Hence, there is a need to care for the multiplicity of meanings, contested nature, ambiguity and elasticity of central concepts within the climate change debate as well as the potential impacts that different framings and language around climate change problems and solutions can have in supporting transformative change.

The role of communication and language in distilling complexity and conveying uncertainty in ethical, responsible and actionable ways is central to facilitating dialogue, sharing understandings and enabling transformative learning as well as engaging with different perspectives, views and values and effectively addressing potential disagreement and conflict. Knowledge is needed that can help to distinguish between different, interconnected drivers and responses to climate change in order to shed light on how people make sense of complex, interconnected, ideologically-charged "wicked" problems, recognising that information about climate change is but one aspect - and not always the most important aspect - in personal, professional and policy decision-making contexts. In facing the diversity of the many perceptions and ideas of transformations in a deliberative manner, the perspective of a learning society can be helpful. Public policy can facilitate the learning society and societal transformations by many appropriate means. In a bottom up perspective, social movements, local governments and business actors can also contribute in many ways by bringing forward their experiences, innovation and practical solutions for present and future climate action.

Thematic area 5: Transformative Finance and Economies

Key terms: Effective finance and policies for low-carbon innovation; social cost of carbon; transnational climate risks, behavioural responses to climate policies; legal, ethical and governance aspects of climate finance and climate services

Climate change results from and presents fundamental challenges for the way society is organised, produces and exchanges. From a traditional environmental economics perspective, climate change is viewed as the main, and most complex, global source of negative externalities in economic models. Burke et al. (2016) identify several major research gaps that climate change economics needs to tackle in the years to come. These include specific gaps linked to the "social cost of carbon" (SCC), which stem from our incomplete understanding of the socio-economic consequences of climate change impacts, particularly impacts related to extreme events (and the risks they imply) and indirect damages. The real world performance of (theoretically optimal) climate policy is moreover disappointing. Burke et al. point out that there is a need for a more rigorous analysis of how markets and individuals react to policy actions. From a SCC perspective, macroeconomic analyses of capital stock and flows are important in relation to the key role of the financial sector in sustaining the transition to a low carbon society. In a broader

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perspective of how economics and finance can positively influence societal transformation towards sustainability, research on the degree to which a growth- and market-based economy can be adapted to a finite planet, both from a resource, and from an ethical point of view, is desirable.

Stoknes (2014) shows how a wider perspective that includes aspects of psychology and culture can enrich understanding of the economics of climate change. Integration of perspectives from psychology and sociology, history, law, philosophy and ethics, as well as institutional perspectives, can help to more fully elucidate the social costs of climate change, including losses and damages associated with climate-induced conflicts and migration, and climate change impacts on human health. Greater participation from such disciplines can also help to conceptualise and operationalise transformative financial and economic systems, models and incentives as part of climate resilient development pathways. The HLPE Report (2018:31) underlines the importance of analysing Green Bond Standards in order to incorporate existing best market practices while at the same time addressing uncertainties and areas of concern that may require greater prescription or more explicit criteria (avoiding "Green Washing"). SSH can provide insights into both the material and normative mechanisms of this system. There is an increasing need for Climate Services covering both adaptation, mitigation and the linkages between the two, to inform the climate risk assessments for investments that can direct financial flows in the most societally optimal and responsible way. Knowledge about the economic impacts of climate change remains unbalanced toward the developed world. Focus should shift to where vulnerabilities and adaptation needs are greatest, where the consequences of climate change will be most felt, and to where mitigation finds both its most promising potential and its most understandable ethical and political objections as a potential obstacle to reaching long-awaited improvements in material living conditions. The clear and direct relevance to current and future generations of these knowledge gaps requires research in this field to be guided by a strong policy perspective, focused on steering existing economic and financial systems towards pathways that are compatible with a global warming well below 1.5 degrees. Furthermore, research should lay bare the normative principles (e.g. solidarity, costs/benefits) underlying the financing of climate change adaptation and mitigation policies. It is necessary to find out how these policies 'score' in terms of legitimacy, efficiency and effectiveness and to determine whether such scores could be explained from these normative principles (van den Doel, W. and Maes K., 2013:35).

3.   Cross-cutting issues and guidance on transdisciplinarity

In reviewing past JPI Climate initiatives relating to societal transformations and the role of the social sciences and humanities in climate research to ascertain what has worked, what is missing and why, we have developed a framing tool shown in Figure 1 that we hope will help JPI Climate to develop forward-looking transdisciplinary research topics that can attract broad SSH participation. The figure highlights that research projects funded by JPI Climate should consider both *process* and *outcome* aspects of the research and endeavour to involve relevant stakeholders and practitioners in the research cycle. At the left hand-side of the figure are two overarching issues that cut across all of the thematic areas. These are **'Politics of knowledge co-production, communication and integration'** which (among other topics) looks at how and by whom research topics and questions are framed; and **'Responsible Research and Innovation'** which looks at the ethical and distributional issues associated with climate policies. These

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cross-cutting issues highlight important aspects of the research *process* that were identified as being important during the scoping and review process for the White Paper, such as the need to consider and critically assess the various interests and power dynamics that are bound up in knowledge production processes, to adhere to high ethical standards, and to collaborate with and involve relevant stakeholders to ensure the societal relevance and applicability of the research. In the middle of the figure are the five thematic areas outlined in Section 2. At the right hand-side of Figure 1 are the suggested outcomes from research combining one or more thematic areas and cross-cutting issues. These outcomes reflect the *normative goals and expected impacts* of the research, such as contributing to climate resilient development pathways; emissions reductions and climate mitigation in line with the Paris Agreement; inclusive and sustainable climate adaptation; and empowered, reflexive and engaged citizens and societies. More cross-cutting issues and outcomes than the ones suggested could be identified, and different combinations could be used to identify research topics that expand or branch out in reference to specific aspects of these combinations.

Figure 1: Overview of key thematic areas, cross-cutting issues, and outcomes
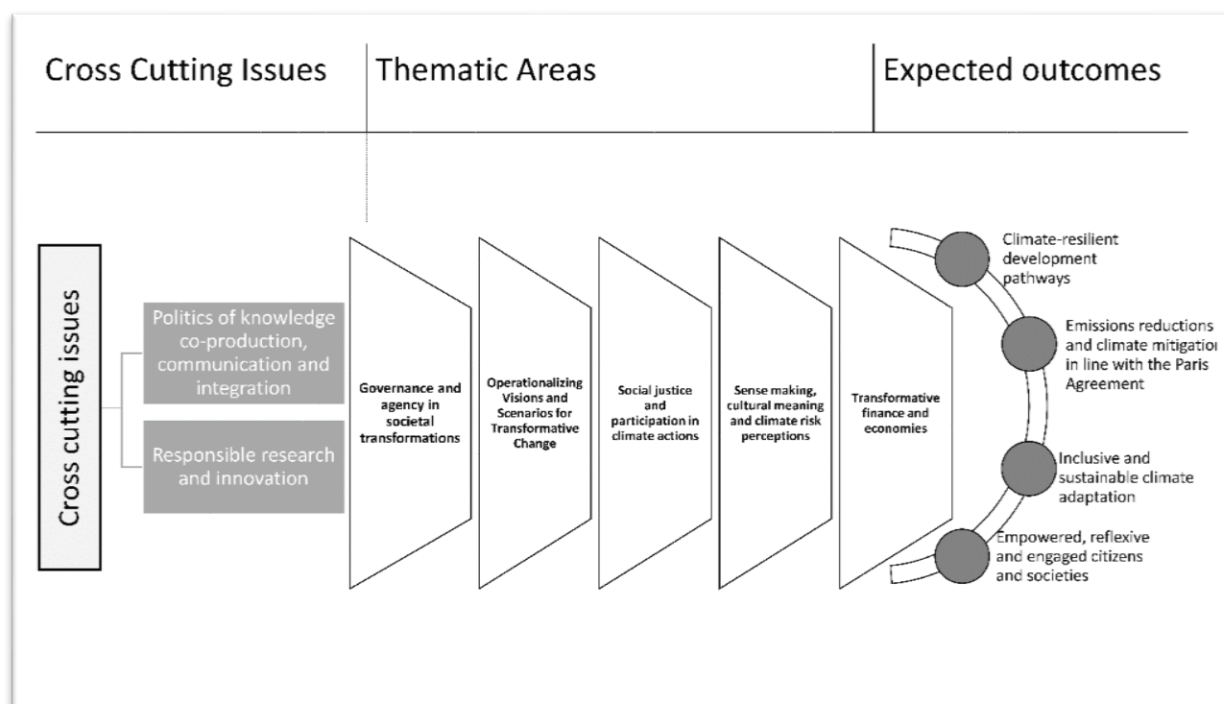
To provide an example based on Figure 1, a call for proposals that combines research on the key thematic areas 'Governance and Agency in Societal Transformations' and 'Operationalising Visions and Scenarios for Transformative Change' with the cross-cutting issue of 'Responsible Research and Innovation' could facilitate discussions around ethically sound and inclusive ways of co-developing, governing and using climate adaptation and mitigation information, services and technologies that support climate-resilient

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development pathways. **We recommend that JPI Climate use the approach of combining a cross-cutting issue with a key thematic priority to address one or more outcomes as an aid in developing future calls for proposals.** This approach will help to connect and address key challenge areas 2: "Improving knowledge on climate-related decision-making processes and measures" and 3: "Researching sustainable societal transformation in the context of climate change" in the JPI Climate Strategic Research and Innovation Agenda (JPI Climate, 2016).

Transdisciplinary Guidance

Transcending disciplinary boundaries in climate change research is increasingly seen as a critical factor in developing effective strategies for societal transformations (Fazey, Schäpke et al. 2018). Solutions and strategies developed from the standpoint of a single discipline are often inadequate and provide an incomplete understanding of the complexity of climate change issues. Interdisciplinary and transdisciplinarity thinking is a way to connect, build and improve on existing expertise between different disciplines and to bridge traditional divides between science, policy and practice, in order to carve out a new platform which pushes beyond existing knowledge boundaries and provides actionable scenarios and visions for the future. SSH researchers perform a dual role in these knowledge and solution production processes. On the one hand, inclusion of SSH perspectives can help to bridge gaps between science, policy and practice and make research results more relevant and applicable. SSH researchers also provide critical perspectives and insights on power and other dynamics that are bound up in knowledge production processes and that influence the application of new knowledge and the distribution of societal benefits derived from it (Driessen et al., 2013). An important hallmark of transdisciplinary research is that it involves participation and collaboration with different stakeholders and areas of knowledge including local and grassroots knowledge. It can include the adaptation of existing research methods and tools in novel contexts, the transfer or mobilisation of knowledge into a wider platform or context, or the creation of experimental and innovative communication and education channels (Gillis, Nelson et al. 2017). For example, in developing further our understanding of strategies for governing societal transformations, transdisciplinary thinking can support the development of participatory and deliberative methods, which purposively bridge different knowledges and institutional cultures. Similarly, with respect to societal justice and responsibility in climate change, the development of new scenarios and visions for the future would need to be based on a comprehensive and interdisciplinary understanding of the implications of these visions for society in the short and long term. Transdisciplinary research moreover provides an opportunity for learning and reflexivity that can stimulate new methods and new paradigms for solving climate change issues, not just problematising them. **We recommend that the JPI Climate Governing Board includes requirements for transdisciplinary research in all future calls for proposals.**

In closing, we suggest that considering the interrelationships between thematic areas, cross-cutting issues, and desired *processes* and *outcomes* of transdisciplinary research when devising future calls for proposals can help JPI Climate to engage a broad range of relevant research, policy and practitioner perspectives and expertise in efforts to operationalise societal transformations in the face of climate change.

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Appendices

Table 1. Overlap between key topics, priorities and cornerstones for social science research on and for societal transformation identified in previous scoping efforts[3]

Five 2013 Joint Call Topics	Ten Research Priorities	Six Transformative Cornerstones
Social justice[4]	Scenarios	History & context
Risk perception[5]	Processes	Consequences
Governance[6]	Responses	Visions for change
Economy & finance[7]	Cultural meanings	Sense making
Visions & transformations[8]	Concepts	Responsibilities
	Social justice	Governance
	Governance of transformations	
	Economy & finance	
	Impact	
	SSH agenda setting	

Table 2. Alignment between the 2013 JPI Climate Joint Call Topics, Ten Research Priorities (Driessen et al., 2013) and proposals that received funding

2013 Joint Call TOPICS	10 Research Priorities	2013 Funded projects addressing Call Topics
1. Normative and social justice dimensions of climate change	4. Social and cultural meanings of climate change 5. Role of specific concepts 6. Social justice and participation	Not directly addressed
2. Role of knowledge and risk perceptions in climate-related policies	5. Role of specific concepts 9. Science-policy interfaces	Partially addressed by: EPCC[10]

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[3] The colour codes represent a qualitative assessment of areas of similarity across topics, research priorities and cornerstones in the three documents

[4] The full heading of this thematic area is "The **normative** and social justice dimensions of climate change"

[5] The full heading of the thematic area is "The role of **knowledge** and risk perception in climate related **policies**

[6] The full heading of the thematic area is «The **societal capacity** and governance to **respond** to climate change"

[7] The full heading of the thematic area is "The role of economy and finance in societal transformations

[8] The full heading of the thematic area is "**Integrative studies** on societal transformation, visions and pathways under climate change"

[10] European perceptions of climate change: scepticism, energy preferences and societal transformation

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	10. Integration of SSH[9]* *1. Socio-economic scenarios* *3. Ability of society to respond* *6. Social justice and participation*	HUMANOR[11] SELFCITY[12]
3. Societal capacity and governance to respond to climate change	2. Processes that take place 3. Ability of society to respond 7. Governance of societal transformations	Main thematic area addressed by HOPE[13], TRANS-ADAPT[14], MobGIs[15], EPCC , SELFCITY
4. Role of economy and finance in societal transformation	8. Role of economy and finance	Partially addressed by MobGIs
5. Integrative studies on societal transformation, visions and pathways under climate change	1. Socio-economic scenarios 2. Processes that take place 3. Ability of society to respond 10. Integration of SSH *4. Social and cultural meanings of climate change* *6.Social justice and participation*	Addressed by HUMANOR

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[9] * Research Priorities listed in italics are those that were identified as being reflected in a secondary, rather than primary, manner, in the 2013 Joint Call Topics

[11] Social-Ecological Transformations: HUMan-ANimal Relations Under Climate Change in NORthern Eurasia

[12] Collective governance, innovation and creativity in the face of climate change

[13] HOusehold Preferences for reducing greenhouse gas Emission in four European High Income Countries

[14] Societal transformation and adaptation necessary to manage dynamics in flood hazard and risk mitigation

[15] Mobilizing grassroots capacities for sustainable energy transitions: path improvement or path change?

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