

Plural pasts, plural futures

Considerations for transnational, transformative, and transdisciplinary histories of socio-material-ecological change¹

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1. Introduction

Much has been said about studying the history of science (or, more inclusively, knowledge), technology (or technique, material culture, relevant vernacular terms, etc.), and the environment (or more-than-human) in global perspective.² Inspired by these debates, this final chapter in this volume on the epistemology of the history of technique pitches a set of considerations towards a transnational, transformative and transdisciplinary approach to study and engage with histories of socio-material-ecological change. We do so in response to 1) highly interconnected yet situated Envirotech crisis/es of today's world(s); 2) the wider current sociopolitical context of increasing polarization between globalism and nationalism more generally; and 3) polarization in the knowledge arena between scientific expertise and the diverse knowledges that thrive outside formal academia.³

Why transnational, transformative and transdisciplinary? Certainly not because these terms are hallmarks of elegance and beauty. To the contrary, we feel that these have a jargonish, technocratic and policy hype ring to them. Then why? On one level, we simply fell for the alliteration. On another level, these terms do refer to specific scholarly debates that we consider pertinent to the role of historiography in relation to the growing polarizations between globalism and nationalism in a highly interconnected world in crisis/es. *Transnational* history for us refers to historiographical debates on

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² The very terms of engagement, such as "global", "history", "technology", "environment" etc. are contested and part of the debate, see van der Vleuten et al. 2025; Honarmand Ebrahimi and Milford, 2022.

³ We do so starting from the understanding that we live in a highly interconnected world in crisis/es. For example, controversies around large amounts of toxic waste washing ashore in Ghana developed in entanglement with controversies around the growth of extremely cheap electronics production (amongst others in China) and fast fashion (produced in e.g. Vietnam, Bangladesh, Indonesia, etc.). Or, another example – which we will focus on at the end of this paper – connects controversies related to deforested Brazilian landscapes dominated by soy production, and Dutch landscapes in which intensive animal farming, consuming large quantities of soy, and its vast nitrogen emissions play an important role. Their histories are ontologically incommensurable yet interacting; it will not do to study them in isolation, nor as reduced 'global' singularities such as the 'global waste crisis', 'deforestation crisis', 'biodiversity crisis', 'energy crisis', 'climate crisis', etc. which are omnipresent in current public and scholarly debate.

studying the “more-than-national” that accelerated from the late 1980s, and that may have renewed relevance today when researching so-called global issues in times of nationalist revival. Amongst the many varieties of global and transnational history, we shall be particularly interested in the notion of connected micro-histories to combine two major research concerns: appreciating and researching a plurality of situated histories in diverse localities across the globe, and researching how these histories may have developed in mutual interaction. Next, regarding the term *Transformative*, we argue that engaging with present-day sociopolitical polarizations and controversies as historians also raises questions on the relationship between academic knowledge-making and real-world dynamics: Transformative research refers to long-standing and ongoing debates on (historical) knowledge making’s performativity, actionability, or reflexivity on the empirical world that it studies, usually with reference to transformations towards more social justice and, more recently, sustainability. This raises contentious questions about the politics of doing global history: how can we discuss, investigate, and work with the performativities at play in our historical work, and to what and whose purposes? *Transdisciplinary* research, finally, refers to debates and questions about the epistemic politics of knowledge making, and in our case, doing global history in times of nationalist revival. Notably, whose knowledge, inside and outside of the academy, counts as historical knowledge? Who gets to decide on that, and who gets to write whose histories and futures? We here explore ‘transdisciplinary’ research in the specific meaning of co-producing knowledges together with those whose histories are being investigated, taking seriously diverse knowledges that exist across the boundary of the academy itself.⁴

In this Chapter we would like to explore questions of transnational, transformative and transdisciplinary history in conjunction. Our intuition is that by mobilizing a broader diversity of contemporary experiences, perspectives, memories and heritage within and between distant regions, *transdisciplinary* history could help develop plural and more nuanced *transnational* histories of the connected socio-material-environmental crises of our present-day world—at least if we manage to anticipate and address several historiographical challenges associated with the approach. Also, transdisciplinary approaches may help us engage with questions of transnational history’s performativity, reflexivity, and *transformativity*: the social groups we work with, and whose historical narratives we explore, are often engaged in ongoing debates, conflicts and envisionings of (un)desirable futures—typically in the context of disruptive and ‘global’ techno-socio-ecological crises or transitions. This creates opportunities to actually discuss and study how co-produced historiographical insights may, or may not, interact with such groups’ production of future imaginaries and action repertoires. The idea is thus to bring transformative and transdisciplinary research insights to global and transnational history, and conversely, a transnational history lens to transformative and transdisciplinary research. Inspired by work in the field of STS, we would like to explore how making a “historiographical intervention” can be a site to simultaneously question and develop historical knowledges, present-day practices and future imaginaries in the context of today’s ‘global’ technical, social and environmental controversies.⁵

Below we will explore this conceptual terrain and some of the research debates involved. We shall address the questions of transnational, transformative and transdisciplinary history in turn, and do so in conversation with two recent works in the global history of technology/technique. Based thereon,

⁴ Regeer et al., 2024; Network for Transdisciplinary Research, 2024. For a short (Western) history of this concept of transdisciplinary research see e.g. Somsen and Van Lunteren, 2024.

⁵ De Hoop et al., forthcoming. The notion of historiographical intervention was developed in the broader SOY STORIES team and builds on the notion of situated intervention coined by Zuiderent-Jerak, 2015.

we will articulate a set of considerations relevant to our proposed research approach, which we will then enrich with empirical material from an on-going research project that engages with two connected envirotech controversies—controversy in Brazilian landscapes (variously referred to as pertaining to ‘deforestation’, ‘landgrabbing’, etc.), and in Dutch landscapes (predominantly referred to as ‘nitrogen crisis’)—studied in collaboration with Dutch and Brazilian universities and a variety of social partners.⁶

2. Transnational histories

To anchor this Chapter in the field of history of technology/ technique, let us start our discussion of global and transnational history with two recently completed book projects. The majestic multi-author volume *Global History of Techniques: 19th-21st Centuries* (2024) is a direct inspiration for the present book volume. *Microhistories of Technology: Making the World* (2023) is the capstone monograph of a large ERC project.⁷ These recent volumes already count amongst the most prominent and innovative contributions to global history of technology research, and constitute helpful starting points to develop our considerations towards transnational, transformative and transdisciplinary histories of socio-material-ecological change.

In our discussion of these volumes here, we focus on how their prefaces, introductions and conclusions frame and position their overall approach. We argue that despite all their differences in content, form, and style, these books resonate in many ways. In this section we selectively highlight three resonances for the purpose of introducing our own argument and approach.

First and most noticeably: both books highlight local and regional diversity, and reject quasi-universalistic global histories, which they accuse of projecting canonical European experiences to global scales, and of thereby obscuring the rich variety of European and non-European historical experiences alike. *Global History of Techniques* laments “the return of grand narratives, which, in the name of global history, fall back on the mostly Eurocentric meta-narrative that long dominated this field of research”.⁸ Such “illusory ‘global’ overarching templates” [apostrophes in the original] typically foreground global economic histories and theories of industrial revolutions, modern capitalism, and the monetization of the world, which supposedly spread from European centers to global peripheries. These economic history frames typically cast ‘Western’ technologies (often denoting: modern industrial or science-based technology) as enablers and/or indicators of these phenomena. In response to such “global reductionism”, the book’s “world tour of techniques” seeks to “restore the uniqueness of each region”, “restore the complexity of regional historiographies”, and acknowledge the “infinite variety of techniques” in diverse contexts. *Microhistories of Technology* similarly opposes global histories that apply “one-dimensional macro-histories” familiar from European history to global scales, notably those of industrialization, urbanization, rationalization, and globalization. It asks: “what if we were to tell stories from ‘below’ rather than from ‘above’?”⁹ And likewise, its microhistories of everyday life in specific localities should help restore the “peculiarities of each regional technological landscape” and make visible a “multifarious global history of technology and material culture.” A difference with the

⁶ Van der Vleuten et al., 2022.

⁷ Carnino et al., 2024; Hård, 2023. For the latter see also Van der Straeten, this volume.

⁸ Cited from Carnino et al., p. 7. The following quotes stem from pp. 7 and 15.

⁹ Cited from Hard, pp. v-vi. The following quotes are from pp vii, viii, and vi respectively.

former book is that this latter book specifically targets “the richness of material cultures beyond Europe and North America” to “illustrate that Western societies do not have a monopoly on novelty.”

Both books thereby add a material history dimension to over a decade of fierce debate in the field that calls itself global history. According to critical voices in this debate, that field has degenerated into a Eurocentric ‘globalization history’. Like our history of technology books, these critics lament the exaggerated focus on ‘the global’ and ‘global connections’ as perceived from Western viewpoints and created by (primarily) Western historical actors, at the expense of (1) the specificities and dynamics of locally situated historical experiences and knowledges around the world, (2) the plurality of available research languages and history-telling modes, and (3) field work immersion in specific contexts (the critique here is that historiography’s transnational and global turn coincided with its ‘digital turn’, and that today much historical research on ‘the global South’ is done from distant desktops in the Western academy).¹⁰ In order to bring back the plurality, situatedness and specificities of historical experiences and knowledges across the globe on their own terms, the critics pleaded for a return of place-based, immersive research and a plurality of research languages and storytelling modes. In response to these critiques, global(ization) history protagonists answered that their field is already busy increasing its sensitivity to non-West regional specificities, especially in new studies of commodity frontiers: stemming from the World Systems Theory literature and similar later conceptualisations (as global commodity chains, global production networks, global value chains etc.), those studies research the expanding capitalist world economy from perspectives of peripheral frontier zones—sites where world systems (notably global capitalism) and indigenous systems collide, and where ‘cheap nature’ is incorporated as resources for the world economy.¹¹ That approach also informs two recent iconic Oxford global history handbooks on commodity history and on agricultural history (incidentally, the ‘new global agricultural historiography’ also presents itself as a history of technique).¹² The commodity frontiers approach indeed produced some fine bottom-up frontier zone histories of conflicts, adaptation, resistance and alternatives following the expansion of global capitalism.¹³ Even so, critics of global(ization) history responded that the commodity frontiers approach still presupposes and reifies the schematic frame of Europe-born global capitalism and its fixed center-periphery relations, derived from European economic theory and history, as the global-history-master-narrative from which to interpret what is relevant about local histories and frontier zones—at the price of “what ‘locality’ offers the historian ... the deep archival research that uncovers the nuances, the unexpected, the individual lives and events that appeal to so many historians”, as one prominent historian complained.¹⁴ Also the so-called ‘Center’ is often homogenized and reduced to a monolithic site of producing global capitalism and extractivism. In light of this debate, our two global history of technique/ technology books take a clear position—to reject a universalized form of European history as benchmark and unifying frame for global history (including resistance and subversion in the so-called periphery), and to study diverse histories on and in their own terms instead, in East and West, North and South; and they make an invaluable contribution by doing so for material history (the “hardest case”, to paraphrase Harry Collins, since technology has been highly prone to universalistic development assumptions). Appreciating such

¹⁰ For a discussion: Ghobrial, 2019. For a much-cited critique: Adelman, 2017. On the Global North-ness of global history: Eckart, 2018; Appadurai, 2020. On the digital turn: Putnam, 2016, 2017.

¹¹ A much-cited defense of global(ization) history is Drayton et al., 2018. On (commodity) frontiers in transnational/ global(ization) history see e.g. Moore, 2015; Beckert et al., 2021.

¹² Curry-Machado et al., 2024; Whayne, 2024.

¹³ Including history-of-technology fieldwork on ‘anti-commodities’; Hazareesingh and Maat, 2016.

¹⁴ Berg, 2021, p. 454.

historical plurality without subjugating it to a quasi-universalistic master narrative is also the first consideration on which we build our envisaged research program.

A second similarity between both books is that both explicitly address the question of connecting the local to the global—a classic research challenge of transnational and global history. *Microhistories of technology* argues that it deals with this challenge by endorsing the familiar microhistorical approach of studying global and cross-cultural encounters from a place-based perspective in the regions under study.¹⁵ In addition, it studies similar issues and developments in diverse times and places on the globe. In contrast, *Global Histories of Technique* separates its discussion of situated regional histories – the first part of the book – from its discussions of connections in the third part of the book, invoking the notion of circulation to bridge the two: “techniques thus emerge as infinitely varied practices that are inseparable from global processes.”¹⁶

However, and this is the second consideration for our envisaged research approach, we feel these efforts could be further conceptualized and developed. As such, we take our cue from the aforementioned debate in global and transnational history. In this debate, some critics of global(ization) history favoured microhistories and transnational history (i.e. the ‘New Transnational History’ of the early 1990s¹⁷), for creating place-based knowledge about interactions of local, national, and global developments. These approaches by and large work with one locality from which these interactions are studied. By contrast, the field of global and transnational history has also spawned approaches to engage with histories situated in multiple localities across the globe and their interrelations – still without resorting to connecting ‘global’ forces. Subrahmanyam’s (1997) connected history approach aimed to transcend the binary between area studies’ “methodological fragmentationism” and global(ization) history’s universalism, by studying how specific and diverse regional histories, each articulated in their own terms, developed in interaction (even when connections were “feeble”).¹⁸ Multi-sited historiography (inspired by multi-sited ethnography) and relational history (studying relational histories of entities, not the history of relations between entities) make a similar argument.¹⁹ One can also include microhistories of actants who inhabit connections (say migrant communities, ‘invasive species’, traded commodities etc.) in a multi-sited research design—this would further develop a connected history (not: history of connections) that neither wishes to unreflectively essentialize the local, nor the connection.²⁰

Much has been said about these approaches, but for now, all we want to do is flag recent calls to revalue these approaches so as to study a plurality of situated-yet-connected histories around the globe without *a priori* assuming the centrality of ‘the connection.’²¹ This argument may be further expanded when we take seriously the plurality of (often incongruent and incommensurable) histories not only between, but also *within* localities as historians, anthropologists, human geographers and others have amply documented. To develop this further, we propose taking into consideration arguments for

¹⁵ On microhistory and the global: Levi, 2019.

¹⁶ Carnino et al, p 14. Also p. 30.

¹⁷ Tyrell, 1991. Compare the discussion in Van der Vleuten, 2008.

¹⁸ Subrahmanyam, 1997. For an empirical masterpiece: Subrahmanyam, 2017. For a discussion in the context of global sustainability history: De Hoop & van der Vleuten, 2022.

¹⁹ Zimmerman, 2013; Epple, 2018, p.406. One can also include microhistories of actants who inhabit connections (say migrant communities, ‘invasive species’, traded commodities etc.) in a multi-sited research design. E.g. Wenzlhuemer 2020.

²⁰ Wenzlhuemer, 2020, pp 172-3. Compare the roots/routes debate of the 1990s: Clifford, 1997.

²¹ Putnam 2016, 377-378; Levi, 2019.

pluriversal research as articulated in work on the decolonization of science and technology studies (in their terminology, replacing the idea of a one-world-world with the idea of a pluriverse, i.e. an ontologically plural approach).²² We consider this to be important not only for intellectual reasons, but also (or rather, especially) to take seriously diverse peoples' different realities in present-day socio-material-ecological conflict around the globe – the subject matter which we endeavor to investigate further below.

When it comes to demarcation of the subject matter, we would like to further build our approach based on a third similarity between the *Global histories of Technique* and *Microhistories of Technology*. We observe that both book introductions engage extensively (and laudably, in our opinion) with central debates in history of technology on democratizing and rendering inclusive the study of 'technology' – but we also observe that this happens at the expense of engaging with ecological matters in their positioning statements. With regard to the inclusive demarcations of technology as subject matter, these books explicitly seek to stretch beyond Eurocentric, colonialist narratives of technology as Western industrial or science-based technology that is subsequently exported globally; notions of technique, technological landscapes, material practices, or vernacular terms are used to signify material artefacts, skills, processes, systems and knowledges specific to the regions in investigation.²³ In our opinion, these debates are also important because they address naïve and Eurocentric conceptualizations of 'technology' in much global(ization) history and environmental history.

At the same time, we find these books' limited engagement with environmental histories in their conceptualization of their subject matter surprising and problematic, given that environmental issues are major present-day public and historiographical concerns, and that the techniques/ technologies under study are highly implicated in their (un)making.²⁴ As such, since the 1990s many colleagues have called to transcend 'the illusory boundary' between technology and environment, and between the academic fields of history of technology and environmental history.²⁵ These colleagues see the history of technology not as a specialized subdiscipline targeting human-made material stuff and associated practices, knowledges, and systems, however inclusively defined; instead they advocate for the interdisciplinary and integrated history of technology, society and environment, sometimes flagging envirotech, technopolitical, or sociotechnical change as their unit of analysis.²⁶

²² Law 2015; Escobar 2017; Braga et al. 2025.

²³ To be more specific: *Global History of Techniques* rejects the term 'technology', which allegedly privileges Western science-based high-tech industrial innovation and engineering, and instead proposes *technique* as the more inclusive term that inspires the study of a plurality of locally specific knowledges and material practices. See Carnino et al. 2024, pp. 7-9. *Microhistories of Technology* similarly rejects "the Eurocentric, colonialist narrative" of "Western technology" in order to create room for local initiatives and culturally specific technologies." Quoted from Hard 2024, p.2 and vi. Also see 6-8 and 252-255. Different from *Global History*, it 'reclaims' the term 'technology' in a pluralistic fashion: it studies localized 'technological landscapes' that include old and new, low-tech and high-tech, indigenous and foreign, and above all 'creole' and 'hybrid' technologies. Both books also share an occasional use of other inclusive terms that serve place-based research, such as material practices, material culture, or vernacular terms (e.g. *fundi* in Kiswahili, *jugaad* in Hindi, etc.). For more on vernacular 'keywords', Mavhunga, 2017. Others have maintained the focus on science-based industrial 'technology', though not as a Western, but as a polyglot global discourse, see Bray and Hahn, 2022.

²⁴ *Global Histories of Technique* does have a chapter on 'Technology, pollution and environment' amongst its 39 chapters, but this is not reflected in the book's overall positioning in the academic landscape.

²⁵ Reuss and Cutcliffe, 2010. Also: Jørgensen et al., 2013; Pritchard and Zimring, 2020.

²⁶ Pritchard 2013, 2020; Bijker and Law, 1994; Hecht, 2024.

We outlined these three specific resonances between our two books of reference because they help us to articulate considerations for the development of a transnational history approach to study multi-sited phenomena such as incommensurable-yet-connected socio-material-environmental crises: the highlighting of local and regional diversity, rejecting universalistic global histories; building on Subrahmaniam's connected history approach; and transcending the analytical boundary between technology and environment. Such a connected microhistories approach raises many operational questions that we will not address here. Instead, the next two sections explore how doing global histories differently along these lines could make a difference—not only to historiography, but also to the ongoing local and global envirotech debates that they speak to.

3. Transformative histories

Our concern with present-day connected crises yields questions not only on intellectual advances in historical understandings, but also about why and for whom we do such historical work – for the ongoing local and global environmental debates touch upon the lives and well-being of many: pertinent questions, given that we do our work with the explicit desire to make a meaningful difference. Here we would like to observe a fourth similarity between our two books of reference. Both *Global History of Techniques* and *Microhistories of Technology* take a socially and politically engaged stance: they oppose Eurocentric master narratives, seek to decenter Western-centric narratives of technology, and emphasize the importance of including non-West regional historical experiences on their own terms. In doing so, they imply that it is important to understand technology in an inclusive fashion and to give voice to actors whose historical experiences have been, and continue to be, marginalized. Despite this emancipatory engagement, however, both books frame their relevance as academic contributions to historiography only.²⁷ Neither reflects substantially on the social or political implications of telling histories of technology differently beyond the bubble of historiographical debate.

However, few would dispute that historical narratives and knowledges do have performativity in the present, whether historians address this explicitly or not, and the performative power of Envirotech knowledges and narratives has been much observed and made object of historical study in its own right. A well-known example is how the 1986 Chernobyl nuclear meltdown was predominantly commemorated in Germany as a 'disaster' with many human and nonhuman casualties; this historical consensus entwined with imaginaries of nuclear-free futures, enacted by policies to phase-out nuclear energy. In contrast, to French policy makers, Chernobyl 1986 remained an "incident" with limited casualties -an incident that could not bend the success (hi)story of French nuclear power that enabled further nuclear consolidation and expansion.²⁸ Such studies also exist in global Envirotech history, analysing for example the performativity and politics of historical frames in global sustainability governance and in academic sustainability research.²⁹ Notably, such work addresses the performativity of both social actors' and professional historians' historical narratives (accordingly we have suggested to research global Envirotech hi/stories³⁰).

Still, these studies rarely intervene in worlds beyond academia. Can and should we go a step further and connect global Envirotech history more squarely to notions of transformative research that

²⁷ *Global History* does so implicitly, *Microhistories* quite explicitly: Hard, 2024, pp.252, 254, 257.

²⁸ Kalmbach, 2013, 2020.

²⁹ E.g. Priebe et al., 2021; de Hoop and Van der Vleuten, 2022.

³⁰ Van der Vleuten and De Hoop 2022, following Cronon 1992 and Cheung 2001.

purposefully engage with transformative socio-environmental change beyond academia? And if so, how, and to which and whose purposes? These too are contentious questions we would like to explore.

To do so, we might consult another long-standing historiographical debate—about the relation between history and social engagement. Intriguingly, those colleagues who bridge between historiography and transformative research invariably position themselves against allegedly dominant dispositions of their fields. Professional historians usually cite their field's deeply entrenched aversion to engagement with present-day concerns for the future. For example, Timothy Moss and Heike Weber, who edited a special journal issue on usable pasts in the environmental and technological history, speak of a historiographical fear of contact [*Berührungsangst*] with the present, and of peer accusations of presentism, historicism, and the instrumentalization of history.³¹ Apparently the so-called modernist paradigm in 20th century Western historiography, which objectivizes the past and hides its own politics with claims to 'critical distance' from the present, still looms large.³²

Conversely, transformative research often overlooks historical research in their quest of promoting social and/or environmental change—even though social actors constantly mobilize pasts to imagine futures, define present-day challenges, and legitimate or contest present-day action.³³ Tellingly, a recent hallmark overview publication of transformative and transdisciplinary research includes a chapter on the history of its field and approach, but neglects historical knowledge making itself as an arena for shaping transformative change.³⁴ Hence, in transformative research, another 20th century Western modernist legacy seems to be at play—that non-historical professionals have by and large come to 'think without history' (i.e. the so-called Schorske thesis³⁵). Either way, a 'sticky' dichotomy appears to tell historians to reconstruct the past and shun the present, and transformative researchers to change futures and forget the past. In our reading, our two books of reference sit in the former category.

However, this prevalent dichotomy obscures from view a broad stream of unorthodox historians bridging the study of pasts, presents and futures. As Moss and Weber argue, most historians of technology and environmental historians have long been concerned with the technological and environmental conflicts of their times – as have many social historians and contemporary historians.³⁶ Recent efforts to establish a field of sustainability history, too, make their 'future-mindedness' quite explicit.³⁷ Across this diversity of historical work, concepts such as applied history, public history, engaged history, policy history, participative history, usable past(s) and so on developed in the 20th century, usually in explicit opposition to detached modernist Western historiography.³⁸

³¹ Moss and Weber, 2021, p. 370.

³² Bevir, 2011 for paradigms in Western historiography.

³³ So complains e.g. Feola 2023, p.138. Note: with the term transformative research we seek to refer to bodies of work that explicitly aim to contribute to both academic debates and 'transformation' (variously defined) at the same time – such as sustainability research, transdisciplinary research for transformation, (participatory) action research, various strands of transition studies etc.. Not all work within these literatures have this dual ambition or may be skewed in its contribution to either academic debate or 'transformation'. Much of this work is entwined with forms of knowledge co-production, which we discuss in the next section of this paper. For overview publications see, e.g. Regeer et al. 2024; Turnhout et al. 2020.

³⁴ Regeer et al., 2024; Somsen and Van Lunteren, 2024.

³⁵ Schorske, 1998.

³⁶ E.g. Macraill and Taylor, 2004 p. 6 on the 'present-mindedness' of social history..

³⁷ Caradonna, 2018, p. 20.; Van der Vleuten 2018; <https://mitpress.mit.edu/series/history-for-a-sustainable-future/> (consulted November 26.

³⁸ See Lubar 2018 for a reflection on performativity of these diverse historiographical concepts.

So to what kind of historical yet transformation-oriented work do these concepts give rise? Our reading of manifestos on applied history, engaged history, policy history, usable pasts etc. brings three key elements to the fore, namely: (a) drawing historical research questions from present-day societal issues and debate; (b) producing historical knowledge relevant to those issues; and (c) feeding historical research findings back into relevant ongoing debates.³⁹

To examine what this may look like in practice and what lessons can be learned from doing so, we briefly discuss each of these three elements through our experiences in the *Tensions of Europe* umbrella research program ‘Technology and Societal Challenges, ca. 1850-2050’.⁴⁰ Through this large and collaborative programme, involving 100+ researchers, historians engaged with contemporary crises and the role of history of technology therein.⁴¹

Concerning (a) drawing historical research questions from current societal debates, a key challenge was to articulate questions that would not lead to tunnel vision (i.e. through uncritical adoption of self-interested engineering talk of solving crises through technology and innovation as the historians’ frame of reference). To avoid this, the concepts that are used by contemporary engineers to express the problem at hand (i.e. ‘grand challenges’, ‘societal challenges’, etc.) were approached and studied as historically shaped actor concepts, rather than analytical concepts. Second, we examined engineers’ diverse, conflicting and sometimes adverse engagements with societal issues; third, we sought to symmetrically engage with the perspectives of technology’s protagonists as well as its critics.⁴²

Concerning (b) the production of relevant knowledge, discussions revolved especially around the use of historical research to identify forgotten or marginalized alternatives as well as to uncover the historical shaping and contingency of present-day ‘dominant’ systems—mass production and consumption systems, energy and mobility systems, resource extraction systems, and so on (and admittedly, this simplistic binary between dominant systems and alternatives was insufficiently problematized and historicized, thereby reproducing a significant weakness of much early sustainability transition theory, which emerged from efforts to render history-of-technology knowledge actionable but has by now greatly outgrown that field of origin⁴³). The former concerned, for example, histories of the ways in which walking and cycling had become sidelined in urban planning. These historians position their work as a ‘U-turn’ from the present (current urban challenges) via the past (searching for alternative histories to build on) to the future (providing ideas that contribute to more sustainable urban transport).⁴⁴ The latter arguably exposed systems’ present-day contingency and their sources of (social and material) power, thereby opening up sites for contestation and change.⁴⁵

³⁹ Ibid. and Allison and Ferguson, 2016; Guldi and Armitage, 2014; Hirsh 2011; Holbrook and Lowe, 2021; www.historyandpolicy.org; Berger 2019.

⁴⁰ In which the first author of this Chapter was involved as initiator/coordinator and the second author as participant.

⁴¹ <https://www.tensionsofeurope.eu/second-flagship-program-technology-societal-challenges/> (last consulted 11 April 2025). The program was most active in 2015-2020 with 20-30 workshops and conferences, see Van der Vleuten, 2018, 2020. Högselius (2021) characterizes the program as a key example of *usable pasts* (cf. Moss and Weber 2021) research in the field of history of technology in Europe.

⁴² For an overview history of engineers and societal challenge based on this work, see Van der Vleuten et al. 2017; 2024.

⁴³ For an overview presentation of early transition theory: Grin et al. 2010.

⁴⁴ Emmanuel et al., 2020; Schipper et al., 2020.

⁴⁵ Schipper et al., 2020; Hasenöhrl and Meyer, 2020; Heymann et al., 2020.

Concerning (c) feeding such knowledge back to relevant societal debates, whether or not to engage directly with relevant stakeholders or maintain ‘critical distance’ and impartiality as a source of authority remained a point of discussion and disagreement. Nevertheless, a host of impact- and engagement initiatives has unfolded—including outreach via traditional and social media, exhibitions and podcasts, policy briefs and advice, and more. For example, the above-mentioned work on cycling also resulted in multimedia exhibitions, a sustainability scorecard that municipalities can use to assess mobility systems’s sustainability, teaching modules, a web platform (under construction), and—at the center of all these efforts—a ‘Your city next’ booklet series to support municipal policy making. These booklets use local historical archival research and interviews to show for each specific city how cycling once was omnipresent, how it was subsequently sidelined in urban planning with the advent of traffic engineering, and how ‘pockets of persistence’ survived that can be mobilized today.⁴⁶ Beyond these examples, the list of possibilities further expands: Moss developed usable infrastructure pasts walking tours; Hein et al. designed open online courses, serious games and apps, and more broadly seek to mobilize water heritage for design. And Daniel Barber’s history of airconditioning inspired a program of architectural experiments in ‘designing for discomfort.’⁴⁷

How may these experiences help us to explore and develop transformative historical global Envirotech research? If we contemplate such a program, we argue that more conceptual work on the relationship between historical research and transformation is needed, as well as more explicit study of the performativity of historical work in practice. Let us briefly set out our reasons for placing these two considerations on the agenda.

With regard to the former, we observe that much usable technological pasts research tends to claim, rather than conceptualize, how pasts may be usable for so-called ‘social or environmental improvement’. While there was widespread agreement in the Tensions of Europe program discussed above that widening present-day options and future possibilities by providing historical alternatives and by uncovering the shaping of present-day systems would constitute ‘relevant knowledge’, there was little critical reflection on which and whose pasts are being mobilized towards which and whose purposes in the future – in the sense that unquestioned and ahistorical *a priori* assumptions on what the societal challenges were and are, who the good and the bad guys were and are, and what counts as morally (un)desirable solutions, set the research agenda. Such research risks undermining its very purpose of widening present-day options and future possibilities by inadvertently producing new tunnel visions (to paraphrase Donald M. Scott’s comments on Howard Zinn’s engaged history program half a century ago). We observe this, for example, in the Sustainable Urban Mobility/Cycling Cities program mentioned above in the form of a quasi-universalistic ‘five factor model’ that claims to ‘explain’ variations amongst urban histories in a singularizing manner, which is at odds with the pluriversal approach we discussed in the previous section; the same applies to early history-of-technology inspired sustainability transition theory.⁴⁸

Thus, we consider further conceptual work on relations between historical research and transformative change to be much needed. What sorts of historical research (microhistories, (quasi)-universalistic history, transnational history, etc.) may open up and foreclose what kinds of presents and futures, where and to whom? And what is the role of historians and the form through which they communicate

⁴⁶ More information: <https://www.cyclingcities.info/> (consulted 18 December, 2024).

⁴⁷ Moss 2024; Hein 2020, 2023; Barber et al 2023.

⁴⁸ Some of this critique is articulated in Van der Vleuten 2019, p.30 for the case of Deep Transition theory.

with other actors in the present therein? Such transformative history could draw on ongoing work to better conceptualize usable pasts (e.g. Moss's work on developing usable pasts typologies for "past-proofing" urban infrastructure futures) and certainly has much to learn not only from transformative research in the present but also from (critical) heritage and memory studies – fields in which working with the performativity of pasts in presents and futures (and *vice versa*) take the centre stage.⁴⁹

With regard to the latter consideration, we observe that present-day relevance is often claimed rather than empirically studied in usable technological pasts research: what do the diverse interventions discussed above (i.e. policy briefs, walking tours, exhibitions, etc.) actually do in the present? Such evaluations can be done ex-post, i.e. after the intervention, but we especially consider promising evaluations that accompany a 'historical intervention' on-the-go to enable continuous learning and reflection. This could and should be a subject for systematic research in its own right. In order to do so, there is much to learn from transformative and transdisciplinary research traditions – we will address the latter in the next section.⁵⁰

Let us end this section with a third—and in our eyes crucial—programmatic consideration with regard to transformative Envirotech history research. This consideration pertains to the global history aspect of the conceptual and empirical transformative history work proposed. One challenge is that to our knowledge, work using terms such as usable pasts, applied histories and the like is predominantly situated in the Western academy—and even if it is applied to non-Western cases, it is still conceptualized and thought from the West.⁵¹ To be sure, there is plenty of relevant work situated more diversely across the globe, but that travels under different names, and we have only begun to scratch the surface of such work in our search for more-than-Western research ideas and synergies.⁵² We argue that geographical situatedness should be explicitly articulated and reflected upon when doing the conceptual and empirical work proposed above, as both the empirical material and the conceptualizations emerging from different places may be different. This is in line with the connected micro-histories perspective which we articulated in the previous section, in particular as an antidote to the quasi-universalistic frames of much global(ization) history. How do the specific places in which this work is done play a part in the conceptualizations and empirical observations produced? And what would this look like in multi-sited (transnational) research?

The latter question raises another challenge that is especially pertinent for our ambition to study connected Envirotech crises in distant regions: virtually all usable pasts and transformative research that we encountered so far focus on single regions, also when invoking 'planetary challenges' to legitimate the study. However, in the case of connected envirotech crises, transformative action in one region will have implications for the other region. The notion of connected crises thus not only begs us to research pluriversal connected Envirotech histories as we argued in the previous section; in the

⁴⁹ Moss, 2024, 2021; Kalmbach et al, 2020; ten Berge, 2024a, 2024b, 2025; Hein 2020, 2023; van de Voort, 2021; Egberts & Riesto 2021; Smith 2006.

⁵⁰ On (learning) evaluations, see, e.g. Mertens 2008 in African settings; and e.g. Verwoerd et al. 2023 in western European settings

⁵¹ A preliminary literature review only gave a few counter examples, e.g. Lane 2011; Stump 2013; Getachew 2023.

⁵² Not least the temporal (re)turn in anthropology. E.g. Kirtsoglou and Simpson 2020; and in the anthropological uptake of memory and heritage studies. But also work on colonial history with decolonization ambitions would be relevant avenues for exploration here, e.g. Bhabra 2023.

present section, we add questions of how telling connected histories differently may help us tarry constructively with the connected futures of diverse regions simultaneously.

4. Transdisciplinary history

The ambition to make a difference in worlds beyond academic debates comes with more pertinent questions about the epistemic politics of historical knowledge-making: which and whose knowledges are taken seriously, who is considered a knowledge-maker, and with what implications? If we take one final look at our two books of reference through this lens, we may observe a fifth similarity. While *Global Histories of Techniques* and *Microhistories of Technologies* both are collaborative team science projects with participation of researchers across the Global North-South divide, they have little to say about writing history with non(-professional) historians as knowledge-makers—even when they engage with contemporary agents while writing contemporary histories. Presumably such agents are regarded as ‘sources’ for knowledge making or ‘historical actors’ that are ‘objects of analysis’ for the professional historian, not partners in knowledge making.

To discuss why and how such partnering can be relevant to transnational and transformative histories of connected Envirotech crises, we would here like to consider literature on transdisciplinary research, in which questions on epistemic politics are key. Note that the notion of ‘transdisciplinary research’ has different meanings in academia; here, we do not follow the meaning that came in vogue in the 1970s and that has been dominant in the history of technology since the 1980s, referring to how academics and the actors and processes they study transcended the organization of academic knowledge within scientific disciplines (like Thomas Hughes’s study of how Thomas Edison built sociotechnical electric power systems through transdisciplinary problem solving heedless of formal scientific disciplinary divisions between e.g. the technical and social sciences⁵³). In contrast, we refer to the large body of academic literature on transdisciplinary research, especially since the 1990s, in the sense of producing knowledge through collaboration between academic and non-academic partners, often seeking to enable joint learning about complex social issues for mutual benefit.⁵⁴ In this section, we would like to explore—if only briefly—how insights from transdisciplinary research may help us further the ambitions outlined in our previous sections on transnational and transformative Envirotech history, and *vice versa*.

Transdisciplinary research offers a research approach that recognizes and works with (historical) research and transformation as intertwined phenomena, based on which we develop the notion of a “historiographical intervention” below.” We also argue that transdisciplinary research would assist plural and situated transnational history (section 2) because it actively works with the historical perspectives and experiences of more diverse contemporary groups of actors and actants than one would usually find by following the (conventional) historical archive.

Let us begin with the way in which transdisciplinary research may help to conceptualize and empirically study how historical research may relate to transformation, i.e. to address the first two considerations outlined in the previous section on transformative history. In much existing historical research that

⁵³ Hughes and Coutard 1996.

⁵⁴ In kind with concepts of ‘Mode II’ knowledge production, participatory action research, etc. E.g. Rivelot 2020; Regeer et al 2024; Somsen and Van Lunteren 2024. With regard to the term “academic” and “non-academic”, we do not use these naively, i.e. we recognize that these terms themselves are the result of (contestable) boundary work, cf. Gieryn 1983.

engages actively with questions of transformation, we observe a rather linear articulation⁵⁵ of the relation between historical research and transformation – a linear relation that can go two ways. Applied history and usable pasts research often start with doing historical research of the sort that historians are formally trained for (even if, as we saw in the previous section, historians derive their research questions from their take on present-day societal debate), which in turn is ‘communicated’ to contribute towards transformation; this is the conventional linear model in science communication. Conversely, much public, community and policy history begins with societal partners’ pre-existing historical knowledges or knowledge wish lists, and put their expertise to work for these.⁵⁶ At the 2023 Environmental History conference in Bern, we observed this binary between the two linearities in practice, in an Environmental History for Policy (EnvHist4P) plenary that was one of the conference highlights.⁵⁷ The plenary brought 5 policy makers and 5 young environmental historians together. The historians brought in historical research that they deemed relevant and expected policy makers to appreciate. These, however, showed little interest, and instead posed their own questions, based on their own policy challenges, which they encouraged the historians to answer, and which they posited as a requirement for historians to have an impact. We find this mismatch rather interesting and telling.

To overcome this binary, we propose to draw upon work in transdisciplinary research that explicitly and purposefully collapses the dichotomy between research and transformation, by considering the act of making a real-world change together with social partners as a fundamental research approach in itself (as opposed to a ‘communication’, ‘application’ or ‘use’ of academic knowledge).⁵⁸ This is based on the idea that intervening in phenomena constitutes a unique opportunity for fundamental (scholarly) learning.⁵⁹ This learning explicitly includes study of and reflection on the normativities that inform and

⁵⁵ Even when their work in practice, to our knowledge, is not linear – our point is that such work rarely makes these interactions between historical research and transformation explicit let alone reflects on them.

⁵⁶ A good example would be the history and policy session at the ‘SHOT 2024 conference in New Orleans, where a round through the audience revealed that all present worked directly from the questions of their clients. With regard to these linear models, one may also consider Scott’s (1974: 345) distinction between ‘history as act’ and ‘history as activist’, or the idea of applied history being a “derivative, upon mainstream history as engineering is upon physics or medical practice on biochemistry” (cited from <https://belfercenter.org/programs/applied-history-project> (consulted 20 December 2024). Compare Allison, Graham and Niall Ferguson 2016.

⁵⁷ EnvHist4P (organizer), ‘Plenary Roundtable: Environmental History and Public Policy. 12th ESEH Conference (Bern, 22-26 August 2023).

⁵⁸ In what is to come, i.e. our interest in ‘situated intervention’ as a particular form of transdisciplinary research, we depart from other (and dominant) articulations of the relation between research and transformation in literature on transdisciplinary research. Central to much of the latter work is the argument that collaborating with partners who are actually making a change is crucial to contribute to transformation. This argument is mediated by various conceptualizations of the relation between research and transformative change. Some consider knowledge co-production to produce more legitimate and credible research findings – this idea is underpinned by an instrumental understanding of the role of knowledge production in transformation. Others argue that people have a right to participate in research that may affect their lives, foregrounding democratization through knowledge production as a crucial ingredient of transformation. A third commonly expressed argument is that co-produced knowledge is better knowledge—in the sense that it draws on more diverse inputs *and* responds better to societal needs, making it more scientifically as well as socially robust. Cf. Verwoerd 2022.

⁵⁹ Cf. Zuiderent-Jerak 2015, p. 3, who has coined the term ‘situated intervention’ for this research approach. We appreciate strands of historical research that do collaborate with a wide variety of actors in historical knowledge production, such as the people’s and public history movement, local and community history, participatory historical geography and policy history, among others, but observe that they by and large mobilize participation for either historiographical purposes or transformative purposes, but not all. But some do: Slatter captures this ambition nicely when arguing for “collaboration with local communities to co-produce historical narratives that are equally transformative for researchers and local people.” Slatter 2024, pp. 204; compare Cauvin 2016, 2025; Priebe et al. 2022.

emerge from transformative practices ('normative learning'). As such, this kind of research engages heads-on with many historians' concern that knowledge co-production in (historical) research may lead to uncritical adoption of social actors' normativities (turning researchers into consultants, rather than critical analysts). Instead, this approach does not eschew normativity, but neither does it work with an *a priori* normative ambition (which is the hallmark of much history that has explicit advocacy or transformation ambitions, i.e. working for emancipation, social justice, or more sustainable worlds). As such, we would like to place the following consideration with regard to transdisciplinary historical research on the agenda: to understand both the co-production of historical knowledges and the use of those historical knowledges in present-day change processes as an opportunity for scholarly learning, and to refer to this idea as 'historiographical intervention'. Such scholarly learning includes the normative learning outlined in this paragraph, as well as transformative learning and historiographical learning – which we will discuss in turn below.⁶⁰

With regard to transformative learning, the idea of the 'historiographical intervention' leads to the following consideration, namely to develop evaluation methods to study the role of historical knowledge co-production in present-day transformation processes, including analysis of the implications thereof for historical knowledge co-production. In the previous section, we described a range of inspiring examples in which historians sought outreach, but we observed little scholarly work that studies and evaluates knowledge co-production practices. To address this gap, we propose to take inspiration from so-called reflexive or learning evaluation methods that allow for continuous and mutual learning during an intervention: what effects is an intervention having with regard to a transformation ideal at hand, and what implications may this have for the intervention at hand?⁶¹ As a consequence of asking and answering this question, both the transformation ideal and the intervention may be adapted along the way.⁶²

With regard to historiographical learning, the idea of the 'historiographical intervention' leads to the next consideration, namely to develop what we would provocatively call 'better' historiography, in the sense of producing more plural and situated historical knowledges. Working with social partners – partners who are ready to put their beliefs at risk from being challenged by historical knowledge production⁶³ – to produce historical knowledge together has the potential to bring out a richer plurality of historical accounts than work following the conventional archive, even when it is read critically 'against the grain' and supplemented with oral history (in which non-(professional) historians mostly figure as add-on sources rather than knowledge producers from whose perspective one could start the investigation; though we acknowledge that some oral history does approach our historiographical intervention ideas, and we intend to engage more deeply with these). Bringing professional historians' and social partners' ideas with regard to the research agenda as well as their diverse historical knowledges together creates space for a richer form of knowledge than writing history based on written and/or oral accounts when conducted by a professional historian that treats others as source only. Key here is to collaborate, rather than naively follow non-(professional) historians' narratives,

⁶⁰ See, for example Priebe et al. 2022, which constitutes an interesting example of research that conducts both historiographical and transformative learning through collaboration with diverse partners.

⁶¹ See, e.g., Verwoerd et al. 2023

⁶² Other interesting sources of inspiration include methodological innovations in the field of anthropology that took place during Covid when conventional ethnographic fieldwork became near impossible, in which research informants came to act as knowledge co-producers – transcending the researcher-researched binary. See, e.g., Roque de Pinho et al. 2022; Meneses 2023.

⁶³ We argue that the work we propose cannot be conducted by just any social partner, especially in current post-truth contexts, falsification of history to serve ideology etc.: willingness to challenge one's ideas and beliefs seems crucial for a constructive and historiographically interesting collaboration

ideas and practices – needless to say, doing so would come with great and obvious caveats and dangers (one may think of how some authoritarian leaders are currently highly selectively rewriting, even falsifying, history for political purposes). Also, we highlight the pivotal importance of working with a diversity of partners—mindful of the warning that much public history is in fact private history—notably in cases where institutions employ historians (e.g. company historians, historians in policy agencies and in activist organizations).⁶⁴

To end, we would like to repeat the final consideration in the previous section with regard to taking geographical situatedness in connected histories seriously. Like we did for transformative research in the previous section, we may again observe that much of the conceptual work in transdisciplinary research resides in Western academic settings, even when partners and research sites are situated diversely across the globe, where the binary between “research” and “intervention” that transdisciplinary research seeks to transcend may be much less pronounced anyway.⁶⁵ Some frames and methods are rather universally used, while others are tailored to specific localities (much the way in which micro-history works).⁶⁶ Additional reflection attuned to geographic and social situatedness of transdisciplinary research is much needed. Moreover, we again observe that like transformative research, transdisciplinary research typically focusses on single localities rather than connected crises in distant regions.⁶⁷ As such, the notion of connected histories and futures developed in this paper would arguably constitute a challenge to, and source of inspiration for, transdisciplinary research engaging with connected crises in the present-day. And of course it comes with a host of operational research challenges to constructively collaborate with diverse partners both within and between diverse regions.

5. Back to empirics

Eager to investigate diverse but connected Envirotech crises that abound in our present-day world, we have now articulated and conceptually elaborated a number of considerations with regard to a transnational, transformative, and transdisciplinary historiography of such crises. We do not mean to say this is ‘*the way of working*’, but have rather tried to articulate why we consider this worth exploring from a conceptual point of view. Still, the proof of the pudding is in the eating. In this final section, we will explore and challenge the conceptual observations presented in the previous three sections by sharing some preliminary insights-under-development from an on-going research project on two sets of connected Envirotech crises. The focus of this section is thus not on the findings of the project, nor on whether the approach we presented “works”, but on how to further sharpen our approach.

Let us very briefly introduce the focus of this research project called *Soy Stories*. It connects two sets of current socio-environmental-technological controversies in Brazilian and Dutch landscapes, respectively. Both are often considered to be ‘global’ crises or challenges. With regard to Brazilian landscapes, for some, this chiefly concerns controversy on major hotspots of what they (in quasi-

⁶⁴ Cauvin 2016, p.12. It should be noted that public history has been involved in developing citizen science approaches to history as well, see for example the *Public History as the New Citizen Science of the Past* project (<https://www.uni.lu/c2dh-en/research-projects/phacs/>, last consulted on 21-08-2025)

⁶⁵ Regeer et al. 2024; participatory action research (PAR) arguably constitutes an exception here, as some PAR strands have strong roots in Colombia and the broader Global South, see Jones and Loeber 2024.

⁶⁶ Van Breda and Swilling 2018.

⁶⁷ For a discussion thereon as well as articulation of place-based transdisciplinary research, see Brouwers et al. *under review*.

universalistic language) call a 'global deforestation crisis' (notably featuring the Cerrado Savannas, Pantanal wetlands, and Amazon rainforest, and sometimes the Atlantic rainforest). For others, that controversy is about agricultural technologies such as pesticides and GM crops; conflicts over land rights; crime and child labor issues; 'the Brazilian economy'; and more.

With regard to Dutch landscapes, the main eyecatcher is the so-called Nitrogen Crisis that currently deadlocks Dutch society and politics. To some, that crisis counts a major hotspot for the so-called 'global nitrogen cycle challenge' (which is also included in the 'global grand challenges to engineering' originally articulated by the U.S. National Academy of Engineering).⁶⁸ It entails discussions on the economics, technologies, and massive nitrogen emissions in some of the world's most dense factory farming regions (e.g. in terms of nitrogen emissions per hectare⁶⁹). Key disagreements include the harmful effects on emitted nitrogen on biodiversity and human health; the position of farmers and their livelihoods in Dutch society; animal abuse; Dutch landscaping futures; and more. The name 'Nitrogen Crisis' emerged only when these long-standing debates became acute following European Court (2018) and Dutch Council of State (2019) rulings that invalidated the Dutch government's nitrogen emission permit system (which allowed continued emissions based on unsubstantiated expectations of future compensation). An emergency government commission proposed reducing Dutch animal holdings, responsible for over half of all harmful nitrogen emissions, by half (!). Massive farmer community protests won vast popular and political support, igniting what the *Guardian* named the 'Nitrogen Wars' that redefined Dutch social conflict and politics.⁷⁰

These Brazilian and Dutch controversies are overwhelmingly discussed and analyzed separately. But for all their differences, they historically unfolded in mutual interaction, as connected histories. By extension, their respective futures are equally connected, for better or worse. One may identify various connectors, but the soybean supply chain stands out. Put succinctly: In South and North American plantations, associated with controversies around deforestation, the power of agrobusiness, indigenous land rights etc., soy plants bind aerial nitrogen into reactive nitrogen in protein. In Dutch factory farming regions (and similar regions around the globe), imported soy provides the cheapest protein base for feeding cows, pigs and chicken (respectively tens to hundreds to thousands of millions over the decades), which transform consumed soy proteins partly into milk, meat and eggs, and partly into reactive nitrogen (ammonia) emitted through manure slurry, harming human health and biodiversity. As such, the accelerations of Brazilian soy monoculture and of Dutch factory farming in the 1970s coincided (indeed the Netherlands emerged as a major Brazilian soy export destination—in some periods second only to China); so did both countries' emblematic environmental crises of deforestation and nitrogen pollution.⁷¹

Based on this brief account of Dutch and Brazilian landscapes' controversies, we would argue that this empirical case demonstrates the relevance of approaching these as distinct, regionally situated, and connected histories. That situation is largely overlooked in historical research, that either focusses on these sites in isolation or at both from a so-called global perspective. This reflects our critique on the

⁶⁸ E.g. Melilo 2021; Galloway et al., 2021; Perry et al. 2017.

⁶⁹ E.g. Potter, 2010 (see especially the mapping of nitrogen emissions through manure per hectare).

⁷⁰ Tullis, 2023. More references: van der Vleuten and de Hoop, 2022.

⁷¹ da Silva and de Majo, 2021, 2022. About 60% of soy consumed in the Netherlands comes from Brazil (in 2021; numbers vary significantly by year).

binary between micro-histories and global(ization) histories discussed earlier.⁷² Moreover, while the controversies at play in these two connected landscapes are considered highly urgent by many in the present-day, there is to our knowledge no historical work that explicitly address its transformative potential and/or collaboration with non(-professional) historians.⁷³ Altogether, we felt this could be a promising empirical focus to further develop the research approach outlined in the previous sections.⁷⁴ In the remainder of this chapter, we will briefly share some preliminary learnings from the project that we consider directly pertinent to the conceptual considerations we articulated with regard to transnational, transformative and transdisciplinary history.

Firstly, with regard to transnational historical analysis, we already observed that our cases concern fundamentally different and situated, yet interacting and connected Envirotech crises. Our connected history approach, however, taught us that it is critical to remain open to how different actors and written sources articulate other regions and other connections than those foregrounded by us in our project design (i.e. Dutch and Brazilian regions, with soy as connector), or even articulate no connected regions and connections at all. Box 1 illustrates these learnings empirically based on a pilot study (note that we did desk research only for this pilot, and we limit ourselves to three narratives articulated in Dutch media and historiography). Drawing on Subrahmanyam's paradigmatic studies of the connected histories of India and Europe, we asked and investigated how narrated experiences from Dutch regions represented 'the other' (i.e. in Brazilian peoples and landscapes) and connections between the regions.⁷⁵ The reverse, i.e. to study narratives articulated in Brazilian regions' media and historiography in the same way, is still on-going work, as is deepening our research in both regions through field work, including collaboration with various non-academic partners.

Box 1: Examples of connected narratives in Dutch media and historiography⁷⁶

We here highlight three narratives that circulated widely in *Dutch* media and historiography. These allow us to illustrate a plurality of historical experiences and imaginaries at play in debates on Dutch factory farming and the Nitrogen Crisis—featuring highly diverse plots, crisis identifications, solution articulations, chronologies, and geographies (notably concerning framings of soy-connected Brazilian histories) that defy integration in global(ization) history's 'unified frame'.

Narrative 1: Survival of agricultural communities. We traced the emergence of this narrative to interactions between farmer communities, regional policy makers and agronomists in the post-WW2 so-called Small Farmers Question crisis; later it was solidified into public memory by agricultural historians. According to this story's chronology, smallholder farming communities in nutrient-poor

⁷² Some situated histories do mention overseas regions and actors as contributors to domestic crises (Brazilian historiography e.g. observes how agribusiness profits from Dutch markets and tax evasion opportunities; Dutch historiography sees massive cheap protein imports as enabling the Dutch factory farming business model), but by-and-large ignore 'the other region's crisis.' For references: *ibid.* Self-proclaimed 'global histories of soy' do connect soy plantations to distant factory farming sites, with the aim of explaining soy globality. See, e.g. Baraibar & Deutsch, 2023; Langthaler et al. 2023, 2020; Prodöhl, 2023.

⁷³ Notable exceptions include the so-called Soy Observatory in Chapéco, Brazil, a platform through which historians interact with scientists of other stripes as well as a wide diversity of soy actors in the south of Brazil – see www.soyacene.com (last consulted on April 30, 2025).

⁷⁴ Of course, our motivation to develop this research approach also came, in large part, from our interest to engage in a reflexive yet societally-relevant way with these two connected landscapes.

⁷⁵ Subrahmanyam 2017: 44. Also 1997, 2005.

⁷⁶ Van der Vleuten and de Hoop, 2022.

inland regions were in dire trouble in the late 1940s and early 1950s. Farmer's sons had stayed on their parents' farms as parental lands were too small to be further subdivided. Rural overpopulation, mass unemployment, and impoverishment loomed large. This crisis, according to the narrative, was solved when regional farmer organizations, regional authorities, agricultural engineers, and national politics massively invested in the industrialization of sandy-soil smallholder agriculture. This involved massive agitation campaigns and educational initiatives to prepare a new rural generation for industrial entrepreneurship (which older generations distrusted as 'urban' threats to rural ways of life); research, development, and diffusion of relevant technologies (stables, feed composition, animal varieties, and other ingredients of factory farming); and organizational forms, business models, and financial support schemes (cheap loans) for specialized pig and chicken farms. The national government and the European Economic Community added export subsidies for meat, eggs and dairy products and tax-free imports of feed. By the 1960s, the narrative continues, factory farming in these regions had become a national success story. By the 1970s it was looked upon with envious eyes by EEC competitors. Sandy soil communities had survived and become affluent. Meanwhile, this narrative is silent about places of feed origin. Despite observing that massive and cheap feed imports were the decisive cost factor in the factory farming success story, the plot centers on domestic farmers solving domestic crises through domestic innovation and entrepreneurship.

In this narrative, today's 'nitrogen crisis' constitutes a derivative problem, introduced by 'politicians' and 'ignorant society' from the 1980s, when public concern rose and Dutch policy makers for the first time demanded nitrogen emission cuts. To address that new crisis, the narrative extends its historical perspective in its articulation of solutions: sector-driven innovation (e.g. emission free stables) and agricultural entrepreneurship and 'stewardship' are the ways forwards.

Narrative 2: Environmental pollution. This environmental history narrative highlights agricultural environmental pollution as its focal crisis. It was first articulated by scientists, environmentalists and journalists from the late 1960s and became prominent in the 1980s. It cites scientific insights that ammonia emitted through manure slurry causes acidification and eutrophication harming biodiversity and human health, threatens groundwater supply, and produces a pervasive countryside stench. This different focal crisis came with a different cast of characters: Farmers were culprits, rural dwellers and nature became victims, and governments became half-hearted policy makers that manipulated statistics to hide problems (a major scandal in the 1980s) or that farmers could easily fool (there is an impressive record of prize-winning investigative journalism on farmer manure-fraud).

Note that geographically, this story fully resembles the previous one: soy and the history of the lands from which it was imported are all but absent in the narrative. Even though most polluting nitrogen came from North and South American soy, the plot revolves completely around Dutch problem causes and solutions. In accordance with the historical problem definition, this narrative seeks solutions to the current Nitrogen Crises in severe reduction of animal holdings demanding serious government commitment (which hitherto has been wanting) and a stopper to farmer fraud.

Narrative 3: Soy imports harm South American farmers and ecosystems. This third narrative, circulated by a coalition of Dutch development and environmental NGOs from the early 2000s, *does* turn the geographical frame of the former narratives upside down. The plot revolves around Dutch import of cheap soy for factory farming destroying nature in soy monoculture areas in South America and in the US Midwest. Dutch actors are the culprits; overseas environments and social groups the

victims; and the soybean trade the 'global connection', as reflected in the naming of the Dutch NGO coalition—the Soy Coalition. Remarkably, this narrative often sidelines environmental histories of Dutch regions, and notably the nitrogen crisis (this omission was later cited as one reason for disbanding the Coalition in 2018). Note that this narrative represents a predominantly *Dutch* narrative about Brazilian and other bioregions, which frames Brazilian environmental history as a consequence of Dutch actions; we are not talking about narratives as told from within Brazilian regions here (which we are currently studying and we will report findings in due course).

In line with this historical problem analysis, this narrative's solution articulation mostly revolves around how Europeans can develop sustainability certification schemes for soy cultivation (through the Roundtable for Responsible Soy and similar schemes). This could indeed mitigate the Brazilian crises, but have no effect whatsoever on the Dutch nitrogen emissions (more radical solutions are sometimes mentioned, but receive much less attention in key publications by the Soy Coalition).

The three Dutch narratives presented in Box 1 demonstrate a plurality of narrated historical experiences articulated in relation to Dutch factory farming, highlighting and sidelining different crises, solution articulations, actors, knowledges, chronologies and geographies. This reinforces our point that not only histories of distant regions may be plural in the sense of being incommensurable or irreducible to one another or a 'global' frame of reference; this also applies to diverse histories within regions. We also saw that these Dutch narratives variously emplotted the connected (Brazilian regional histories) and the connection – ranging from dominance to complete absence. We might add that in these narratives we also encountered a wide variety of connected regions and connectors other than those we initially focused on. We hence conclude that it is crucial to also pay attention to absence and disconnect, in addition to connection and the connected. Not delimiting ourselves to studying regional narratives of 'the other' connected by 'soy', but also the lack of such others in relevant narratives allowed us to cast our net widely to identify a plurality of narratives that diverse actors/actants in Dutch regions considered highly pertinent, but which we would have excluded from our study if we had only looked for regional narratives of 'the other' or of 'connections'. Notably, these omissions had serious implications for articulations of present(s) and future(s) in these narratives, e.g. in the form of neglecting the implications of 'solutions' for connected regions – in other words, they perform important political work.

This leads us to a second set of preliminary learnings that we would like to highlight here, concerning transformative and transdisciplinary history. We can again use Box 1 to illustrate that historical actor narratives' perform political work in articulations of present(s) and future(s). Each historical narrative apparently made visible and actionable certain solutions at the expense of other solutions, prioritizing the perspective of certain social groups in one region at the expense of other groups and/or regions. This underpins our consideration of historical knowledge production as being inseparable from and pertinent to transformation ambitions.

For our project, this observation with regard to existing, largely geographically isolated, historical narratives and their similarly geographically isolated transformation implications, was an important starting point. Next, we developed our project not only based on the foregoing desk study but also through a round of conversations with envisaged social partners, with whom we further finetuned this research agenda: we asked how writing history differently, in terms of plural-yet-connected histories within and between the two distant regions in our investigation, might result in articulations of

solutions and futures that actively engage with both regions' plurality. We coined the idea of the historiographical intervention as our research approach to answer this question, i.e. conducting historical knowledge co-production as an intervention in the present-day with ambition to foster normative, transformative and historiographical learning.

So what did we learn regarding how we may conduct historiographical interventions well? To start, in order to avoid writing history as a political weapon (as discussed in the section on transdisciplinary research), we have so far worked with a variety of social partners to set the research agenda. With regard to such multi-stakeholder collaboration, we learned that creating a space that allows for normative, historiographical and transformative learning required one-on-one interactions (at least at first; we are yet to explore more workshop-style formats with multiple partners) because we are dealing with issues that are (highly) sensitive to our partners. In addition, when we asked our partners for research foci they considered interesting, most of our partners, understandably, only considered historical research relevant that would help address their already-defined problem – yielding instrumental historical research questions (similar to the situation we described with regard to the environmental history for policy session in the ESEH 2023 conference). Instead, we realized that it was more fruitful to identify research lines by exploring present-day issues in more depth with our partners, as well as their narrations of pasts in relation to their narrations of futures.⁷⁷ In addition, while we have so far conducted only two rounds of conversations with our partners, we will be going through several rounds of conversations to build a stronger relationship in order to foster space for more in-depth learning. Finally, through our interactions with the partners we had initially approached (including representatives from industry, policy, research domains other than our own, and civil society) we realized we missed both more marginalized human actors whose voices are less frequently heard, and, crucially, those of non-human actors. Hence we have broadened our set of partners and drew on historiography and present-day literature that represents these voices. Indeed, the PhD candidates in the project are currently exploring how non-humans can become more active participants in the project (in a non-humanizing way, of course).⁷⁸

We have also attempted to avoid writing history as a political weapon by using art as a means of communication, in close collaboration with a partner (with a direct stake in soy) that was as keen on normative, historiographical and transformative learning as we are. Our partner and we considered art as a promising means to foster normative, historiographical and transformative learning by both of us as well as other actors, because of art's multi-interpretability that could open up conversations on politics and associated historical and future narratives that would otherwise remain implicit and/or too sensitive. However, this collaboration never took off: those responsible for funding in our partner's organization considered such communication on this topic too dangerous as it could easily harm their relations with other actors on which they depended. This taught us that the kinds of collaborations we envisage are not suitable for all topics and/or partners – even when there is a shared interest in normative, historiographical and transformative learning. We are currently exploring alternative actor constellations in which an arts-based intervention may be fruitful.

So where do we stand now? Based on our interactions with partners and careful exploration of existing historical literatures' articulations of 'the connected' and of solutions/futures/transformations, we

⁷⁷ For more in-depth reflections thereon, including the way in which we came to select our lines of investigation, see van de Voort et al. *forthcoming*

⁷⁸ Kreysel et al., *forthcoming*

have identified multiple lines of historical enquiry, which are taking place with various levels of collaboration with (human and non-human) partners. While this work is on-going we are now also setting up a series of conversations and workshops with those partners who have not been part of our historical investigations (most of our partners do not partake in our historical investigations) to jointly develop this historical knowledge further, to explore how these historical knowledges may (not) be transformative, and to identify new lines of historical investigation for the upcoming years. Throughout the remainder of the project, we will go through multiple rounds of historical research and present-day interactions, creating, hopefully, a rich base for further normative, historiographical and transformative learning in relation to this particular case as well as to further develop this research approach.

Either way, we believe that this essay's engagement with diverse scholarly literatures, as well as with a broad diversity of partners in an empirical research project, has helped us to tentatively and reflexively articulate and conceptualize a research approach for an age of alleged polarization between globalists and nationalists, and between academia and popular constituencies. However, we repeat that our musings very much are in an explorative and programmatic state; in the coming years we hope to report further learnings. To be continued.

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