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1. Science and scientific knowledge transfer for forest and forest-related policy in turbulent times

In turbulent times like the present, it becomes clear what influence science has on political and practical decisions. In view of the climate crisis, questions of sustainability, the global decline in biodiversity or events such as the devastating forest fires in Australia or Brazil, it becomes clear that many global problems can only be solved by taking scientific findings into account. Forest and forest-related policies need scientific knowledge. Nevertheless, it is still a much-debated scientific question how scientific knowledge transfer works and how it can be improved (Böcher and Krott, 2016). While many approaches assumed early on that there can be no direct transfer of scientific knowledge into politics and rejected the so-called traditional linear models (Sokolovska et al., 2019), scientific knowledge transfer was understood primarily as communication that takes place between science, politics and practice and should be the object of improvement (Bubela et al., 2009). Further improvements were aimed at understanding the transfer of knowledge not unidirectionally but bidirectionally (Roux et al., 2006) - science also needs knowledge about political and practical needs in order to be able to react to them in a targeted manner. Demands for more participatory approaches have been called for, particularly in environmental and sustainability policy. In the processes of co-production between science, politics, business and citizens, scientific findings should lead to practical solutions that ultimately meet the demands of politics, science and society (Turnhout et al., 2020). Or, as a recent review article suggests, approaches to scientific knowledge transfer have changed in three major phases: from the linear phase, over an interactive phase, to the current phase of embedding, in which more emphasis is placed on co-production and the involvement of citizens and laypeople (Sokolovska et al., 2019). However, it must be emphasized that none of these approaches completely replaced others; rather, one can currently observe a scientific coexistence of different approaches in which even the linear model is still discussed and relevant (Durant, 2015). Recently, newer questions have been added to these long-established ones: On the one hand, a stronger public mistrust of science can be observed (Baron, 2020), which also has to do with the fact that citizens inform themselves about relevant issues in social media, in which anyone can act as an expert (Hopf et al., 2019). The quality of the information obtained there can often not be checked by laypersons and reliable sources cannot easily be distinguished from unreliable. Others believe information above all when it is shared in their relevant peer groups (Kahan, 2012; Kahan, 2013). Examples are the rejection of vaccinations, even if there is good scientific evidence for them, or - very recently - the spreading of conspiracy theories in the course of new crises such as the COVID-19 pandemic (Calisher et al., 2020). In view of such phenomena there is even talk of the “death of expertise” (Nichols, 2017) - this argument is put forward by Tom Nichols, who observes an increasing rejection of established knowledge and makes it clear that with modern media anyone can become an expert, as long as he is only able to use the media to spread his views. Nichols identifies a collapse of any division between experts and laypeople, which is encouraged by new information channels: “a Google-fueled, Wikipedia-based, blog-sodden collapse of any division between professionals and laymen, students and teachers, knowers and wonderers - in other words, between those of any achievement in an area and those with none at all” (Nichols, 2014).

At the same time, a tendency is reviving according to which even due politics ignores and rejects scientific facts: Instead of the much demanded evidence-based policy, post-truth politics is gaining ground, which means political action that is not based on facts, or that relies on false information that is labelled as being an alternative truth (d’Ancona, 2017). Countries such as the USA or Brazil are good examples - here presidents are in power who reject scientific findings on climate change and, as in the case of Trump, restructure entire institutions such as the Environmental Protection Agency (EPA), which are actually supposed to provide science-based environmental policy information, without any longer considering all the scientific facts (Bravender, 2016; Dillon et al., 2018). In Brazil, President Bolsonaro is neglecting any responsibility of the Brazilian government for the Amazon rainforest fires whereas scientists argue that these are at least partly a result of Brazil’s deforestation policy (Escobar, 2019). Thus, in addition to a social questioning and de-differentiation of scientific knowledge, a supposedly, very powerful new political rejection of scientific expertise is emerging.
2. The need for advanced approaches for a better understanding of scientific knowledge transfer

Under these conditions, the question arises more and more how processes of scientific knowledge transfer can be advanced in such a way that scientific expertise can inform political and practical decisions. But first, the question must be asked why politics often does not act based on facts? From me, the answer to this question is initially astonishingly simple: politics is not science and science is not politics. This very brief answer was advocated early in the so-called “two-communities” (Caplan, 1979) or “different systems” (Böcher and Krott, 2016: 156) approach, that argues that scientists and policy makers act in totally different “worlds” based on different interests and values. Because politics follows a different logic, namely the acquisition of power and interests under short-term conditions, it is not compatible with science, which is based on the continuous, in principle timely unlimited search for truth (Böcher and Krott, 2016: 156). Scientific facts, no matter how valid and reliable they are, are not likely to be politically utilized if central interests of powerful political actors run counter to them. There is simply no automatic mechanism that forces politicians to apply scientific expertise. This also means, however, that approaches primarily calling for an improvement of communication (like, e.g. Requiert et al., 2020) between science, politics, and practice have their limitations (Iyengar and Massey, 2019). But even if the latter authors note that weak communication is not the only problem and highlight important changes in information technology and the role of actors in serving misleading information (Iyengar and Massey, 2019), they still underestimate the importance of political processes, power and interests of political actors, which cannot be undermined by communication alone.

A current red-hot example is the action of US President Trump in the Corona pandemic: while he rejects the advice of science in questions of man-made climate change, he has now responded to the proposals of science and is taking the pandemic seriously and reacting politically to it: Now it is benefiting his interests in the US presidential election campaign to act in accordance with scientific findings in order not to lose office and power if he fails in the crisis. In the COVID-19 case, scientific expertise is in line with his political interests, whereas in the case of climate change this is by far not the case. In both cases, scientific evidence seems to be clear - yet there are major differences in their political utilization, which could not be changed only by improved communication. This makes clear that scientific knowledge alone does not necessarily lead to appropriate action by political actors. If the right scientific solution contradicts their interests, it will not be utilized. Conversely, the right scientific solution can become relevant in the political process if it corresponds also to the political interests of relevant actors and if these actors use their power to ensure that the expertise is taken into account. A decisive key to scientific knowledge transfer is therefore the linking between expertise and the interests and demands of political and practical actors. If these are met in terms of political interests, content and timing, the chances for successful scientific knowledge transfer increase. Advanced approaches of scientific knowledge transfer should therefore develop a deeper understanding of political processes and the underlying interests and power relations. The same applies to the role of expertise in forest policy: as the examples of forest fires and deforestation or forest-related climate change show, it is often a matter of science-based questions that are the subject of political debate. Advanced approaches to scientific knowledge transfer in these fields must also take a closer look than before at forest policy processes with their conflicts and political interests in order to develop science-based policies that are used.

3. The contributions to this special issue

This issue consists of six contributions. The first three contributions apply the RIU model of scientific knowledge transfer that was developed by Böcher and Krott (Böcher, 2016; Böcher and Krott, 2016). In the RIU model scientific knowledge transfer consists of three different activities: research, integration, and utilization. The crucial intermediary step between scientific research and utilization is “integration” – representing a bi-directional selection from scientific knowledge and respectively from the demands of political or practical actors. One of the main hypotheses of RIU is that powerful political actors who serve as allies could enforce the utilization of science – if scientific expertise meets their demands and interests, they can use their power to enforce other actors to apply scientific findings. The RIU model integrates scientific findings about political processes and the role of actors and their interests and delivers a political science perspective on scientific knowledge transfer. Many case studies have been conducted based on the RIU model. However, so far, a comparative case study has been missing. Huong Do Thi, Max Krott, and Michael Böcher present the first comparative case study based on the RIU model from Vietnam, Germany, Indonesia, Japan, and Sweden (Do et al., 2020). Their results show that an improvement of scientific research alone does not lead to scientific knowledge transfer. Political utilization is as well possible without having a strong scientific basis, a finding that stands well in line with the remarks made above. To address strong political actors in integration in a way that they support scientific solutions could be a possible option suggested by the RIU model. Ulrike Zeigermann and Michael Böcher take up with these findings and – also by using the RIU model – deliver a case study on the OECD’s epistemic community for “Policy Coherence for Sustainable Development” and investigate if this community is an example for successful integration (Zeigermann and Böcher, 2019). They conclude that these processes could be strengthened in integration to not just be used on an abstract level for strategy-building. Improved integration could lead to more balanced considerations of scientific results and political interests. The third contribution that applies the RIU model investigates deforestation monitoring and scientific knowledge transfer in REDD+ projects in the Congo Basin region (Sufo Kankeu et al., 2020). Richard Sufo Kankeu, Moise Tsayem Demaze, Max Krott, Denis Jean Sonwa, and Symphorien Ongolo investigate bottlenecks of scientific knowledge transfer within deforestation reduction monitoring under REDD+ mechanisms. Here, methods and tools are developed at the international level and it is expected that they can be transferred to national levels of developing countries. The paper reveals a main weakness of integration in the absence of an important link between international and domestic knowledge. The contribution demonstrates again that it is very important for scientific knowledge transfer to consider political interests: here, integration did not consider potential synergies between scientists and the existing knowledge and interests of indigenous actors. The fourth contribution presents a case study on the science-policy interface in Brazil nut management in Peru (Ramirez and Belcher, 2018). Luisa Ramirez and Brian Belcher present their findings from a case study on the influence of timber harvesting on Brazil nut production that was based on transdisciplinary research principles. They established a transdisciplinary research quality assessment framework (TDR), based on the criteria relevance, credibility, legitimacy, and effectiveness that refer to the works of Cash et al. (2002). Their assessment shows clearly the innovativeness of this framework. They identify strengths and weaknesses of the process: whereas direct communication with policy makers lead to an inclusion of scientific knowledge into the management guidelines, the incorporation of regional stakeholders who are here very important actors remained weak. Again, this paper shows that scientific knowledge transfer must be organized in a way that includes all important and powerful political actors. The fifth paper has a similar direction: David Edwards and Laura Meagher also present a framework to assess the practical impacts of practice-oriented research projects (Edwards and Meagher, 2019). Their framework was used to analyze practical impacts in 12 case studies led by Forest Research, a government research agency in the UK. It deals with guiding questions regarding impacts, causes of impacts, and lessons and actions. The
framework is easily applicable, includes important questions regarding different political actors, and especially can be used to identify weaknesses of existing, but also lessons for the optimization of future scientific knowledge transfer processes. The framework helps to identify different kind of changes that rely on research results, on the question who changes behavior and is even aimed at causes of impacts. Another innovative method that is used to organize scientific knowledge transfer in transdisciplinary research settings are so-called “policy labs”. Heman Ojha, Udeep Regmi, Krishna K. Shrestha, Naya Sharma Paudel, Swoyambhu Man Amatya, Anthony Zwi, Ian Nuber, Edwin Cedamon, and Mani Banjade present a case study from Nepal (Ojha et al., 2019). Here, policy lab methodology was used in Nepal’s community forestry governance. To link knowledge that is gained by the researchers during the research process with the interests of the policy actors, six policy labs have been organized. Policy labs serve here as bridge between the policy cycle and the research process. The paper clearly shows that innovative methods like this can help to better integrate the demands and political interests of different actors in the knowledge transfer process in order to become early able to adjust the research if necessary. This improvement of transdisciplinary research methods serves here as a promising strategy to advance scientific knowledge transfer by better connecting the needs of political actors with the research process.

4. Conclusion: Rich examples for advancing our understanding of scientific knowledge transfer in forest and forest-related policy

All papers represent rich, empirically saturated, examples for different scientific strategies and methods to advance scientific knowledge transfer. They have in common that they concentrate on improving the connection between scientific research and political or practical utilization. This can be done by advancing theoretical models of scientific knowledge transfer: the three papers that are based on the RIU model deliver such an advancement by theoretically describing and empirically examining the crucial role of integration as important step between research and utilization and vice versa. All papers have in common that they highlight the importance of political actors to be incorporated into integration processes to become allies for scientific knowledge transfer. The other three papers of this special issue are also based on state-of-the-art theory – but rather, they represent approaches for methodological advancements in existing research processes dealing with scientific knowledge transfer. These methods could be gained from transdisciplinary research (like TDR, policy labs) or pre-existing approaches in project and research evaluation. They have in common that they deliver organizational solutions for an advanced design for research projects that integrate political and practical actors right from the beginning to deliver outcomes that represent scientific knowledge.

They also emphasize the importance of integrating the “right” political actors and stakeholders during research processes. The role of political actors and their interests for scientific knowledge transfer is therefore an aspect that connects all six papers of this special issue – so they clearly represent an advanced understanding of scientific knowledge transfer for forest and forest-related policy, especially in regard to the aforementioned phenomena in the relationship between science, politics, and society that currently can be observed.

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