

Full Bibliography for the WHO Report on Nature, Biodiversity and Health: An Overview of Interconnections



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Full bibliography for the WHO report on nature, biodiversity and health: an overview of interconnections

This full bibliography of evidence and strategy relating to nature, biodiversity and health was compiled during the production of the WHO overview report which is available at <https://www.euro.who.int/en/nature-biodiv-health>. It was prepared by:

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References on sections “Introduction”, “A changing world: a risk to nature and a risk to health” and “The benefits of nature for health and wellbeing”

Benton, T.G., Bieg, C., Harwatt, H., Pudasaini, R. and Wellesley, L. (2021). *Food system impacts on biodiversity loss. Three levers for food system transformation in support of nature*. Chatham House, London. https://www.chathamhouse.org/sites/default/files/2021-02/2021-02-03-food-system-biodiversity-loss-benton-et-al_0.pdf

Bergstrom, D.M., Wienecke, B.C., van den Hoff, J., Hughes, L., Lindenmayer, D.B., Ainsworth, T.D., Baker, C.M., Bland, L., Bowman, D.M.J.S., Brooks, S.T., Canadell, J.G., Constable, A.J., Dafforn, K.A., Depledge, M.H., Dickson, C.R., Duke, N.C., Helmstedt, K.J., Holz, A., Johnson, C.R., McGeoch, M.A., Melbourne-Thomas, J., Morgan, R., Nicholson, E., Prober, S.M., Raymond, B., Ritchie, E.G., Robinson, S.A., Ruthrof, K.X., Setterfield, S.A., Sgrò, C.M., Stark, J.S., Travers, T., Trebilco, R., Ward, D.F.L., Wardle, G.M., Williams, K.J., Zylstra, P.J., and Shaw, J.D. (2021). *Combating ecosystem collapse from the tropics to the Antarctic*. Global Change Biology, 27, pp 1692-1703
<https://doi.org/10.1111/gcb.15539>

Brondizio, E.S., Settele, J., Díaz, S., Ngo, H.T., editors. (2020) *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Bonn: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services Secretariat (<https://www.ipbes.net/global-assessment>).

Chapin, F.S. and Díaz, S. (2020). Interactions between changing climate and biodiversity: Shaping humanity's future. *Proceedings of the National Academy of Sciences*, 117(12), pp.6295-6296.
<https://www.pnas.org/content/117/12/6295.short>

Cohen, A. J., Brauer, M., Burnett, R., Anderson, H. R., Frostad, J., Estep, K., Balakrishnan, K., Brunekreef, L., Dandona, B., Dandona, R., Feigin, V., Freedman, G., Hubbell, B., Jobling, A., Kan, H., Knibbs, L., Liu, Y., Martin, R., Morawska, L., Pope, III, C. A., Shin, H., Straif, K., Shaddick, G., Thomas, M., van Dingenen, R., van Donkelaar, A., Vos, T., Murray, C. J. L., and Forouzanfar M. H. (2017). Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015. *The Lancet* 389(10082), pp 1907-1918. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(17\)30505-6/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)30505-6/fulltext)

Dasgupta, P. (2021). *The Economics of Biodiversity: The Dasgupta Review*. (London: HM Treasury)
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf

Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., Larigauderie, A., Adhikari, J. R., Arico, S., Baldi, A., Bartuska, A., Baste, I. A., Bilgin, A., Brondizio, E., Chan, K. M. A., Figueroa, V. E., Duraiappah, A., Fischer, M., Hill, R., Koetz, T., Leadley, P., Lyver, P., Mace, G. M., Martin-Lopez, B., Okumura, M., Pacheco, D., Pascual, U., Pérez, E. S., Reyers, B., Roth, E., Saito, O., Scholes, R. J., Sharma, N., Tallis, H., Thaman, R., Watson, R., Yahara, T., Hamid, Z. A., Akosim, C., Al-Hafedh, Y., Allahverdiyev, R., Amankwah, E., Asah, S. T., Asfaw, Z., Bartus, G., Brooks, L. A., Caillaux, J., Dalle, G., Darnaedi, D., Driver, A., Erpul, G., Escobar-Eyzaguirre, P., Failler, P., Fouada, A. M. M., Fu, B., Gundimeda, H., Hashimoto, S., Homer, F., Lavorel, S., Lichtenstein, G., Mala, W. A., Mandivenyi, W., P. Matczak, C. Mbizvo, M. Mehrdadi, J. P. Metzger, J. B. Mikissa, H. Moller, H. A. Mooney, P. Mumby, Nagendra, H., Nesshöver, C., Oteng-Yeboah, A. A., Pataki, G., Roué, M., Rubis, J., Schultz, M., Smith,

P., Sumaila, R., Takeuchi, K., Thomas, S., Verma, M., Yeo-Chang Y., and Zlatanova, D. (2015). The IPBES Conceptual Framework — connecting nature and people. *Current Opinion in Environmental Sustainability* 14: 1-16. European Commission Directorate-General, (2008). Environment and Ageing Final Report. <https://ec.europa.eu/environment/enveco/others/pdf/ageing.pdf>

IPBES. (2020). *Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services*. Daszak, P., das Neves, C., Amuasi, J., Hayman, D., Kuiken, T., Roche, B., Zambrana-Torrelío, C., Buss, P., Dundarova, H., Feferholtz, Y., Foldvari, G., Igbinosa, E., Junglen, S., Liu, Q., Suzan, G., Uhart, M., Wannous, C., Woolaston, K., Mosig Reidl, P., O'Brien, K., Pascual, U., Stoett, P., Li, H., Ngo, H. T., IPBES secretariat, Bonn, Germany
<https://www.ipbes.net/pandemics>

IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. <https://ipbes.net/global-assessment>

Kumar, P. ed. (2010). *The economics of ecosystems and biodiversity: ecological and economic foundations*. UNEP/Earthprint.

Kilpatrick, A.M., Salkeld, D.J., Titcomb, G. and Hahn, M.B. (2017). Conservation of biodiversity as a strategy for improving human health and well-being. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 372(1722), p.20160131.
<https://royalsocietypublishing.org/doi/full/10.1098/rstb.2016.0131>

Marselle, M., Stadler, J., Korn, H., Irvine, K., Bonn, A. (Eds.). (2019). *Biodiversity and Health in the Face of Climate Change*. NY: Springer ISBN 978-3-030-02318-8
<https://www.springer.com/gp/book/9783030023171>

Marselle, M. R., Hartig, T., Cox, D. T. C., de Bell, S., Knapp, S., Lindley, S., Triguero-Mas, M., Böhning-Gaese, K., Braubach, M., Cook, P. A., de Vries, S., Heintz-Buschart, A., Hofmann, M., Irvine, K. N., Kabisch, N., Kolek, F., Kraemer, R., Markevych, I., Martens, D., Müller R., Nieuwenhuijsen, M., Potts, J. M., Stadler, J., Walton, S., Warber S. L., and Bonn A. (2021). Pathways linking biodiversity to human health: A conceptual framework. *Environment International* 150, 106420.
<https://www.sciencedirect.com/science/article/pii/S0160412021000441>

McCann, P. (2012). Foreword: Demographic Change, Ageing and Societal Challenges in Europe. *European Spatial Research and Policy*, 19(1), pp.5-8.

Millennium Ecosystem Assessment. (2005) *Ecosystems and human well-being: synthesis*. Washington DC: Island Press; (<https://www.millenniumassessment.org/en/index.html>).

Neergheen-Bhujun, V., Taj Awan, A., Baran, Y., Bunnefeld, N., Chan, K., dela Cruz, T.E., Egamberdieva, D., Elsässer, S., Johnson, M-V.V., Komai, S., Konevega, A.L., Malone, J.H., Mason, P., Nguon, R., Piper, R., Shrestha, U.B., Pešić, M., Kaganovsky, A. (2017). Biodiversity, drug discovery, and the future of global health: Introducing the biodiversity to biomedicine consortium, a call to action. *J Glob Health*. 7(2), 020304. doi: 10.7189/jogh.07.020304

OECD. (2019), *Biodiversity: Finance and the Economic and Business Case for Action*, report prepared for the G7 Environment Ministers' Meeting, 5-6 May 2019.
<https://www.oecd.org/environment/resources/biodiversity/G7-report-Biodiversity-Finance-and-the-Economic-and-Business-Case-for-Action.pdf>

Patrick, R., Noy, S., Henderson-Wilson, C. (2016) Urbanisation, climate change and health equity: how can health promotion contribute? *International Journal of Health Promotion and Education*, 54:1, pp 34-49, DOI: 10.1080/14635240.2015.1057653

Prüss-Üstün, A., Wolf, J., Corvalán, C.F., Bos, R.V., Neira, M.P. (2016). *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*. WHO https://www.who.int/quantifying_ehimpacts/publications/preventing-disease/en/

Ritchie, H., and Roser, M. (2019). *Land use*. In: *Our World in Data* [website]. Oxford: Our World in Data; 2019 (<https://ourworldindata.org/land-use>).

ten Brink P., Mutafoglu K., Schweitzer J-P., Kettunen M., Twigger-Ross C., Baker J., Kuipers Y., Emonts M., Tyrväinen L., Hujala T., and Ojala A. (2016) *The Health and Social Benefits of Nature and Biodiversity Protection*. A report for the European Commission (ENV.B.3/ETU/2014/0039), Institute for European Environmental Policy, London/Brussels.

UN Environment. (2019). *Global Environment Outlook – GEO-6: Healthy Planet, Healthy People*. Nairobi. <https://www.unep.org/resources/global-environment-outlook-6>

WHO. (2020). *Manifesto on a sustainable and healthy recovery from COVID-19: Prescriptions for a healthy and green recovery from COVID-19*. <https://www.who.int/news-room/feature-stories/detail/who-manifesto-for-a-healthy-recovery-from-covid-19>

WHO-CBD. (2015). *Connecting Global Priorities: Biodiversity and Human Health: A State of Knowledge Review*. World Health Organization and Secretariat of the Convention on Biological Diversity. <https://www.cbd.int/health/SOK-biodiversity-en.pdf>

WHO. (2016). *Ambient air pollution: A global assessment of exposure and burden of disease*. WHO ISBN 9789241511353.

World urbanization prospects: the 2018 revision. New York: United Nations; 2019 (<https://population.un.org/wup/Publications/>).

Zafra-Calvo, N., Balvanera, P., Pascual, U., Merçon, J., Martín-López, B., van Noordwijk, M., Mwampamba, T.H., Lele, S., Speranza, C.I., Arias-Arévalo, P. and Cabrol, D. (2020). Plural valuation of nature for equity and sustainability: Insights from the Global South. *Global environmental change*, 63, pp.102115. <https://www.sciencedirect.com/science/article/abs/pii/S0959378020306981>

Zaidi, A., Gasior, K., Zolyomi, E., Schmidt, A., Rodrigues, R. and Marin, B. (2017). Measuring active and healthy ageing in Europe. *Journal of European Social Policy*, 27(2), pp.138-157.

References on section “Freshwater systems”

Albert, J.S., Destouni, G., Duke-Sylvester, S.M., Magurran, A.E., Oberdorff, T., Reis, R.E., Winemiller, K.O. and Ripple, W.J. (2020). Scientists’ warning to humanity on the freshwater biodiversity crisis. *Ambio*, pp.1-10. <https://link.springer.com/article/10.1007/s13280-020-01318-8>

Belletti, B., de Leaniz, C.G., Jones, J., Bazzi, S., Börger, L., Segura, G., Castelletti, A., Van de Bund, W., Aarestrup, K., Barry, J. and Belka, K., (2020). More than one million barriers fragment Europe’s rivers. *Nature*, 588(7838), pp.436-441. https://www.nature.com/articles/s41586-020-3005-2?fbclid=IwAR2j4li_tg7BG1NfL14Q8WDYNWrU-qO7ZinhJ_Xyf8bvE9f5FkgpRwXButY#Sec3

European Environment Agency (EEA). (2016). *European water policies and human health: Combining reported environmental information*. <https://www.eea.europa.eu/publications/public-health-and-environmental-protection>

European Environment Agency (EEA). (2019). *The European Environment—State and Outlook 2020: Knowledge for Transition to a Sustainable Europe*. <https://www.eea.europa.eu/publications/soer-2020>

European Environment Agency (EEA). (2021). *Why should we care about floodplains?* <https://www.eea.europa.eu/publications/why-should-we-care-about-floodplains/why-should-we-care-about-floodplains>

European Environment Agency. (2018). *EEA Signals 2018: water is life*. Luxembourg: Publications Office of the European Union, (<https://www.eea.europa.eu/publications/eea-signals-2018-water-is-life>).

Use of freshwater resources in Europe. In: European Environment Agency [website]. Copenhagen: European Environment Agency; 2020 (<https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-3/assessment-4>).

Jorda-Capdevila, D., Gampe, D., García, V.H., Ludwig, R., Sabater, S., Vergoñós, L. and Acuña, V. (2019). Impact and mitigation of global change on freshwater-related ecosystem services in Southern Europe. *Science of The Total Environment*, 651, pp.895-908.
<https://www.sciencedirect.com/science/article/pii/S0048969718336726>

Kristensen, P., Whalley, C., Zal, F.N.N. and Christiansen, T. (2018). *European waters assessment of status and pressures 2018*. EEA Report, (7/2018). <https://www.eea.europa.eu/publications/state-of-water>

Manes, F., Incerti, G., Salvatori, E., Vitale, M., Ricotta, C., Costanza, R. (2012) Urban ecosystem services: tree diversity and stability of tropospheric ozone removal. *Ecol Appl.* 22(1), pp 349–60. doi:10.1890/11-0561.1.

Maltby, E., Ormerod, S., Acreman, M., Dunbar, M., Jenkins, A., Maberly, S., Newman, J., Blackwell, M. and Ward, R. (2011). *Freshwaters: openwaters, wetlands and floodplains [chapter 9]*. In *UK National Ecosystem Assessment: understanding nature's value to society*. Technical Report: Cambridge, UK, UNEP-WCMC, p. 295-360 <http://nora.nerc.ac.uk/id/eprint/16133/>

Orgiazzi, A., Panagos, P. (2018) Soil biodiversity and soil erosion: It is time to get married. *Global Ecol Biogeogr.* 27: 1155– 1167. <https://doi.org/10.1111/geb.12782>

Panagos, P., Meusburger, K., Ballabio, C., Borrelli, P., Alewell, C. (2014). Soil erodibility in Europe: A high-resolution dataset based on LUCAS. *Science of Total Environment*, 479–480, pp 189–200.

Russi, D., ten Brink, P., Farmer, A., Badura, T., Coates, D., Förster, J., Kumar, R. and Davidson, N. (2013). *The economics of ecosystems and biodiversity for water and wetlands. IEEP, London and Brussels*, 78. https://www.ramsar.org/sites/default/files/documents/pdf/TEEB/TEEB_Water-Wetlands_Final-Consultation-Draft.pdf

Verhoeven, J.T. (2014). Wetlands in Europe: perspectives for restoration of a lost paradise. *Ecological Engineering*, 66, pp.6-9.
<https://www.sciencedirect.com/science/article/abs/pii/S0925857413001109>

Water and sanitation: data and statistics. In: WHO/Europe [website]. Copenhagen: WHO Regional Office for Europe; 2021 (<https://www.euro.who.int/en/health-topics/environment-and-health/water-and-sanitation/data-and-statistics>).

World Health Organization. (2020). *Water and Sanitation: Data and statistics*. <https://www.euro.who.int/en/health-topics/environment-and-health/water-and-sanitation/data-and-statistics>

Zhang, M., Liu, N., Harper, R., Li, Q., Liu, K., Wei, X., Ning, D., Hou, Y. and Liu, S. (2017). A global review on hydrological responses to forest change across multiple spatial scales: Importance of scale, climate, forest type and hydrological regime. *Journal of Hydrology*, 546, pp.44-59.
https://www.sciencedirect.com/science/article/pii/S0022169416308307?casa_token=JefnvMdy9wAAAAA:ITofA9tiLRJFsvRn2QIK-RffAAiMNFT-U34Sjdq5BcxjlTmq682obl38b0_qa1pl8aRKFDTydA

References on section “Air quality”

- Barwise, Y. and Kumar, P. (2020). Designing vegetation barriers for urban air pollution abatement: a practical review for appropriate plant species selection. *Npj Climate and Atmospheric Science*, 3(1), pp.1-19. <https://www.nature.com/articles/s41612-020-0115-3>
- Bealey, W.J., Loubet, B., Braban, C.F., Famulari, D., Theobald, M.R., Reis, S., Reay, D.S. and Sutton, M.A. (2014). Modelling agro-forestry scenarios for ammonia abatement in the landscape. *Environmental Research Letters*, 9(12), pp.125001. <https://iopscience.iop.org/article/10.1088/1748-9326/9/12/125001/meta>
- Clougherty, J.E. (2010). A growing role for gender analysis in air pollution epidemiology. *Environmental health perspectives*, 118(2), pp.167-176.
<https://pubmed.ncbi.nlm.nih.gov/20123621/>
- Fuhrer, J., Val Martin, M., Mills, G., Heald, C.L., Harmens, H., Hayes, F., Sharps, K., Bender, J. and Ashmore, M.R. (2016). Current and future ozone risks to global terrestrial biodiversity and ecosystem processes. *Ecology and evolution*, 6(24), pp.8785-8799.
<https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/ece3.2568>
- Haines, A., Amann, M., Borgford-Parnell, N., Leonard, S., Kuylenstierna, J. and Shindell, D. (2017). Short-lived climate pollutant mitigation and the Sustainable Development Goals. *Nature Climate Change*, 7(12), pp.863-869. <https://www.nature.com/articles/s41558-017-0012-x>
- Jones, L., Mills, G., Milne, A., Hayes, F., Monteith, D., Dwyer, J., Ozdemiroglu, E., Hall, J.R., Evans, C., Emmett, B.A. and Sutton, M.A. (2014). Assessment of the impacts of air pollution on ecosystem services—gap filling and research recommendations. *Defra Project AQ0827), Final Report*. https://uk-air.defra.gov.uk/assets/documents/reports/cat10/1511251140_AQ0827_Asessment_of_the_impacts_of_air_pollution_on_Ecosystem_Services_Final_report.pdf
- Jones, M.L.M., Provins, A., Harper-Simmonds, L., Holland, M., Mills, G., Hayes, F., Emmett, B.A., Hall, J., Sheppard, L.J., Smith, R. and Sutton, M. (2012). *Using the Ecosystems Services Approach to value air quality*. Full technical report to Defra, project NE0117. https://uk-air.defra.gov.uk/assets/documents/reports/cat10/1511251138_NE0117_Using_the_ecosystems_services_approach_to_value_air_quality.pdf
- Manes, F., Incerti, G., Salvatori, E., Vitale, M., Ricotta, C. and Costanza, R. (2012). Urban ecosystem services: tree diversity and stability of tropospheric ozone removal. *Ecological applications*, 22(1), pp.349-360. <https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/11-0561.1>
- Manosalidis, I., Stavropoulou, E., Stavropoulos, A. and Bezirtzoglou, E. (2020). Environmental and health impacts of air pollution: a review. *Frontiers in public health*, 8.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7044178/>
- Nemitz, E., Vieno, M., Carnell, E., Fitch, A., Steadman, C., Cryle, P., Holland, M., Morton, R.D., Hall, J., Mills, G. and Hayes, F. (2020). Potential and limitation of air pollution mitigation by vegetation and

uncertainties of deposition-based evaluations. *Philosophical Transactions of the Royal Society A*, 378(2183), pp.20190320. <https://royalsocietypublishing.org/doi/10.1098/rsta.2019.0320>

Nowak, D.J., Jovan, S., Branquinho, C., Augusto, S., Ribeiro, M.C. and Kretsch, C.E. (2015). Biodiversity, air quality and human health. In: *Connecting global priorities: biodiversity and human health: a state of knowledge review*. Geneva, Switzerland: World Health Organization: 63-74. <https://www.fs.usda.gov/treesearch/pubs/49691>

Prüss-Üstün, A., Wolf, J., Corvalán, C., Bos, R. and Neira, M. (2016). *Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks*. World Health Organization.

https://apps.who.int/iris/bitstream/handle/10665/204585/9789241565196_eng.pdf?sequence=1&isAllowed=y

Smith, P., Ashmore, M.R., Black, H.I., Burgess, P.J., Evans, C.D., Quine, T.A., Thomson, A.M., Hicks, K. and Orr, H.G. (2013). The role of ecosystems and their management in regulating climate, and soil, water and air quality. *Journal of Applied Ecology*, 50(4), pp.812-829.

<https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.12016>

Wang, B., Shuman, J., Shugart, H.H. and Lerdau, M.T. (2018). Biodiversity matters in feedbacks between climate change and air quality: a study using an individual-based model. *Ecological Applications*, 28(5), pp.1223-1231.

https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.1721?casa_token=LDX48aG6XGMAAAAA%3AyyGIVO5OznoMz99HZOl3gGle-da-aLaXdI3InluSxP1GnMj-lhvsizec_9ftw-AU5MsUkdKth0qCeYH8

WHO Urban Ambient Air Pollution database – update 2016: data summary. Geneva: World Health Organization; 2016 (https://www.who.int/phe/health_topics/outdoorair/databases/cities/en/).

WHO. (2016). *Ambient air pollution: A global assessment of exposure and burden of disease*. WHO ISBN 9789241511353. <https://www.who.int/publications/air-pollution-global-assessment/en/>

References on section “Coasts, seas and oceans”

Collins, J.E., Harden-Davies, H., Jaspars, M., Thiele, T., Vanagt, T. and Huys, I. (2019). Inclusive innovation: Enhancing global participation in and benefit sharing linked to the utilization of marine genetic resources from areas beyond national jurisdiction. *Marine Policy*, 109, pp.103696. <https://www.sciencedirect.com/science/article/pii/S0308597X19301393?via%3Dihub>

Depledge, M.H., Harvey, A.J., Brownlee, C., Frost, M., Moore, M.N., Fleming, L.E. (2013). Changing views of the interconnections between the Oceans and Human Health in Europe. *Microbial ecology*, 65(4), pp.852-859. <https://pubmed.ncbi.nlm.nih.gov/23325465/>

Dyshlovoy, S.A., Honecker, F. (2018). *Marine compounds and cancer: 2017 updates*. Multidisciplinary Digital Publishing Institute. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5852469/>

Golden, C., Allison, E.H., Cheung, W.W.L., Dey, M.M., Halpern, B.S., McCauley, D.J., Smith, M., Vaitla, B., Zeller, D., Myers, S.S. (2016) Fall in fish catch threatens human health. *Nature* 534, pp 317-320. <https://www.nature.com/news/nutrition-fall-in-fish-catch-threatens-human-health-1.20074>

How climate change relates to oceans. In: WWF [website]. Washington DC: World Wildlife Fund; 2021 (<https://www.worldwildlife.org/stories/how-climate-change-relates-to-oceans>).

Ibsen, D.B., Warberg, C.K., Würtz, A.M.L., Overvad, K., Dahm, C.C. (2019). Substitution of red meat with poultry or fish and risk of type 2 diabetes: a Danish cohort study. *European Journal of Nutrition* 58, pp 2705-2712. <https://link.springer.com/article/10.1007/s00394-018-1820-0>

Land use statistics. In: Eurostat [website]. Luxembourg: European Commission; 2017 (https://ec.europa.eu/eurostat/statistics-explained/index.php/Land_use_statistics).

Landrigan, P., Stegeman, J., Fleming, L., Allemand, D., Anderson, D., Backer, L., Brucker-Davis, F., Chevalier, N., Corra, L., Czerucka, D. (2020). Human Health and ocean pollution. *Annals of global health* 86, pp 151. <https://annalsofglobalhealth.org/article/10.5334/aogh.2831/>

Narayan, S., Beck, M.W., Reguero, B.G., Losada, I.J., van Wesenbeeck, B., Pontee, N., Sanchirico, J.N., Ingram, J.C., Lange, G.-M., Burks-Copes, K.A. (2016). The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defences. *PLOS ONE* 11, e0154735.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154735>

Short, R.E., Cox, D.T., Tan, Y.L., Bethel, A., Eales, J.F., Garside, R. (2020). Review of the evidence for oceans and human health relationships in Europe: A systematic map. *Environment International* 146, 106275. <https://www.sciencedirect.com/science/article/pii/S0160412020322303>

The oceans – the largest CO₂-reservoir. In: World ocean review: living with the oceans – a report on the state of the world's oceans. Hamburg: maribus; (2010) (<https://worldoceanreview.com/en/world/ocean-chemistry/co2-reservoir/>).

Wheeler, B.W., White, M., Stahl-Timmins, W., Depledge, M.H. (2012). Does living by the coast improve health and wellbeing? *Health & place* 18, pp 1198-1201.
<https://www.sciencedirect.com/science/article/abs/pii/S1353829212001220>

Yi, M.Q., Lin, S.X., Zhang, B., Jin, H.X., Ding, L.J. (2020). Antiviral potential of natural products from marine microbes. *European Journal of Medicinal Chemistry* 207, pp 11.
<https://www.sciencedirect.com/science/article/abs/pii/S0223523420307625>

Young, N., Sharpe, R.A., Barciela, R., Nichols, G., Davidson, K., Berdalet, E., Fleming, L.E. (2020). Marine harmful algal blooms and human health: A systematic scoping review. *Harmful Algae* 98, pp 8. <https://www.sciencedirect.com/science/article/pii/S1568988320301803>

References on section “Soil, agriculture, nutrition and food security”

Artmann, M. and Sartison, K. (2018). The role of urban agriculture as a nature-based solution: A review for developing a systemic assessment framework. *Sustainability*, 10(6), p.1937.
<https://www.mdpi.com/2071-1050/10/6/1937>

Asnicar, F., Berry, S.E., Valdes, A.M., Nguyen, L.H., Piccinno, G., Drew, D.A., Leeming, E., Gibson, R., Le Roy, C., Al Khatib, H. and Francis, L. (2021). Microbiome connections with host metabolism and habitual diet from 1,098 deeply phenotyped individuals. *Nature Medicine*, 27(2), pp.321-332.
<https://www.nature.com/articles/s41591-020-01183-8>

Burlingame, B., Charondiere, R. and Mouille, B. (2009). Food composition is fundamental to the cross-cutting initiative on biodiversity for food and nutrition. *Journal of food composition and analysis*, 22(5), pp.361-365.

<https://www.sciencedirect.com/science/article/abs/pii/S0889157509001525>

- Charrondière, U.R., Stadlmayr, B., Rittenschober, D., Mouille, B., Nilsson, E., Medhammar, E., Olango, T., Eisenwagen, S., Persijn, D., Ebanks, K. and Nowak, V. (2013). FAO/INFOODS food composition database for biodiversity. *Food chemistry*, 140(3), pp.408-412.
<https://pubmed.ncbi.nlm.nih.gov/23601383/>
- Cleveland, D.A., Phares, N., Nightingale, K.D., Weatherby, R.L., Radis, W., Ballard, J., Campagna, M., Kurtz, D., Livingston, K., Riechers, G. and Wilkins, K. (2017). The potential for urban household vegetable gardens to reduce greenhouse gas emissions. *Landscape and Urban Planning*, 157, pp.365-374. <https://www.sciencedirect.com/science/article/abs/pii/S0169204616301323>
- Kaufer, L., Englberger, L., Cue, R., Lorens, A., Albert, K., Pedrus, P. and Kuhnlein, H.V. (2010). Evaluation of a “traditional food for health” intervention in Pohnpei, Federated States of Micronesia. *Pac Health Dialog*, 16(1), pp.61-73. <https://pubmed.ncbi.nlm.nih.gov/20968237/>
- FAO & WHO. (2014). *Framework for action*. Report of the Joint FAO/WHO Second International Conference on Nutrition, Rome, 19–21. <http://www.fao.org/3/amm215e.pdf>
- FAO, IFAD, UNICEF, WFP, and WHO. (2019). *The State of Food Security and Nutrition in the World 2019*. Rome, FAO. <http://www.fao.org/3/ca5162en/ca5162en.pdf>
<https://www.sciencedirect.com/science/article/abs/pii/S2211912418300300>
- FAO. (2019). *The State of the World’s Biodiversity for Food and Agriculture*. J. Bélanger & D. Pilling (eds.). Rome: FAO Commission on Genetic Resources for Food and Agriculture Assessments. <http://www.fao.org/3/CA3129EN/ca3129en.pdf>
- Jánová E. (2019). Emerging and threatening vector-borne zoonoses in the world and in Europe: a brief update. *Pathog Glob Health*. 113(2), 49–57. doi:10.1080/20477724.2019.1598127.
- Malnutrition: key facts*. In: World Health Organization [website]. Geneva: World Health Organization; 2020 (<https://www.who.int/news-room/fact-sheets/detail/malnutrition>).
- El Mujtar, V., Muñoz, N., Mc Cormick, B.P., Pulleman, M. and Tittonell, P. (2019). Role and management of soil biodiversity for food security and nutrition; where do we stand?. *Global Food Security*, 20, pp.132-144.
- Niles, M.T., Emery, B.F., Wiltshire, S., Brown, M.E., Fisher, B. and Ricketts, T.H. (2021). Climate impacts associated with reduced diet diversity in children across nineteen countries. *Environmental Research Letters*, 16(1), p.015010. <https://iopscience.iop.org/article/10.1088/1748-9326/abd0ab>
- Poux, X. and Aubert, P.M. (2018). An agroecological Europe in 2050: multifunctional agriculture for healthy eating. *Findings from the Ten Years For Agroecology (TYFA) modelling exercise, Iddri-AScA, Study*, (09/18). <https://www.iddri.org/en/publications-and-events/study/agroecological-europe-2050-multifunctional-agriculture-healthy-eating>
- Ritchie, H. *What are the environmental impacts of food and agriculture?* In: Our World in Data [website]. Oxford: Our World in Data; 2019 (<https://ourworldindata.org/env-impacts-of-food>).
- Springmann, M., Mason-D'Croz, D., Robinson, S., Garnett, T., Godfray, H.C.J., Gollin, D., Rayner, M., Ballon, P. and Scarborough, P. (2016). Global and regional health effects of future food production under climate change: a modelling study. *The Lancet*, 387(10031), pp.1937-1946.
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)01156-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01156-3/fulltext)
- WHO. (2020). *Guidance on mainstreaming biodiversity for nutrition and health*. Geneva: World Health Organization. Licence: CC BY-NC-SA 3.0 IGO.
<https://www.who.int/publications/i/item/guidance-mainstreaming-biodiversity-for-nutrition-and-health>

Willett, W., Rockstrom, J., Laken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., Jonell, M., Clark, M., Gordon, L.J., Fanzon, J., Hawkes, C., Zurayk, R., Rivera, J.A., De Vries, W., Majele, L., Afshin, A., Chaudhury, A., Herrero, M., Augstina, R., Branca, F., Lartey, A., Fan, S., Crona, B., Fox, E., Bignet, V., Troel, M., Lindahl, T., Sig, S., Cornell, S.E., Sinrath Reddy, K., Narain, S., Nishtar, S., Murray, C.J.L. (2019). et al. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *Lancet.* 393, 10170. Pp. 447-492
[https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)

References on section “Infectious diseases”

- Bouzid, M., Colón-González, F.J., Lung, T., Lake, I.R., and Hunter, P.R. (2014). Climate change and the emergence of vector-borne diseases in Europe: case study of dengue fever. *BMC Public Health* 14, 781. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-14-781>
- Delgado-Baquerizo, M., Maestre, F.T., Reich, P.B., Jeffries, T.C., Gaitan, J.J., Encinar, D., Berdugo, M., Campbell, C.D., and Singh, B.K. (2016). Microbial diversity drives multifunctionality in terrestrial ecosystems. *Nat Commun.* 7, pp. 10541. DOI: 10.1038/ncomms10541
- Flandroy, L., Poutahidis, T., Berg, G., Clarke, G., Dao, M.C., Decaestecker, E., Furman, E., Haahtela, T., Massart, S., Plovier, H., Sanz, Y., and Rook, G. (2018). The impact of human activities and lifestyles on the interlinked microbiota and health of humans and of ecosystems. *Sci Total Environ.* 627, pp. 1018–38. doi:10.1016/j.scitotenv.2018.01.288
- Holding, M., Dowall, S.D., Medlock, J.M., Carter, D.P., Pullan, S.T., Lewis, J., Vipond, R., Rocchi, S., Baylis, M., and Hewson, R. (2020). Tick-Borne Encephalitis Virus, United Kingdom. *Emerg Infect Dis.* Jan; 26(1): 90–96. doi: 10.3201/eid2601.191085
- Hosseini, P.R., Mills, J.N., Prieur-Richard, A.H., Ezenwa, V.O., Bailly, X., Rizzoli, A., Suzán, G., Vittecoq, M., García-Peña, G.E., Daszak, P. and Guégan, J.F. (2017). Does the impact of biodiversity differ between emerging and endemic pathogens? The need to separate the concepts of hazard and risk. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 372(1722), pp.20160129. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5413877/>
- IPBES. (2020). *Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services*. Daszak, P., das Neves, C., Amuasi, J., Hayman, D., Kuiken, T., Roche, B., Zambrana-Torrelío, C., Buss, P., Dundarova, H., Feferholtz, Y., Foldvari, G., Igbinosa, E., Junglen, S., Liu, Q., Suzan, G., Uhart, M., Wannous, C., Woolaston, K., Mosig Reidl, P., O'Brien, K., Pascual, U., Stoett, P., Li, H., Ngo, H. T., IPBES secretariat, Bonn, Germany, <https://ipbes.net/pandemics>
- Liu, X., Chen, L., Zhou, S. (2020). The relationship between biodiversity and infectious disease: Progress, challenge and perspective. *Biodiv Sci* 28, 11, 1376-1390.DOI: 10.17520/biods.2020218
- Mysterud, A., Easterday, W.R., Stigum, V.M., Aas, A.B., Meisingset, E.L. and Viljugrein, H. (2016). Contrasting emergence of Lyme disease across ecosystems. *Nature Communications*, 7(1), pp.1-11. <https://www.nature.com/articles/ncomms11882>
- Nah, K., Bede-Fazekas, Á., Trájer, A.J., W, J. (2020). The potential impact of climate change on the transmission risk of tick-borne encephalitis in Hungary. *BMC Infect Dis* 20, pp 34. <https://doi.org/10.1186/s12879-019-4734-4>
- Newman, D.J., Cragg, G.M. (2020). Natural products as sources of new drugs over the nearly four decades from 01/1981 to 09/2019. *J Nat Prod.* 83(3), 770–803. doi:10.1021/acs.jnatprod.9b01285

Preventing the next pandemic: zoonotic diseases and how to break the chain of transmission.
Nairobi: United Nations Environment Programme; 2020
(<https://www.unep.org/resources/report/preventing-future-zoonotic-disease-outbreaks-protecting-environment-animals-and>).

Semenza, J.C., Menne, B. (2009). Climate Change and Infectious Diseases in Europe. *Lancet ID*. 9:365-75. doi: 10.1016/S1473-3099(09)70104-5.

van der Poel, W., Koops, A., Bergevoet, R., van Langevelde, F., Bron, B., Bonants, P., Siebenga, J., Hellebrekers, L., Dijkman, J., Hogeweegen, H. and Pijlman, G. (2020). *Early recognition and rapid action in zoonotic emergencies: A framework document for the proposed contribution of Wageningen University & Research to a global response for early recognition and rapid action in zoonotic emergencies*. Wageningen University & Research.

<https://library.wur.nl/WebQuery/wurpubs/580722>

Schmeller, D.S., Courchamp, F. and Killeen, G. (2020). Biodiversity loss, emerging pathogens and human health risks. *Biodivers Conserv*, 29, 3095–3102
<https://link.springer.com/article/10.1007/s10531-020-02021-6>

Zhu, C., Kobayashi, K., Loladze, I., Zhu, J., Jiang, Q., Xu, X., Liu, G., Seneweera, S., Ebi, K.L., Drewnowski, A. and Fukagawa, N.K. (2018). Carbon dioxide (CO₂) levels this century will alter the protein, micronutrients, and vitamin content of rice grains with potential health consequences for the poorest rice-dependent countries. *Science advances*, 4(5), pp. 1012.
<https://advances.sciencemag.org/content/4/5/eaaq1012>

References on section “Microbes in the environment and human body”

DeLeon-Rodriguez,N., Lathem, T.L., Rodriguez-R, L.M., Barazesh,J.M., Anderson, E.E., Beyersdorf,A.J., Ziembka, L.D., Bergin, M., Nenes, A., and Konstantinidis, K.T., (2013). Microbiome of the upper troposphere: Species composition and prevalence, effects of tropical storms, and atmospheric implications. *Proceedings of the National Academy of Sciences*, 110 (7), pp 2575-2580;
<https://doi.org/10.1073/pnas.1212089110>

Flandroy, L., Poutahidis, T., Berg, G., Clarke, G., Dao, M.C., Decaestecker, E., Furman, E., Haahtela, T., Massart, S., Plovier, H. and Sanz, Y., (2018). The impact of human activities and lifestyles on the interlinked microbiota and health of humans and of ecosystems. *Science of the total environment*, 627, pp.1018-1038. <https://doi.org/10.1016/j.scitotenv.2018.01.288>

Flies, E.J., Skelly, C., Lovell, R., Breed, M.F., Phillips, D. and Weinstein, P., (2018). Cities, biodiversity and health: we need healthy urban microbiome initiatives. *Cities & Health*, 2(2), pp.143-150.
<https://doi.org/10.1080/23748834.2018.1546641>

Fouladi, F., Bailey, M.J., Patterson, W.B., Sioda, M., Blakley, I.C., Fodor, A.A., Jones, R.B., Chen, Z., Kim, J.S., Lurmann, F. and Martino, C., (2020). Air pollution exposure is associated with the gut microbiome as revealed by shotgun metagenomic sequencing. *Environment international*, 138, p.105604. <https://www.sciencedirect.com/science/article/pii/S0160412019345726>

Hanski, I., von Hertzen, L., Fyhrquist, N., Koskinen, K., Torppa, K., Laatikainen, T., Karisola, P., Auvinen, P., Paulin, L., Mäkelä, M.J. and Vartiainen, E. (2012). Environmental biodiversity, human

microbiota, and allergy are interrelated. *Proceedings of the National Academy of Sciences*, 109(21), pp.8334-8339. <https://doi.org/10.1073/pnas.1205624109>

Hoisington, A.J., Brenner, L.A., Kinney, K.A., Postolache, T.T. and Lowry, C.A., (2015). The microbiome of the built environment and mental health. *Microbiome*, 3(1), pp.1-12. <https://microbiomejournal.biomedcentral.com/articles/10.1186/s40168-015-0127-0>

Kassam, Z., Lee, C.H., Yuan, Y. and Hunt, R.H. (2013). Fecal Microbiota Transplantation for Clostridium difficileInfection: Systematic Review and Meta-Analysis. *American Journal of Gastroenterology*, 108(4), pp.500-508. <https://pubmed.ncbi.nlm.nih.gov/23511459/>

Mills, J.G., Weinstein, P., Gellie, N.J., Weyrich, L.S., Lowe, A.J. and Breed, M.F. (2017). Urban habitat restoration provides a human health benefit through microbiome rewilding: the Microbiome Rewilding Hypothesis. *Restoration ecology*, 25(6), pp.866-872. <https://onlinelibrary.wiley.com/doi/10.1111/rec.12610>

Pearson, A.L., Pechal, J., Lin, Z., Benbow, M.E., Schmidt, C. and Mavoa, S. (2020). Associations detected between measures of neighborhood environmental conditions and human microbiome diversity. *Science of The Total Environment*, 745, p.141029. <https://doi.org/10.1016/j.scitotenv.2020.141029>

Rook, G.A. (2013). Regulation of the immune system by biodiversity from the natural environment: an ecosystem service essential to health. *Proceedings of the National Academy of Sciences*, 110(46), pp.18360-18367. <https://doi.org/10.1073/pnas.1313731110>

Zhou, Z., Wang, C. and Luo, Y. (2020). Meta-analysis of the impacts of global change factors on soil microbial diversity and functionality. *Nature communications*, 11(1), pp.1-10. <https://www.nature.com/articles/s41467-020-16881-7>

References on section “Medicine and health care”

Howes, M.J.R., Quave, C.L., Collemare, J., Tatsis, E.C., Twilley, D., Lulekal, E., Farlow, A., Li, L., Cazar, M.E., Leaman, D.J. and Prescott, T.A. (2020). Molecules from nature: Reconciling biodiversity conservation and global healthcare imperatives for sustainable use of medicinal plants and fungi. *Plants, People, Planet*, 2(5), pp.463-481.

<https://nph.onlinelibrary.wiley.com/doi/full/10.1002/ppp3.10138>

Khalifa, S.A., Elias, N., Farag, M.A., Chen, L., Saeed, A., Hegazy, M.E.F., Moustafa, M.S., El-Wahed, A., Al-Mousawi, S.M., Musharraf, S.G. and Chang, F.R. (2019). Marine natural products: A source of novel anticancer drugs. *Marine drugs*, 17(9), p.491. <https://pubmed.ncbi.nlm.nih.gov/31443597/>

Neergheen-Bhujun, V., Awan, A.T., Baran, Y., Bunnefeld, N., Chan, K., Dela Cruz, T.E., Egamberdieva, D., Elsässer, S., Johnson, M.V.V., Komai, S. and Konevega, A.L. (2017). Biodiversity, drug discovery, and the future of global health: Introducing the biodiversity to biomedicine consortium, a call to action. *Journal of global health*, 7(2). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5735771/>

Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity. Montreal: Secretariat of the Convention on Biological Diversity; 2011 (<https://www.cbd.int/abs/>).

Newman, D.J. and Cragg, G.M. (2020). Natural products as sources of new drugs over the nearly four decades from 01/1981 to 09/2019. *Journal of natural products*, 83(3), pp.770-803.
<https://pubs.acs.org/doi/10.1021/acs.jnatprod.9b01285>

Newman, D.J. (2019). The impact of decreasing biodiversity on novel drug discovery: is there a serious cause for concern?. *Expert opinion on drug discovery*, 14(6), pp.521-525.
<https://www.tandfonline.com/doi/abs/10.1080/17460441.2019.1593370>

Riccio, G., Ruocco, N., Mutualipassi, M., Costantini, M., Zupo, V., Coppola, D., de Pascale, D. and Lauritano, C. (2020). Ten-Year Research Update Review: Antiviral Activities from Marine Organisms. *Biomolecules*, 10(7), p.1007.<https://doi.org/10.3390/biom10071007>

Shahzad, F., Anderson, D. and Najafzadeh, M. (2020). The Antiviral, Anti-Inflammatory Effects of Natural Medicinal Herbs and Mushrooms and SARS-CoV-2 Infection. *Nutrients*, 12(9), p.2573.
<https://pubmed.ncbi.nlm.nih.gov/32854262/>

ten Brink, P., Mutafoglu, K., Schweitzer, J.-P., Kettunen, M., Twigger-Ross, C., Baker, J., Kuipers, Y., Emonts, M., Tyrväinen, L., Hujala, T. and Ojala, A. (2016). *The Health and Social Benefits of Nature and Biodiversity Protection*. European Commission DG Environment (ENV.B.3/ETU/2014/0039).b
<https://ec.europa.eu/environment/nature/biodiversity/intro/docs/Health%20and%20Social%20Benefits%20of%20Nature%20-%20Final%20Report%20Main%20sent.pdf>

World Health Organization. (2013). *WHO traditional medicine strategy: 2014-2023*. World Health Organization. https://www.who.int/medicines/publications/traditional/trm_strategy14_23/en/

Wright, G. (2019). Unlocking the potential of natural products in drug discovery. *Microbial Biotechnology*, 12, 55– 57. <https://doi.org/10.1111/1751-7915.13351>

References on section “Access to nature”

Arendt, F., Matthes, J. (2016). Nature Documentaries, Connectedness to Nature, and Pro-environmental Behavior. *Environmental Communication*, 10(4), 453–472.
<https://doi.org/10.1080/17524032.2014.993415>

Burkart, K., Meier, F., Schneider, A., Breitner, S., Canário, P., Alcoforado, M. J., Scherer, D., & Endlicher, W. (2015). Modification of Heat-Related Mortality in an Elderly Urban Population by Vegetation (Urban Green) and Proximity to Water (Urban Blue): Evidence from Lisbon, Portugal. *Environmental Health Perspectives*, 124(7). <https://doi.org/10.1289/ehp.1409529>

Clements, H., Valentin, S., Jenkins, N., Rankin, J., Baker, J. S., Gee, N., Snellgrove, D., & Sloman, K. (2019). The effects of interacting with fish in aquariums on human health and well-being: A systematic review. *PLOS ONE*, 14(7), e0220524. <https://doi.org/10.1371/journal.pone.0220524>

Cox, D. T. C., and Gaston, K. J. (2015). Likeability of Garden Birds: Importance of Species Knowledge & Richness in Connecting People to Nature. *PLOS ONE*, 10(11), e0141505.
<https://doi.org/10.1371/journal.pone.0141505>

Cracknell, D. L., Pahl, S., White, M. P., and Depledge, M. H. (2018). Reviewing the role of aquaria as restorative settings: How subaquatic diversity in public aquaria can influence preferences, and human health and well-being. *Human Dimensions of Wildlife*, 23(5), pp 446–460.
<https://doi.org/10.1080/10871209.2018.1449039>

Cracknell, D. L., White, M. P., Pahl, S., Nichols, W. J., and Depledge, M. H. (2016). Marine biota and psychological well-being: A preliminary examination of dose-response effects in an aquarium

setting. *Environment and Behavior*, 48(10), pp 1242–1269.

<https://doi.org/10.1177/0013916515597512>

de Vries, S., ten Have, M., van Dorsselaer, S., van Wezep, M., Hermans, T., & de Graaf, R. (2016). Local availability of green and blue space and prevalence of common mental disorders in the Netherlands. *British Journal of Psychiatry Open*, 2(6), pp 366–372.
<https://doi.org/10.1192/bjpo.bp.115.002469>

Gidlow, C. J., Smith, G., Martinez, D., Wilson, R., Trinder, P., Gražulevičienė, R., and Nieuwenhuijsen, M. J. (2016). Research note: Natural environments and prescribing in England. *Landscape and Urban Planning*, 151, pp 103–108. <https://doi.org/10.1016/j.landurbplan.2016.02.002>

Helbich, M., de Beurs, D., Kwan, M.-P., O'Connor, R. C., & Groenewegen, P. P. (2018). Natural environments and suicide mortality in the Netherlands: A cross-sectional, ecological study. *The Lancet Planetary Health*, 2(3), pp 134–139.

<https://www.sciencedirect.com/science/article/pii/S2542519618300330>

Marselle MR, Bowler DE, Watzema J, Eichenberg D, Kirsten T, Bonn A. Urban street tree biodiversity and antidepressant prescriptions. *Sci Rep*. 2020;10(1),22445. doi:10.1038/s41598-020-79924-5.

Martin, L., White, M. P., Hunt, A., Richardson, M., Pahl, S., and Burt, J. (2020). Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours. *Journal of Environmental Psychology*, 68, pp 101389. <https://doi.org/10.1016/j.jenvp.2020.101389>

Impacts of green and blue space on mental health. In: Eklipse [website]. Leipzig: Eklipse; 2021 (<https://eklipse.eu/request-health/>).

Pouso, S., Borja, A., Fleming, L.E., Gómez-Baggethun, E., White, M.P., and Uyarra, M.C. (2021). Contact with blue-green spaces during the COVID-19 pandemic lockdown beneficial for mental health. *Sci Total Environ*. 756,143984. doi:10.1016/j.scitotenv.2020.143984.

Rojas-Rueda, D., Nieuwenhuijsen, M. J., Gascon, M., Perez-Leon, D., and Mudu, P. (2019). Green spaces and mortality: A systematic review and meta-analysis of cohort studies. *The Lancet Planetary Health*, 3(11), e469–e477. [https://doi.org/10.1016/S2542-5196\(19\)30215-3](https://doi.org/10.1016/S2542-5196(19)30215-3)

Rugel, E. J., and Brauer, M. (2020). Quiet, clean, green, and active: A Navigation Guide systematic review of the impacts of spatially correlated urban exposures on a range of physical health outcomes. *Environmental Research*, 185, 109388. <https://doi.org/10.1016/j.envres.2020.109388>

Sulander, T., Karvinen, E., and Holopainen, M. (2016). Urban Green Space Visits and Mortality Among Older Adults. *Epidemiology*, 27(5), e34–e35.

<https://doi.org/10.1097/EDE.0000000000000511>

Taylor, M. S., Wheeler, B. W., White, M. P., Economou, T., & Osborne, N. J. (2015). Research note: Urban street tree density and antidepressant prescription rates—A cross-sectional study in London, UK. *Landscape and Urban Planning*, 136, pp 174–179.

<https://doi.org/10.1016/j.landurbplan.2014.12.005>

Tester-Jones, M., White, M. P., Elliott, L. R., Weinstein, N., Grellier, J., Economou, T., Bratman, G. N., Cleary, A., Gascon, M., Korpela, K. M., Nieuwenhuijsen, M., O'Connor, A., Ojala, A., van den Bosch, M., and Fleming, L. E. (2020). Results from an 18 country cross-sectional study examining experiences of nature for people with common mental health disorders. *Scientific Reports*, 10(1), 19408. <https://doi.org/10.1038/s41598-020-75825-9>

Twohig-Bennett, C., and Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research*, 166, pp 628–637. <https://doi.org/10.1016/j.envres.2018.06.030>

Urban green spaces and health – a review of evidence. Copenhagen: WHO Regional Office for Europe; 2016 (<https://www.euro.who.int/en/health-topics/environment-and-health/urban-health/publications/2016/urban-green-spaces-and-health-a-review-of-evidence-2016>).

White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., Hartig, T., Warber, S. L., Bone, A., Depledge, M. H., and Fleming, L. E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific Reports*, 9(1), pp 7730. <https://doi.org/10.1038/s41598-019-44097-3>

White, M. P., Elliott, L. R., Gascon, M., Roberts, B., and Fleming, L. E. (2020). Blue space, health and well-being: A narrative overview and synthesis of potential benefits. *Environmental Research*, 191, pp 110169. <https://doi.org/10.1016/j.envres.2020.110169>

White, M. P., Pahl, S., Wheeler, B. W., Depledge, M. H., and Fleming, L. E. (2017). Natural environments and subjective wellbeing: Different types of exposure are associated with different aspects of wellbeing. *Health & Place*, 45, pp 77–84.
<https://doi.org/10.1016/j.healthplace.2017.03.008>

White, M. P., Weeks, A., Hooper, T., Bleakley, L., Cracknell, D., Lovell, R., and Jefferson, R. L. (2017). Marine wildlife as an important component of coastal visits: The role of perceived biodiversity and species behaviour. *Marine Policy*, 78, pp 80–89. <https://doi.org/10.1016/j.marpol.2017.01.005>

Yeo, N. L., White, M. P., Alcock, I., Garside, R., Dean, S. G., Smalley, A. J., and Gatersleben, B. (2020). What is the best way of delivering virtual nature for improving mood? An experimental comparison of high definition TV, 360° video, and computer generated virtual reality. *Journal of Environmental Psychology*, 72, pp 101500. <https://doi.org/10.1016/j.jenvp.2020.101500>

References on section “The economic value of nature and biodiversity”

Brandon, C., Brandon, K., Fairbrass, A. and Neugarten, R. (2021). Integrating natural capital into national accounts: Three decades of promise and challenge. *Review of Environmental Economics and Policy*, 15(1), pp.134-153. <https://www.journals.uchicago.edu/doi/abs/10.1086/713075>

Dasgupta, P. (2020). *The economics of biodiversity: the Dasgupta Review*. London: HM Treasury (<https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>).

Guerry, A.D., Polasky, S., Lubchenco, J., Chaplin-Kramer, R., Daily, G.C., Griffin, R., Ruckelshaus, M., Bateman, I.J., Duraiappah, A., Elmquist, T. and Feldman, M.W. (2015). Natural capital and ecosystem services informing decisions: From promise to practice. *Proceedings of the National Academy of Sciences*, 112(24), pp.7348-7355. <https://www.pnas.org/content/112/24/7348.short>

Helm, D. (2019). Natural capital: assets, systems, and policies. *Oxford Review of Economic Policy*, 35(1), pp.1-13. <https://academic.oup.com/oxrep/article-abstract/35/1/1/5268055>

Jones, L., Vieno, M., Fitch, A., Carnell, E., Steadman, C., Cryle, P., Holland, M., Nemitz, E., Morton, D., Hall, J. and Mills, G. (2019). Urban natural capital accounts: developing a novel approach to quantify air pollution removal by vegetation. *Journal of Environmental Economics and Policy*, 8(4), pp.413-428. <https://www.tandfonline.com/doi/full/10.1080/21606544.2019.1597772>

Kumar, P. ed. (2010). *The economics of ecosystems and biodiversity: ecological and economic foundations*. UNEP/Earthprint.

Mace, G.M. (2019). The ecology of natural capital accounting. *Oxford Review of Economic Policy*, 35(1), pp.54-67. <https://academic.oup.com/oxrep/article-abstract/35/1/54/5267893>

Ruijs, A., Vardon, M., Bass, S. and Ahlroth, S. (2019). Natural capital accounting for better policy. *Ambio*, 48(7), pp.714-725. <https://link.springer.com/article/10.1007/s13280-018-1107-y>

Russi, D., ten Brink, P., Farmer, A., Badura, T., Coates, D., Förster, J., Kumar, R. and Davidson, N., (2013). *The economics of ecosystems and biodiversity for water and wetlands*. IEEP, London and Brussels, 78. https://www.ramsar.org/sites/default/files/documents/pdf/TEEB/TEEB_Water-Wetlands_Final-Consultation-Draft.pdf

Vaissière, A.C., Levrel, H. and Scemama, P. (2017). Biodiversity offsetting: Clearing up misunderstandings between conservation and economics to take further action. *Biological conservation*, 206, pp.258-262.

<https://www.sciencedirect.com/science/article/abs/pii/S0006320716309351>

References on section “Conclusions”

Dasgupta, P. (2020). *The economics of biodiversity: the Dasgupta Review*. London: HM Treasury (<https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>).

IPBES. (2019). *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. E. S. Brondizio, J. Settele, S. Diaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. <https://ipbes.net/global-assessment>

Mapping multilateral environmental agreements to the Aichi Biodiversity Targets. Cambridge: United Nations Environment Programme World Conservation Monitoring Centre; 2015 (<https://www.unep.org/resources/report/mapping-multilateral-environmental-agreements-aichi-biodiversity-targets>).

OECD. (2019). *Biodiversity: Finance and the Economic and Business Case for Action*, report prepared for the G7 Environment Ministers' Meeting, 5-6 May 2019. <https://www.oecd.org/environment/resources/biodiversity/G7-report-Biodiversity-Finance-and-the-Economic-and-Business-Case-for-Action.pdf>

ten Brink P., Mutafoglu K., Schweitzer J-P., Kettunen M., Twigger-Ross C., Baker J., Kuipers Y., Emonts M., Tyrväinen L., Hujala T., and Ojala A. (2016) .*The Health and Social Benefits of Nature and Biodiversity Protection*. A report for the European Commission (ENV.B.3/ETU/2014/0039), Institute for European Environmental Policy, London/Brussels.

WHO, Food and Agriculture Organization of the United Nations, World Organization for Animal Health. (2019). *Taking a multisectoral, one health approach: a tripartite guide to addressing zoonotic diseases in countries*. Geneva: World Health Organization (<https://apps.who.int/iris/handle/10665/325620>).

WHO. (2020). *Manifesto on a sustainable and healthy recovery from COVID-19: Prescriptions for a healthy and green recovery from COVID-19*. <https://www.who.int/news-room/feature-stories/detail/who-manifesto-for-a-healthy-recovery-from-covid-19>

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