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Pekka Vihervuori
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Toimituskunta
Kari Kuusiniemi
Outi Suviranta
Veli-Pekka Viljanen

Tilausosoite
Suomalainen Lakimiesyhdistys
Kasarmikatu 23 A 17
00130 Helsinki
p. 09 6120 300
toimisto@lakimiesyhdistys.fi
www.lakimiesyhdistys.fi

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Muotokuva julkaistaan taidemaalari Pasi Tammen ja
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Kannen suunnittelu: Elina Malmi
Taiton suunnittelu: Heikki Kalliomaa
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Mikael Hildén

Opportunities and challenges in the use of scientific knowledge in environmental appeal cases in Finland¹

Introduction

Environmental law is dependent on environmental research. This is not a new observation. In the introduction to his 1981 doctoral thesis, Pekka Vihervuori noted that the legal considerations of conflicts of interest relating to water require knowledge of how they materialise in terms of, for example, changing quality, the possibilities to protect nature, the sharing of water for different uses and the broader future development of water courses, which all depend on both the quantity and the quality of the water.² In Finland the interaction between scientific research and legal practice was formalised in the Water Act (264/1961, later superseded by the Water Act 587/2011), which specified an inspection procedure (chapter 18) to precede the granting of permits. Since the 1960s the interaction has become deeper and broader. The environmental legislation in the EU reflects this evolution very clearly, from water legislation to integrated environmental, climate and biodiversity legislation.

Referring to the environment in legislation is one thing, making the interaction operational another. To be reliable, such interaction must be institutionalised in order to deliver predictable results and a fair and systematic treatment of cases.³ This requirement applies to all levels in the decision-making system, from the first level of decision to the appellate courts. This article deals with the specific institutionalisation of environmental science and

¹ This article has emerged from the basis of practical work in the Supreme Administrative Court, but it has also benefited from the author's work for the Strategic Research Council in the programme towards a Carbon Neutral and Resource Efficient Finland that explores how scientific information can be turned to serve societal decision-making (grant 314350). The author is also indebted to legal scholars Antti Belinskij, Kai Kokko, Kari Kuusiniemi, Tiina Paloniitty, and Jukka Similä, whose valuable comments helped to improve the manuscript significantly.

² Pekka Vihervuori, *Viranomaisen asianosaispuhevallasta vesiasioissa. Tutkimus edunvalvonnan edellytyksistä vesien käyttöä koskevassa päätöksenteossa*. [The legal standing of authorities in water cases]. *Suomalainen Lakimiesyhdistys* 1981, p. 5.

³ Keum J. Park, *Judicial utilization of scientific evidence in complex environmental torts: redefining litigation driven research*. *Fordham Environmental Law Review* 7(2) 2011, p. 483–513.

law, as enunciated by the Finnish Supreme Administrative Court (SAC), which is the highest appellate court in Finland for decisions made by authorities in environmental matters. I will discuss the current practice, its advantages, and its pitfalls. The ultimate questions are to what extent the Finnish system is capable of delivering predictable results and a fair and systematic treatment of cases, and how the system could be strengthened.

The institutional setup

The SAC is regulated by the Supreme Administrative Court Act (1265/2006). As regards environmental matters, section 11 of the Act is of particular significance. Under that provision, two environmental expert members (non-lawyers with expertise in environmental matters) of the SAC participate in the consideration of cases concerning the application of

- the Water Act (587/2011),
- the Environmental Protection Act (527/2014)
- the Act on the Organisation of River Basin Management and the Marine Strategy (1299/2004),

Expert members also participate in the consideration of corresponding environmental protection and water matters arising from the autonomous Åland Islands.

It is worth noting that cases concerning the application of the Land Use and Building Act (132/1999) and the Nature Protection Act (1096/1996) do not engage environmental expert members in the SAC.

Besides the relevant substantive regulations, the qualifications of the expert members of the SAC are specified in the Courts Act (673/2016), chapter 10, section 6, where it is stated that the qualification for an environmental expert member at the SAC is an appropriate Master's degree in technology or in the natural sciences. In addition, the expert member must be familiar with the duties falling within the scope of the applicable legislation.

These regulations have been implemented by appointing part-time expert members who meet the required qualifications. In practice, the requirements on expertise have been set higher; most of the environmental expert members have had a doctoral degree and/or documented long-term experience of dealing with environmental issues in research and practical application.⁴

⁴ A more detailed account of the use of expert members in courts in the Finland is provided by Tiina Maria Paloniitty – Sinikka Kangasmaa, Securing scientific understanding: expert judges in Finnish Environmental Administrative Judicial Review. *European Energy and Environmental Law Review* 27(4) 2018, p. 125–139.

Specific challenges relating to environmental evidence

Environmental court cases combine legal issues with questions of a scientific nature. Scientific evidence is needed in order to determine the actual impacts that either are estimated to occur or have already occurred. The challenges that the administrative courts face are analogous to those in forensic science of which Weizman (2011) has noted: “Because objects do not speak for themselves, there is a need for ‘translation’ or ‘interpretation’—forensic rhetoric requires a person (or a set of technologies) to mediate between the object and the forum: to present the object, interpret it and place it within a larger narrative.”⁵ An additional challenge faced by the courts is that primarily they have to deal with the future consequences of emissions or other interventions, given limited information on the estimated amount and nature of the emissions or other interventions in the environment. The historical verification of what has happened may provide a background for concluding what additional emissions or interventions may cause to happen. Some of the court cases will be about specifying indemnities or sanctions for pollution that the activities have already caused, but most will deal with the future.

The introduction of scientific findings into court cases emphasises the need to consider uncertainties, which create potential tensions between environmental science and the logic of the court. Kokko (2013, p. 291), in reflecting on the tensions between scientific and legal information, argues that the search for an ever more elaborate scientific statement concerning a particular case may eventually make the statement lose its relevance in judicial decision-making.⁶ A court case examining the possible adverse consequences of a medical drug also illustrates the tension: “Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly.”⁷ This view raises, however, also important issues of the law itself. Striving for a “definitive” solution is understandable, but in legal cases that aim at formulating operating conditions for the future, a “final resolution” may end up grossly in error, if the projections on which the decision are based turn out to be false. If this happens repeatedly, both the law itself and the courts will lose legitimacy. Scientific uncertainties must therefore be taken seriously.

Scientific uncertainties are highly relevant in court cases and they come in many forms and shapes. It is not always obvious how a court should deal with them. Van der Bles et al. have recently made a useful summary of what uncertainties are relevant and how they can

⁵ Eyal Weizman, *The least of all possible evils: humanitarian violence from Arendt to Gaza*. Verso Books 2011, p. 105.

⁶ Kai Kokko, *Weighing environmental information and its sources in legal decision-making*, p. 285–317 in Lena Gipperth – Charlotta Zetterberg (red.), *Miljörettsliga perspektiv och tankeväндor*. Vänbok till Jan Darpö & Gabriel Michanek. Iustus Förlag 2013, p. 291.

⁷ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), p. 596–597. See also <https://supreme.justia.com/cases/federal/us/509/579/>.

be presented.⁸ The basic uncertainty elements can be: Facts as categorical variables (can this type of emission have the impacts that are being claimed?), the actual numbers (is the impact large or small?), and the hypotheses formulated as models and their built-in assumptions through which numbers or relationships can be derived. In a court case, the specific sources of the uncertainties are relevant: A small sample may not capture the variability adequately and instead hide the true uncertainties. There are also numerous demonstrations of computational or systematic inadequacies at the level of measurement, resulting in uncertain conclusions.⁹ Limited knowledge and ignorance about underlying processes obviously lead to uncertainties that can compromise court decisions.¹⁰ All of these elements lead to uncertainties that the courts will face in the form of disagreement between experts. The quality of the knowledge and the magnitude of the uncertainty become issues that need to be addressed, and ideally also documented.

Climate change is an area which is only beginning to become an issue for court cases,¹¹ but the International Panel on Climate Change (IPCC) has for a long time had to deal with uncertainties, not least because its reports are closely scrutinized by critics and outright sceptics. This has led the IPCC to develop systematic narratives for conveying uncertainties.¹² A starting point is that a conclusion or finding can be characterised by expressing the degree of agreement on one hand and the quality of the evidence on the other hand. The weakest statements are those for which there is low agreement and limited evidence. These may be “weak signals” that further research may explore, but they cannot be used as justifications for a substantive decision. In the world of forensic science, they correspond to a category of findings that give “no reasonable ground for suspicion”, whereas the other extreme where agreement is high and evidence robust could be seen as the equivalent of evidence that is “beyond reasonable doubt”.¹³ Although Finnish decision-making in environ-

⁸ Anne Marthe van der Bles – Sander van der Linden – Alexandra L. J. Freeman – James Mitchell – Ana B. Galvao – Lisa Zaval – David J. Spiegelhalter, Communicating uncertainty about facts, numbers and science. *Royal Society Open Science* 6(5) 2019. Available at <https://royalsocietypublishing.org/doi/10.1098/rsos.181870>.

⁹ Ashley Mills – Stephen Peckham, Garbage in, gospel out? – Air quality assessment in the UK planning system. *Environmental Science & Policy* 101 2019, p. 211–220. Available at <https://doi.org/10.1016/j.envsci.2019.06.010>.

¹⁰ Wendy E. Wagner, Commons ignorance: the failure of environmental law to produce needed information on health and the environment. *Duke Law Journal* 53(6) 2004, p. 1619–1745.

¹¹ See, for example, <http://climatecasechart.com/non-us-climate-change-litigation/> and <http://climatecasechart.com/us-climate-change-litigation/>. To date the cases are extremely limited, not least because provisions that would be directly relevant from the point of view of climate change are still missing from most environmental legislation.

¹² Michael D. Mastrandrea – Christopher B. Field – Thomas F. Stocker – Ottmar Edenhofer – Kristie L. Ebi – David J. Frame – Hermann Held – Elmar Kriegler – Katharine J. Mach – Patrick R. Matschoss – Gian-Kasper Plattner – Gary W. Yohe – Francis W. Zwiers, Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties. IPCC Cross-Working Group Meeting on Consistent Treatment of Uncertainties, Jasper Ridge, CA, USA, 6–7 July 2010. Available at https://www.ipcc.ch/site/assets/uploads/2017/08/AR5_Uncertainty_Guidance_Note.pdf.

¹³ Charles Weiss, Expressing Scientific Uncertainty. *Law, Probability and Risk* 2(1) 2003, p. 25–46.

mental law does not make use of these characterisations in judging evidence,¹⁴ the deliberations of the courts reflect a comparable approach. The purpose is to explore to what extent the appeal is built on relevant and solid information that gives grounds for changing the decision. Unfortunately, many of the issues dealt with in environmental court cases are somewhere in the middle ground where there may be only partial agreement and evidence of varying amount and quality.

A partial solution to the dilemma can be found in considering the significance of the issues from both a legal and a scientific point of view. Based on his experience of work at the SAC, the author argues that it is possible to classify cases with respect to their legal and scientific complexity/simplicity (Table 1). The main effort in the science-law dialogue should be directed at the cases displaying complexity in both dimensions. The criteria for leave to appeal to the SAC, which are provided in section 111 in the Act on Judicial Procedure in Administrative Matters (808/2019), should work in this direction.¹⁵ Leave to appeal should be granted if the decision on the case provides guidance for the consistent treatment of similar cases, if an obvious error has been made in previous decisions or if there are other significant reasons for granting leave to appeal. Following these criteria, the legally and scientifically less problematic cases should be excluded from reaching full consideration by the SAC.

Legally and scientifically complex cases are not only demanding. They may also raise questions on the law itself. Legal certainty is relatively easy to reach when questions are straightforward, as in the upper left-hand corner of Table 1. In the lower right-hand corner, there may also be a need for legislation that gives regulators, permit holders and the public a right to revisit the permit in the light of accumulating evidence. Such adaptive regulation has been discussed also in other legal systems¹⁶, and some possibilities for reopening permit conditions are built into the current Finnish legislation. It is, however, worth considering whether there is a need for provisions that increase the adaptability of the law in addressing the most challenging legal cases. This cannot be done lightly. Braithwaite (2003) made an effort to develop a new base for tax law¹⁷ and there is an analogous need for a theory on how to make environmental law more certain in complex dynamic domains.

¹⁴ Tiina Paloniitty notes that the classical interpretation of evidence in criminal law is too restricted when applied in the context of environmental law (Paloniitty, *The (in)Compatibility between adaptive management and law – regulating agricultural runoff in the EU*. Doctoral Dissertation. University of Helsinki 2017). It is worth noting, however, that the IPPC's use of "evidence" reflects a broad use of the concept, in which any information that fulfil pre-specified scientific criteria is considered relevant for the conclusions. This usage corresponds to the view that also Pekka Vihervuori has emphasised (Pekka Vihervuori, *Totuudesta hallintolainkäytössä in Juhlajulkaisu Pekka Hallberg 1944–12/6–2004*. Suomalainen Lakimiesyhdistys 2004, p. 500, 504).

¹⁵ The leave to appeal procedure was introduced in 2018 in several pieces of environmental legislation (Government Bill 43/2017).

¹⁶ See, for example, J. McDonald – M. C. Styles, *Legal Strategies for Adaptive Management under Climate Change*. *Journal of Environmental Law* 26(1) 2014, p. 25–53. Available at <https://doi.org/10.1093/jel/equ003>.

¹⁷ John Braithwaite, *Making tax law more certain: A theory*. *Australian Business Law Review* 31 2003, p. 72–80.

Full certainty is, however, not likely in the lower right-hand corner of Table 1.

Table 1. Proposed classification of environmental cases

	Legally simple	Legally complex
Scientifically simple	Cases in this class should no longer reach the SAC after the introduction of the appeal restrictions according to Act on Judicial Procedure in Administrative Matters (808/2019), section 111.	Numerous possible legal outcomes that have little, if any, effect on the environment. Typical cases are related to conflicts over small changes in the use of land or waters where issues of ownership and related encumbrances can make cases complicated.
Scientifically complex	A permit should be granted if and only if the environmental damage or harm is tolerable: Demonstrating the degree to which the draining of a bog for peat production deteriorates the status of a downstream water body below “good” is scientifically challenging due to confounding factors.	The legal basis offers many interpretations that interact with the interpretation of what environmental effects may arise. In permitting the question whether an output should be seen as a waste stream or a side product is both a legal and a scientific/technological question. Ultimately, the interpretation may either cause or reduce environmental damage.

Tackling challenges in the science-law dialogue

The current debate on forensic evidence has searched extensively for solutions that would ensure the appropriate use of scientific knowledge in courts. There are at least three dimensions in the debate, i.e., the admissibility of expert evidence, the reliability of the evidence in particular cases, and the communication between the court and the experts.¹⁸

The issue of admissibility of expert evidence raises the question whether there could or should be criteria and processes for the kinds of evidence that can be brought before the

¹⁸ Éadaoin O’Brien – Niamh Nic Daeid – Sue Black, Science in the court: pitfalls, challenges and solutions. *Philosophical Transactions of the Royal Society B* 370(1674) 2015. Available at <http://dx.doi.org/10.1098/rstb.2015.0062>.

court. In the United States, the Committee on the Development of the Third Edition of the Reference Manual on Scientific Evidence and the Committee on Science, Technology, and Law Policy and Global Affairs note, in their preface (2011), that “Supreme Court decisions during the last decade of the Twentieth Century mandated that federal courts examine the scientific basis of expert testimony to ensure that it meets the same rigorous standard employed by scientific researchers and practitioners outside the courtroom.”¹⁹ This basic starting point can be regarded as universally valid, but the processes for reaching it may differ, depending on the specific set-up of the legal system. In the Finnish system, there are no specific safeguards to ensure that only evidence that has been found appropriate by the scientific community is presented to the courts. It is difficult to see how, in the Finnish environmental appeal process, it would be possible to introduce *a priori* criteria for what type of evidence is admissible. However, since practically all evidence is provided in writing, oral hearings being an exception, the arguments can be scrutinised by experts. Ultimately, this scrutiny will be reflected in court in the discussions between the legal experts and the scientific experts. In the appellate court, a scientific expert can challenge the scientific reasoning of experts in the underlying decision. A limiting factor is that the scientific experts neither are masters of all trades nor are they in possession of unlimited time and other resources to explore a particular case in detail. In particularly challenging cases, they need to use their general scientific literacy to identify the salient features of the case and the aspects of the scientific evidence which need to be scrutinised closely. This is a potential weakness of the system. If experts are overly confident of their ability to judge science-based arguments in an area that they are not deeply familiar with, this can lead to errors. In forming their opinions on the case, experts can (and should) consult the scientific literature and expertise beyond their own domain in order to be able to convey a broad scientific position of relevance to the case.

The reliability of evidence issue concerns the data that are presented in a specific case. Questions typically arise concerning the standard of proof. Environmental data are often highly variable, and it may not be possible to provide, for example, statistically significant evidence that would unequivocally demonstrate that a change has occurred as a consequence of emissions. The situation becomes even more challenging where there is a need to consider future emissions and their consequences, especially when the additional emissions contribute to an existing load instead of being completely new to the system. A recent important example is the denial of the environmental permit for a planned new biorefinery in the city of Kuopio. The decision of the SAC²⁰ referred to the risk that a new plant could endanger the quality of the water body and therefore violate the European Water Frame-

¹⁹ National Research Council, Reference Manual on Scientific Evidence: Third Edition. National Academies Press 2011. Available at <https://doi.org/10.17226/13163>.

²⁰ Decision of the Supreme Administrative Court, KHO 2019:166.

work Directive (2000/60/EC), as implemented in the relevant Finnish legislation and applied by the EU Court of Justice, especially in the *Weser* case.²¹ The decision referred to the precautionary principle, which must be taken into account in accordance with section 20(1) of the Environmental Protection Act (527/2014). The fact that the SAC decision was not unanimous shows that the evidence was not “beyond reasonable doubt”. Had it been possible to conclusively determine that the new plant would not harm the water body, the permit could have been granted, but this was not the case. Therefore, it became a key question whether it would be possible to revise the permit conditions to a sufficient degree, were the water body to show signs of unacceptable deterioration. The majority of the Court concluded that this was not possible.

Such cases, which clearly belong in the lower right-hand corner of Table 1, show that the problems in environmental court cases cannot be solved by, for example, standard statistical approaches to reliability. Part of the difficulties arise due to the structures of the law itself. The default assumption of the current Environmental Protection Act is that permits are granted without time limit. Temporary permits can be granted only in exceptional cases (section 87). This influences the decision making—a permanent permit must be more robust against errors, which therefore emphasises the role of the precautionary principle. It has been argued that future law must be made adaptive so that it can deal with changing conditions and increasing knowledge.²² If this were to happen on a wider scale, the role of scientific evidence in environmental court cases would increase further.

Novel tools that involve the use of Bayesian approaches may help quantifying subjective evidence and presenting complex probability calculations.²³ They may make it easier to deal with significant uncertainties, but they also pose new challenges as they make the subjective elements explicit. Methodological standards and new methods may thus be of help, but the basic requirement that the thinking and the argumentation should be transparent, logical, and robust is likely to remain the most important feature of reliable use of scientific evidence in a particular environmental case.

Ultimately, the use of scientific evidence in courts depends on the communication between the legal experts and scientific experts. In discussions on forensic science, questions have been raised on whether there should be standards of reporting which would ensure

²¹ <http://curia.europa.eu/juris/liste.jsf?num=C-461/13>. See also Tiina Paloniitty, *The Weser Case: Case C-461/13 BUND V GERMANY*. *Journal of Environmental Law* 28(1) 2016, p. 151–158. Available at <https://doi.org/10.1093/jel/eqv032>.

²² Barbara A. Cosens – Robin K. Craig – Shana Lee Hirsch – Craig Anthony (Tony) Arnold – Melinda H. Benson – Daniel A. DeCaro – Ahjond S. Garmestani – Hannah Gosnell – J. B. Ruhl – Edella Schlager, *The role of law in adaptive governance*. *Ecology and Society* 22(1) 2017, Article 30. Available at <https://doi.org/10.5751/ES-08731-220130>.

²³ Norman Fenton, *Improve statistics in court*. *Nature* 479 2011, 36–37. Available at <https://doi.org/10.1038/479036a>.

that forensic evidence is “scientifically rigorous, but accessible”. In proceedings where only written statements are provided to the legal expert this would be a reasonable approach, although the practical difficulties in designing a rigorous standard would still be significant. In the Finnish system, which allows for verbal communication between scientific and legal experts both in the first-instance administrative court and in the SAC, there are greater possibilities to work on challenging questions. As the scientific arguments need to be referred to in the justifications for the decision there is a further element of scrutiny, but the feedback generated in this way will only have a slow impact and will hardly ever be able to correct for technical mistakes in a specific decision. Past cases are used by the courts as reference material in new cases, but there still is untapped potential for gaining knowledge. Systematic evaluations of past cases, with the benefit of scientific hindsight, could provide valuable insights into how scientific findings have influenced legal decisions and how new scientific results are adopted in legal proceedings. Such analyses have as yet been rare, but with increasing digitalisation they will become easier to perform.

The danger of relying too much on experts in courts have been recognized for a long time.²⁴ Especially in legal systems using lay jurors “[t]he scientist in court presents a serious risk of being too credible, precisely because the implicit message is that the witness speaks with the authority of a larger community behind him. The simplest solution—and perhaps the only one—is for judges to make sure that the expert witness relies on theories or methods that have survived extensive testing in the scientific community.”²⁵ In the Finnish system the set-up is different. The expert is a member of the court, bound by the solemn affirmation of office (Courts Act (673/2016), chapter 1, section 7). Professional judges can also be expected to be more critical and less easily convinced by individual experts, but the dangers of having too great confidence in experts, even expert members of the court, are worth recognising. The confidential discussions between judges and expert members in the SAC can also help judges examine the scientific arguments, and force the expert member to reflect on which aspects of the scientific arguments are legally relevant.

Possible future developments

The demand for science in dealing with court cases is likely to increase. As argued above, any progress towards more adaptive regulation will underline the role of scientific considerations. Furthermore, the development in digitalisation and environmental data collec-

²⁴ Peter W. Huber – Kenneth R. Foster, *Science in the Courts*. Issue Brief. Manhattan Institute 1997. Available at <https://www.manhattan-institute.org/html/science-courts-5684.html> January 30th, 2020.

²⁵ *Op. cit.*

tion, including remote sensing, will deliver more information that may be relevant for judging environmental impacts,²⁶ but data alone will not do away with uncertainty. Observations must also be interpreted with care. New developments in industrial production processes, such as the efforts to reach a circular economy, may challenge traditional environmental legislation further. For example, new techniques make it possible to observe and track substances that so far have been beyond regulation.²⁷ Yet the consideration of such substances may be important as regards e.g. permit conditions for complex integrated industrial systems whose impacts may seem to be modest in the light of traditional priorities, such as nutrient or metal loads. When new information becomes available, it is sooner or later also likely to end up in appeals.

Completely new issues will also enter the scene, first as general statements of concern, but gradually they will create pressure to revise legislation and eventually also become legitimate concerns in appeal processes. The emission of greenhouse gases and the adaptation to climate change are a case in point. To date, greenhouse gas emissions have played practically no role in the legal permit considerations. For example, an appeal regarding a decision under the Water Act (587/2011) for a permit for installing a ground source heat pump in a ground water area was rejected, because the comparison of interests under chapter 3, section 4 of the Act concluded that mitigation of climate change was an “indirect and minimal public interest” that could not override the potential risk of groundwater pollution, which was considered to be significant in this particular case.²⁸ A stronger emphasis on climate change mitigation as a public interest in the Water Act could tilt the comparison of interests. At the same time, it would, however, also complicate the decision-making as it would require experts to consider trade-offs between different public interests in the context of future risks.

There are also other pieces of legislation that display a lack of consistency with respect to climate change. For example, the environmental impact assessment legislation (EIA Act, 252/2017) recognises climate change as an environmental impact to be considered (section 2), but the Environmental Protection Act (527/2014) only makes a general reference to mitigating climate change in section 1, which specifies the purpose of the Act. The only specific provision concerns the delivery of information on fluorinated greenhouse gases (section 165). Thus, environmental permits for draining bogs to produce peat for fuel do not take a

²⁶ Frank E. Muller-Karger et al., Satellite sensor requirements for monitoring essential biodiversity variables of coastal ecosystems. *Ecological Applications* 28(3) 2018, p. 749–760.

²⁷ Werner Brack – Juliane Hollender – Miren López de Alda – Christin Müller – Tobias Schulze – Emma Schymanski – Jaroslav Slobodnik – Martin Krauss, High-resolution mass spectrometry to complement monitoring and track emerging chemicals and pollution trends in European water resources. *Environmental Sciences Europe* 31 2019, Article 62. Available at <https://doi.org/10.1186/s12302-019-0230-0>.

²⁸ Decision of the Supreme Administrative Court, KHO 2019:37.

position on the consequences of the activity as regards greenhouse gas emissions, although the impact is unambiguous and significant in terms of emissions/produced energy. The first steps towards change have, however, been taken. The Government's fund for analysis, assessment and research activities has put out a call for proposals with the purpose to explore how climate impacts could be introduced in the Environmental Protection Act.²⁹ At the same time, a revision of the Land Use and Building Act (132/1999) is under way and climate change is likely to become more visible in the Act. This ongoing evolution shows that the dialogue on science will remain and become ever more diverse also in the appellate courts.

The current Finnish system has shown that it is capable of dealing with complex legal and scientific questions (Table 1). The restrictions on appeals will most likely ensure that the environmental expert members time is better used than previously, when a significant number of the environmental cases were either scientifically trivial or, because of their minor actual impact, somewhat paradoxically impossible to examine in a scientifically rigorous way. The ongoing changes in the legislation could be taken as an opportunity to broaden the use of scientific expertise in the SAC. There are no strong scientific grounds for not using members in matters related to, for example, the Land Use and Building Act (132/1999) or other legislation that in the future is likely to have a decisive impact on greenhouse gas emissions in Finland in the future.³⁰

Whether or not the matters to be jointly considered by justices and expert members expand in the SAC to new areas of legislation, the demands on the experts remain. The Lord Chief Justice of England and Wales raised, in the 2014 Kalisher Lecture³¹, points that can easily be applied also in the Finnish context. Thus, the expert member will first and foremost need to get the science right by

- examining the scientific rigour in the arguments presented
- recognising the cost-effectiveness of (additional) evidence
- providing feedback to regulators/law makers: communicating to identify the appropriate regime of scientific standards
- living up to her/his role as an expert

These points imply that the role of the expert member is not limited to fact-checking. There will also be elements of reflexive considerations of what can be known and how uncertain-

²⁹ <https://valtioneuvosto.fi/paatokset/paatos?decisionId=0900908f80676174> February 10th, 2020.

³⁰ Tiina Paloniitty and Sinikka Kangasmaa have arrived at the same conclusion concerning environmental cases in Paloniitty – Kangasmaa 2018.

³¹ Lord Chief Justice of England and Wales (The Rt Hon the Lord Thomas of Cwmgiedd, Lord Chief Justice of England and Wales), Expert Evidence – the Future of Forensic Science in Criminal Trials. The 2014 Criminal Bar Association Kalisher Lecture. Available at <https://www.judiciary.gov.uk/wp-content/uploads/2014/10/kalisher-lecture-expert-evidence-oct-14.pdf> February 4th, 2020.

ties should be addressed in the decisions of the court.³² For this to be more than a pious wish, it is important that the argumentation in the SAC is based on the highest standards of all the professions that come together in its deliberations.³³

³² The flexibility of the Finnish system in allowing for confluence of facts and norms during the decision-making has been pointed out by Paloniitty and Kangasmaa (2018, p. 138).

³³ As a final footnote I wish to acknowledge that Pekka Vihervuori, in his capacity as Justice and President of the Supreme Administrative Court represented both the highest standard of his own profession and encouraged all experts to live up to their highest standards.