# Visualizing Sustainability Challenges and Pathways (746A88)

# 7.5 ECTS Credits

Single subject and programme course within  
Master’s programme in   
Science for Sustainable Development and Master's Programme in Strategic Urban and Regional planning

# Course Literature

## Connected to teaching activities (and throughout the course):

## Week 39

* Kennedy, Helen & Engebretsen, Martin (2020): “Introduction: The relationships between graphs, charts, maps and meanings, feelings, engagements”. In Engebretsen, M. & Kennedy, H. (Eds.) Data Visualization in Society. Amsterdam University Press, pp: 19-32. (0pen access) <https://library.oapen.org/bitstream/handle/20.500.12657/22273/9789048543137.pdf?sequence=1&isAllowed=y>
* Robert Spence. 2014. Information Visualization: An Introduction (3rd. ed.). Springer. <https://doi.org/10.1007/978-3-319-07341-5>
* Tominski, C., & Schumann, H. (2020). Interactive visual data analysis. CRC Press LLC. <https://ebookcentral.proquest.com/lib/linkoping-ebooks/detail.action?docID=6151990>
* Danielle Albers Szafir. 2018. The good, the bad, and the biased: five ways visualizations can mislead (and how to fix them). interactions 25, 4 (July - August 2018), 26–33. [https://doi.org/10.1145/3231772](https://eur01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fdoi.org%2F10.1145%2F3231772&data=05%7C01%7Clotten.wirehn%40liu.se%7Cd02b27f37cc9409306d408db732c10c2%7C913f18ec7f264c5fa816784fe9a58edd%7C0%7C0%7C638230405308829092%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=y2w5Cu5SaaeM6li%2BZ%2Fc3CeFOn3n%2BjLeIVjQ0aquXvPo%3D&reserved=0)
* Christa Kelleher, Thorsten Wagener (2011). Ten guidelines for effective data visualization in scientific publications. Environmental Modelling & Software, Volume 26, Issue 6, 2011, Pages 822-827, ISSN 1364-8152, <https://doi.org/10.1016/j.envsoft.2010.12.006>.
* Rød J.-K., Opach T., Neset T.-S. (2015). Three core activities toward a relevant integrated vulnerability assessment: validate, visualize, and negotiate. Journal of Risk Research, 18 (7): 877–895.
* Balla D, Zichar M, Tóth R, Kiss E, Karancsi G, Mester T. Geovisualization Techniques of Spatial Environmental Data Using Different Visualization Tools. Applied Sciences. 2020; 10(19):6701. https://doi.org/10.3390/app10196701
* Pandey, J 2013, Geographic Information System, Energy and Resources Institute, The, New Delhi. Available from: ProQuest Ebook Central. <https://ebookcentral.proquest.com/lib/linkoping-ebooks/detail.action?docID=6318212>

## Week 40

* Nerlich, B., Koteyko, N. & Brown, B. (2010). Theory and language of climate change communication. WIREs Climate Change, 1:97-110.
* Wibeck, V.; Neset, T.-S.; Linnér, B.-O. (2013) Communicating Climate Change through ICT-Based Visualization: Towards an Analytical Framework. Sustainability 2013, 5: 4760-4777.
* Wang, S., Corner, A., Chapman, D., & Markowitz, E. (2018). Public engagement with climate imagery in a changing digital landscape. WIREs Climate Change, 9(2), e509. <https://doi.org/10.1002/wcc.509>
* Van Beurden, A. U. C. J. and Douven, W. J. A. M. (1999) Aggregation issues of spatial information in environmental research, International Journal of Geographical Information Science, 13:5, 513-527, DOI: 10.1080/136588199241184

## Week 41

* Ertiö, T-P. (2015). Participatory Apps for Urban Planning—Space for Improvement. Planning Practice & Research, 30(3), 303-321. DOI: 10.1080/02697459.2015.1052942
* Neset, T.-S., Wilk, J., Navarra, C., Capell, R., Bartosova, A. (2019). Visualization supported dialogues in the Baltic Sea Region. AMBIO. Volume 48, [Issue 11](https://link.springer.com/journal/13280/48/11/page/1), pp 1314–1324https://doi.org/10.1007/s13280-019-01250-6
* Sheppard, S.R.J., Shaw, A., Flanders, D., Burch, S., Wiek, A., Carmichael, J, Robinson, J., Cohen, S. (2011). Future visioning of local climate change: A framework for community engagement and planning with scenarios and visualization. *Futures* 43 (2011)

## Week 42

* Neset, T.-S., Opach, T, Lilja, A., Lion, P., Johansson, J. (2016). Map-Based Web Tools Supporting Climate Change Adaptation. The Professional Geographer 68 (1), 103-114, DOI: 10.1080/00330124.2015.1033670.
* Jacobs, K. L., & Street, R. B. (2020). The next generation of climate services. *Climate Services*, *20*, 100199. <https://doi.org/10.1016/j.cliser.2020.100199>

# Additional relevant literature

Bishop, I. D. (2011). Landscape planning is not a game: Should it be? Landscape and Urban Planning, 100: 390-392.

Bishop et al (2013). Evaluation of data visualisation options for land-use policy and decision making in response to climate change. Environment and Planning B: Planning and Design 2013, volume 40, pages 213 – 233

Gammelgaard Jensen, A, Wibeck, V, Neset, T-S. (2016). Images of climate change – a pilot study of young people’s perceptions of ICT-based climate visualization. Climatic Change, 134(1), 73-85. DOI:10.1007/s10584-015-1533-9

Harrower (2003) Tips for designing Effective Animated Maps, Cartographic perspectives, 44: 63-65: <http://cartographicperspectives.org/index.php/journal/article/download/cp44-harrower/pdf>

Hulme, M. (2010). Problems with making and governing global kinds of knowledge. Global Environmental Change Volume 20, Issue 4, October 2010, Pages 558-564

Hägerstrand, T. (1970) ‘What about people in regional science?’, Papers in Regional Science, 24(1).

Kennedy, Helen & Engebretsen, Martin (2020): “Introduction: The relationships between graphs, charts, maps and meanings, feelings, engagements”. In Engebretsen, M. & Kennedy, H. (Eds.) Data Visualization in Society. Amsterdam University Press, pp: 19-32. (0pen access) <https://library.oapen.org/bitstream/handle/20.500.12657/22273/9789048543137.pdf?sequence=1&isAllowed=y>

Kraak (2003) Geovisualization illustrated, ISPRS Journal of Photogrammetry and Remote Sensing, 57(5–6):390-399 <https://doi.org/10.1016/S0924-2716(02)00167-3>

Lewis, J L. and Sheppard, S.R.J. (2006). Culture and communication: Can landscape Visualisation improve forest management consultation with indigenous communities? Landscape and Urban Planning, 77: 291-313.

Marková, I., Linell, P., Grossen, M., and Salazar Orvig, A. (2007) Dialogue in Focus Groups: Exploring Socially Shared Knowledge. London: Equinox.

Moser, S. & Dilling, L. (2004). Making climate hot: Communicating the urgency and challenge of global climate change. Environment, 46, 32–46.

Moser SC (2010). Communicating climate change: history, challenges, process and future directions. Wiley Interdiscip Rev Clim Change 1:31–53

Multidimensional data and GIS: https://pro.arcgis.com/en/pro-app/latest/help/data/imagery/an-overview-of-multidimensional-raster-data.htm

Navarra, C., Vrotsou, K., Opach, T., Joling, A., Wilk, J., Neset, T.-S. (2021). A Progressive Development of a Visual Analysis Interface of Climate-Related VGI. Environmental Earth Sciences. 80:684. https://doi.org/10.1007/s12665-021-09948-1

Neset, T.-S., Glaas, E., Gammelgaard Ballantyne, A., Linnér, B.-O., Navarra, C., Opach, T., Johansson, J., Bohman, A., Rød, J.K., Goodsite, M.. (2016). Climate Change at your Doorstep – Geographic Visualization to support Nordic homeowners in adapting to climate change. Applied Geography 74: 65–72, DOI:10.1016/j.apgeog.2016.07.003

Nocke, T.; Sterzel, T.; Böttinger, M.; Wrobel, M. (2008). Visualization of Climate and Climate Change Data: An Overview, in Ehlers et al. (Eds.). Digital Earth Summit on Geoinformatics:Tools for Global Change Research

O’Neill, S. & Nicholson-Cole, S. (2009). ‘Fear won’t do it’: Promoting positive engagement with climate change through visual and iconic representations. Science Communication, 30, 355–379.

Reckien, D., & Eisenack, K. 2013. Climate change gaming on board and screen: A review. Simulation & Gaming, 1046878113480867.

Rose, Gillian (2016). Visual methodologies: an introduction to researching with visual materials. 4th edition London: Sage, pp. 1-23

Salter, J.D., Campbell C., Journeay, M., Sheppard, S.R.J. (2009). The digital workshop: Exploring the use of interactive and immersive visualisation tools in participatory planning. J. of Environmental Management, 90: 2090-2101.

Seebacher, D. et al. (2019) ‘Visual Analytics of Volunteered Geographic Information: Detection and Investigation of Urban Heat Islands’, IEEE Computer Graphics and Applications, 39(5), pp. 83–95. doi: 10.1109/MCG.2019.2926242.

Shaw, Alison, Stephen Sheppard, Sarah Burch, David Flanders, Arnim Wiek, Jeff Carmichael, John Robinson, and Stewart Cohen. (2009). “Making Local Futures tangible—Synthesizing, Downscaling, and Visualizing Climate Change Scenarios for Participatory Capacity Building.” Global Environmental Change 19 (4) (October): 447–463.

Sheppard, S. R. J. (2005). Landscape visualisation and climate change: the potential for influencing perceptions and behavior. Environmental Science & Policy, 8(6): 637-654.

Sheppard, S.R.J. (2012). Visualizing Climate Change: A Guide to Visual Communication of Climate Change and Developing Local Solutions. Routledge, London.

Sheppard, S.R.J (2015). Making climate change visible: A critical role for landscape professionals. Landscape and Urban Planning 142 (2015) 95–105.

Spence, R. (2014). Information Visualization: An Introduction (3rd Edition). ISBN 978-3-319-07341-5 (eBook) https://link.springer.com/book/10.1007/978-3-319-07341-5

Spence, R. (2007). Information Visualization: Design for Interaction (2nd Edition). ISBN-13: 978-0132065504.

Tufte, E.R. (1990). Envisioning Information. ISBN-13: 978-0961392116

Vrotsou, K. et al. (2014) ‘PODD: A portable diary data collection system’, in Proceedings of the Workshop on Advanced Visual Interfaces AVI. doi: 10.1145/2598153.2600046.

Ware, C. (2013). Information Visualization, Third Edition: Perception for Design (Interactive Technologies). ISBN-13: 978-0123814647

Wibeck, V. (2010) Fokusgrupper: om fokuserade gruppintervjuer som undersökningsmetod [Focus groups: on focused group interviews as a research method]. Lund, Sweden: Studentlitteratur.

Wibeck (2014) Enhancing learning, communication and public engagement about climate change – some lessons from recent literature, Environmental Education Research, 20:3, 387-411, <http://dx.doi.org/10.1080/13504622.2013.812720>

Winters, Kirsten M., Cushing, Judith B., and Lach, Denise (2016). Designing Visualization Software for Super-wicked Problems’ Information Polity, vol. 21, no. 4, pp. 399-409.

Wrobel, M.; Hinkel, J.; Hofmann, M.; Nocke, T; Vohland, K. (2009). Interactive Access to Climate Change Information. Accepted at International Symposium on Environmental Software Systems (ISESS'09), Venice, 2009.