



FACTSHEET ON HORIZON SCANNING

What is horizon scanning?

- Horizon scanning is a forecasting tool that can help policymakers review new information on the potential risks and opportunities of new technologies in a systematic manner, identifying and evaluating potential positive and negative impacts on the environment, biodiversity, and people.
- All horizon-scanning processes involve some iteration of first broad-based scanning of emerging technologies and issues, subsequent filtering and prioritization, analysis, and finally communicating results. Horizon scanning's purpose is not to forecast the future, but to help current decision-makers develop strategies and plans that are flexible and adaptive enough to remain robust in a variety of potential futures. To do so, they bring in experts from a wide range of subject areas to ensure that the process is conducted through a holistic approach that bears in mind a broad array of considerations.

What is the difference between horizon scanning, technology assessment, and risk assessment?

Technology assessment refers broadly to extensive and interdisciplinary processes of policy research intended to anticipate and address the medium and longer-term consequences of the introduction and use of a particular technology.¹ There is no universal approach to conducting such assessments, and different actors may use different methodologies, although the aims and outputs are broadly similar. They are meant to focus on a specific technology, such as the one conducted by the European Parliamentary Technology Assessment Network in 2009 focused on genetically modified plants and foods.² This was a 3 year, multi-stage process conducted jointly through an international collaboration by 8 different agencies. It was intended to identify and analyse the regulatory challenges the EU might face in the coming years related to GM plants and food, as well

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as likely points of public debate and means of addressing those challenges.

Horizon scanning is a broader and faster process than technology assessment that spans a range of potential technology developments. An illustrative example is a horizon scan on synthetic biology by the Australian Council of Learned Academies, at the request of Australia's Chief Scientist. The report examines the opportunities and challenges of synthetic biology for Australia, including ethical, legal, and social considerations, for advanced biomanufacturing, agriculture, protecting the environment, and health. It is part of a series examining such technologies as precision medicine, artificial intelligence, and the internet of things, among other emerging technologies³.

Risk assessment is a process that involves the collection and critical review of available data for identifying and quantifying, when possible, the potential risks resulting from a specific activity or application of a specific technology in a specific environment at a determined time that may pose threats to people and the environment.

How is horizon scanning conducted?

The terminology used to describe the instruments, techniques, and processes involved in horizon scanning is not standardized, which can lead to misunderstandings. The general process of systematic reflection on the impacts of new technologies and scientific developments on the future is referred to as "horizon scanning" in certain contexts,⁴ while it is referred to as "foresight" or "future(s) thinking" in others.⁵ Because horizon scanning is not a standardized practice, engaging in the process necessitates setting clear objectives and rigorous frameworks ahead of the research.

- Horizon scanning processes rely on a range of quantitative and qualitative methods. A given horizon scanning process uses a unique combination of tools and procedures to identify and assess technical, environmental, and other issues and trends.
- Information for horizon scanning can come from a variety of places, but it must be suited to the specific process's area of interest. Traditional information sources, such as publications, quantitative and qualitative data, and published expert opinions, are crucial, but it's also important to include unique sources that are on the "edges of current thought," to ensure a comprehensive viewpoint. As a result, less traditional sources, such as news outlets, social media, and prepublication servers, may be used.
- In addition, the approach may need to take into account lifestyles, societal expectations, or other potential effect indicators. Insights from key stakeholders, such as those supplied by professional organizations, industry leaders, clients, academia, or those working in the subject in issue, will often be beneficial. Mixed methodologies such as the Delphi method, relying on a panel of experts, can also be used. Engaging expert stakeholders in horizon scanning is a way to ensure the methodological and time-bound rigor of the process. The above applies to the broad practice of horizon scanning, and implementation may require the process to be tailored to specific settings (for example in the case of CBD, remaining within the scope of the objectives of the Convention). Technology assessments should be discussed on a case-by-case basis. Such assessments should be for technologies that are in the scope of CBD and sufficiently advanced

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in their development to be realistically assessed for possible positive and negatives impacts.

Who conducts it?

National governments, scientific societies, and research institutes conduct horizon scanning processes, as they all have an interest in gaining foresight into early signals of risk and the potential of new technologies. Some examples of horizon scanning on different policy scales include:

- **Research Groups:** Since 2008, a [group](#) of people from all around the world has gathered at Cambridge University for a horizon scanning workshop to discuss what the future of global conservation might look like. Professional horizon scanners, a journalist, and experts from a wide range of disciplines related to conservation research are among the about 20 participants. The group reviewed the 15 topics they identified in 2009 a decade later in 2019⁶. They concluded that of these, 5 of the topics appeared to have “widespread salience and effect” and 6 had moderate effects. Using similar methods, a research group at Cambridge University has undertaken horizon scans of bioengineering (i.e., synthetic biology), first in 2017, then again in 2020⁷.
- **National:** As mentioned above, [the Australian Council of Learned Academies](#) (ACOLA) regularly produces horizon scanning reports, commissioned by Australia’s Chief Scientist on behalf of the National Science and Technology Council. These are interdisciplinary studies intended to inform national policy responses to significant scientific and technological changes, and may include environmental, economic, and social considerations, among others.

¹Global Technology Assessment Network, “what is technology assessment?”, accessed November 14, 2022, <https://globalta.technology-assessment.info/what-is-ta>

²Danielle Bütschi, Søren Gram, Jon Magnar Haugen, Rolf Meyer, Arnold Sauter, Stef Steyaert, Helge Torgersen, «Genetically modified plants and foods: challenges and future issues in Europe», 2009, <https://www.itas.kit.edu/pub/v/2009/buua09a.pdf>

³Gray, P., Meek, S., Griffiths, P., Trapani, J., Small, I., Vickers, C., Waldby, C., and Wood, R. (2018). Synthetic Biology in Australia: An Outlook to 2030. Report for the Australian Council of Learned Academies, <https://acola.org/hs3-synthetic-biology-australia/>

⁴UK Government Office for Science. Horizon Scanning Programme: A new approach for policy making. 2013. [September 4, 2019]. <https://www.gov.uk/government/news/horizon-scanning-programme-a-new-approach-for-policy-making>

⁵FAO (Food and Agriculture Organization of the United Nations). Horizon scanning and foresight: An overview of approaches and possible applications in food safety. 2013. [September 4, 2019]. <http://www.fao.org/3/a-i4061e.pdf>

⁶William J. Sutherland, Erica Fleishman, Mick Clout, David W. Gibbons, Fiona Lickorish, Lloyd S. Peck, Jules Pretty, Mark Spalding, Nancy Ockendon. Ten Years On: A Review of the First Global Conservation Horizon Scan Trends in Ecology & Evolution, Volume 34, Issue 2, 2019, Pages 139-153 <https://www.sciencedirect.com/science/article/pii/S0169534718302842>

⁷Luke Kemp, Laura Adam, Christian R Boehm, Rainer Breitling, Rocco Casagrande, Malcolm Dando, Appolinaire Djikeng, Nicholas G Evans, Richard Hammond, Kelly Hills, Lauren A Holt, Todd Kuiken, Alemka Markotić, Piers Millett, Johnathan A Napier, Cassidy Nelson, Seán S ÓhÉigeartaigh, Anne Osbourn, Megan J Palmer, Nicola J Patron, Edward Perello, Wibool Piyawattanametha, Vanessa Restrepo-Schild, Clarissa Rios-Rojas, Catherine Rhodes, Anna Roessing, Deborah Scott, Philip Shapira, Christopher Simuntala, Robert DJ Smith, Lalitha S Sundaram, Eriko Takano, Gwyn Uttmark, Bonnie C Wintle, Nadia B Zahra, William J Sutherland (2020) Point of View: Bioengineering horizon scan 2020 eLife 9:e54489. <https://elifesciences.org/articles/54489>



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