

Lazurko, A. Moore, M.L., Haider, L.J., West, S. McCarthy, D.P.P. Reflexivity as a transformative capacity for sustainability science: Introducing a critical systems approach. *Global Sustainability*.

## Supplementary Material 1 - List of literature for rapid scoping review

The following list includes all literature selected for the rapid scoping review. The literature is listed in alphabetical order.

- Barnaud, C., & van Paassen, A. (2013). Equity, power games, and legitimacy: Dilemmas of participatory natural resource management. *Ecology and Society*, 18(2).  
<https://doi.org/10.5751/ES-05459-180221>
- Baumber, A. (2022). Transforming sustainability education through transdisciplinary practice. *Environment, Development and Sustainability*, 24(6), 7622–7639.  
<https://doi.org/10.1007/s10668-021-01731-3>
- Baumber, A., Kligyte, G., van der Bijl-Brouwer, M., & Pratt, S. (2020). Learning together: a transdisciplinary approach to student–staff partnerships in higher education. *Higher Education Research and Development*, 39(3), 395–410. <https://doi.org/10.1080/07294360.2019.1684454>
- Belcher, B. M., Rasmussen, K. E., Kemshaw, M. R., & Zornes, D. A. (2016). *Defining and assessing research quality in a transdisciplinary context*. 25(November 2015), 1–17.  
<https://doi.org/10.1093/reseval/rvv025>
- Berger-González, M., Stauffacher, M., Zinsstag, J., Edwards, P., & Krütli, P. (2016). Transdisciplinary Research on Cancer-Healing Systems between Biomedicine and the Maya of Guatemala: A Tool for Reciprocal Reflexivity in a Multi-Epistemological Setting. *Qualitative Health Research*, 26(1), 77–91. <https://doi.org/10.1177/1049732315617478>
- Bergmann, M., Schäpke, N., Marg, O., Stelzer, F., Lang, D. J., Bossert, M., Gantert, M., Häußler, E., Marquardt, E., Piontek, F. M., Potthast, T., Rhodius, R., Rudolph, M., Ruddat, M., Seebacher, A., & Sußmann, N. (2021). Transdisciplinary sustainability research in real-world labs: success factors and methods for change. *Sustainability Science*, 16(2), 541–564.  
<https://doi.org/10.1007/s11625-020-00886-8>
- Bernert, P., Wanner, M., Fischer, N., & Barth, M. (2022). Design principles for advancing higher education sustainability learning through transformative research. *Environment, Development and Sustainability*, 0123456789. <https://doi.org/10.1007/s10668-022-02801-w>
- Bornemann, B., & Christen, M. (2020). Navigating between Complexity and Control in Transdisciplinary Problem Framing: Meaning Making as an Approach to Reflexive Integration. *Social Epistemology*, 34(4), 357–369. <https://doi.org/10.1080/02691728.2019.1706120>
- Cockburn, J. (2022). Knowledge integration in transdisciplinary sustainability science: Tools from applied critical realism. *Sustainable Development*, 30(2), 358–374.  
<https://doi.org/https://doi.org/10.1002/sd.2279>
- Cornell, S., Berkhout, F., Tuinstra, W., Tàbara, J. D., Jäger, J., Chabay, I., de Wit, B., Langlais, R., Mills, D., Moll, P., Otto, I. M., Petersen, A., Pohl, C., & van Kerkhoff, L. (2013). Opening up knowledge systems for better responses to global environmental change. *Environmental Science and Policy*, 28, 60–70. <https://doi.org/10.1016/j.envsci.2012.11.008>
- de Geus, T., Avelino, F., Strumińska-Kutra, M., Pitzer, M., Wittmayer, J. M., Hendrikx, L., Joshi, V., Schrandt, N., Widdel, L., Fraaije, M., Iskandarova, M., Hielscher, S., & Rogge, K. (2023). Making sense of power through transdisciplinary sustainability research: insights from a Transformative Power Lab. *Sustainability Science*, 18(3), 1311–1327.  
<https://doi.org/10.1007/s11625-023-01294-4>
- Ely, A., Marin, A., Charli-Joseph, L., Abrol, dinesh, Apgar, M., Atela, J., Ayre, B., Byrne, R., Choudhary, B. K., Chengo, V., Cremaschi, A., Davis, R., Desai, P., Eakin, H., Kushwaha, P., Marshall, F., Mbeva, K., Ndege, N., Ochieng, C., ... Yang, L. (2020). Structured collaboration

Lazurko, A. Moore, M.L., Haider, L.J., West, S. McCarthy, D.P.P. Reflexivity as a transformative capacity for sustainability science: Introducing a critical systems approach. *Global Sustainability*.

across a transformative knowledge network-learning across disciplines, cultures and contexts? *Sustainability (Switzerland)*, 12(6). <https://doi.org/10.3390/su12062499>

Fazey, I., Schöpke, N., Caniglia, G., Patterson, J., Hultman, J., Mierlo, B. van, Säwe, F., Wiek, A., Wittmayer, J., Aldunce, P., Al, H., Battacharya, N., Bradbury, H., Carmen, E., Colvin, J., Cvitanovic, C., Souza, M. D., Gopel, M., Goldstein, B., ... N, C. W. (2018). Energy Research & Social Science Ten essentials for action-oriented and second order energy transitions , transformations and climate change research. *Energy Research & Social Science*, 40(December 2017), 54–70. <https://doi.org/10.1016/j.erss.2017.11.026>

Fortuin, K. P. J. (Karen), & van Koppen, C. S. A. (Kris). (2016). Teaching and learning reflexive skills in inter- and transdisciplinary research: A framework and its application in environmental science education. *Environmental Education Research*, 22(5), 697–716. <https://doi.org/10.1080/13504622.2015.1054264>

Goven, J., Langer, E. R. L., Baker, V., Ataria, J., & Leckie, A. (2015). A transdisciplinary approach to local waste management in New Zealand: Addressing interrelated challenges through indigenous partnership. *Futures*, 73, 22–36. <https://doi.org/10.1016/j.futures.2015.07.011>

Hakkarainen, V., Mäkinen-Rostedt, K., Horcea-Milcu, A., D’Amato, D., Jämsä, J., & Soini, K. (2022). Transdisciplinary research in natural resources management: Towards an integrative and transformative use of co-concepts. *Sustainable Development*, 30(2), 309–325. <https://doi.org/10.1002/sd.2276>

Herrero, P., Dedeurwaerdere, T., & Osinski, A. (2019). Design features for social learning in transformative transdisciplinary research. *Sustainability Science*, 14(3), 751–769. <https://doi.org/10.1007/s11625-018-0641-7>

Holland, R. (1999). *Reflexivity*. 52(4).

Horcea-Milcu, A.-I., Abson, D. J., Apetrei, C. I., Duse, I. A., Freeth, R., Riechers, M., Lam, D. P. M., Dorninger, C., & Lang, D. J. (2019). Values in transformational sustainability science: four perspectives for change. *Sustainability Science*, 14(5), 1425–1437. <https://doi.org/10.1007/s11625-019-00656-1>

Hubeau, M., Marchand, F., Coteur, I., Debruyne, L., & van Huylenbroeck, G. (2018). A reflexive assessment of a regional initiative in the agri-food system to test whether and how it meets the premises of transdisciplinary research. *Sustainability Science*, 13(4), 1137–1154. <https://doi.org/10.1007/s11625-017-0514-5E>

Huning, S., Räuchle, C., & Fuchs, M. (2021). Designing real-world laboratories for sustainable urban transformation: addressing ambiguous roles and expectations in transdisciplinary teams. *Sustainability Science*, 16(5), 1595–1607. <https://doi.org/10.1007/s11625-021-00985-0>

Jacobi, J., Llanque, A., Mukhovi, S. M., Birachi, E., von Groote, P., Eschen, R., Hilber-Schöb, I., Kiba, D. I., Frossard, E., & Robledo-Abad, C. (2022). Transdisciplinary co-creation increases the utilization of knowledge from sustainable development research. *Environmental Science and Policy*, 129(December 2021), 107–115. <https://doi.org/10.1016/j.envsci.2021.12.017>

Jahn, T., Bergmann, M., & Keil, F. (2012). Transdisciplinarity: Between mainstreaming and marginalization. *Ecological Economics*, 79, 1–10. <https://doi.org/10.1016/j.ecolecon.2012.04.017>

Kläy, A., Zimmermann, A. B., & Schneider, F. (2015). Rethinking science for sustainable development: Reflexive interaction for a paradigm transformation. *Futures*, 65, 72–85. <https://doi.org/10.1016/j.futures.2014.10.012>

Lazurko, A. Moore, M.L., Haider, L.J., West, S. McCarthy, D.P.P. Reflexivity as a transformative capacity for sustainability science: Introducing a critical systems approach. *Global Sustainability*.

Knaggård, Å., Ness, B., & Harnesk, D. (2018). Finding an academic space: Reflexivity among sustainability researchers. *Ecology and Society*, 23(4). <https://doi.org/10.5751/ES-10505-230420>

Knickel, M., Knickel, K., Galli, F., Maye, D., & Wiskerke, J. S. C. (2019). Towards a reflexive framework for fostering co-learning and improvement of transdisciplinary collaboration. *Sustainability (Switzerland)*, 11(23), 6–8. <https://doi.org/10.3390/su11236602>

Kok, K. P. W., Gjefsen, M. D., Regeer, B. J., & Broerse, J. E. W. (2021). Unraveling the politics of ‘doing inclusion’ in transdisciplinarity for sustainable transformation. *Sustainability Science*, 16(6), 1811–1826. <https://doi.org/10.1007/s11625-021-01033-7>

Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability Transitions Research: Transforming Science and Practice for Societal Change. In *Annual Review of Environment and Resources* (Vol. 42, pp. 599–626). <https://doi.org/10.1146/annurev-environ-102014-021340>

Marshall, F., Dolley, J., & Priya, R. (2018). Transdisciplinary research as transformative space making for sustainability: Enhancing pro-poor transformative agency in Periurban contexts. *Ecology and Society*, 23(3). <https://doi.org/10.5751/ES-10249-230308>

Mascarenhas, A., Langemeyer, J., Haase, D., Borgström, S., & Andersson, E. (2021). Assessing the learning process in transdisciplinary research through a novel analytical approach. *Ecology and Society*, 26(4). <https://doi.org/10.5751/ES-12631-260419>

Mitchell, C., Cordell, D., & Fam, D. (2015). Beginning at the end: The outcome spaces framework to guide purposive transdisciplinary research. *Futures*, 65, 86–96. <https://doi.org/10.1016/j.futures.2014.10.007>

Nastar, M. (2023). A Critical Realist Approach to Reflexivity in Sustainability Research. *Sustainability (Switzerland)*, 15(3). <https://doi.org/10.3390/su15032685>

O’Brien, K. (2012). Global environmental change II: From adaptation to deliberate transformation. *Progress in Human Geography*, 36(5), 667–676. <https://doi.org/10.1177/0309132511425767>

Pearce, B. B. J., & Ejderyan, O. (2020). Joint problem framing as reflexive practice: honing a transdisciplinary skill. *Sustainability Science*, 15(3), 683–698. <https://doi.org/10.1007/s11625-019-00744-2>

Pereira, L. M., Karpouzoglou, T., Frantzeskaki, N., & Olsson, P. (2018). Designing transformative spaces for sustainability in social-ecological. *Ecology and Society*, 23(4), 32.

Polk, M. (2015). Transdisciplinary co-production: Designing and testing a transdisciplinary research framework for societal problem solving. *Futures*, 65, 110–122. <https://doi.org/10.1016/j.futures.2014.11.001>

Popa, F., Guillermin, M., & Dedeurwaerdere, T. (2015). A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. *Futures*, 65, 45–56. <https://doi.org/10.1016/j.futures.2014.02.002>

Robinson, J. (2008). Being undisciplined : Transgressions and intersections in academia and beyond. *Futures*, 40, 70–86. <https://doi.org/10.1016/j.futures.2007.06.007>

Schäpke, N., Stelzer, F., Caniglia, G., Bergmann, M., Wanner, M., Singer-Brodowski, M., Loorbach, D., Olsson, P., Baedeker, C., & Lang, D. J. (2018). Jointly Experimenting for Transformation? *Gaia*, 27(S1), 85–96. [http://bradford.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwpV07T8MwED7xkBAS413xKCgrQ1Injh17QIXVCoEYgOyV6zgoErRAY8C\\_5y51WujAwhpnsO7i-z7f5bsD4EnEwpWYgDglmeW6VAVXiODSOkqhKaMzXehaBH\\_3qB66Mq9F\\_d1GGuPd3UTJOnQXE0tZ8w6CIYpThB99\\_fYe0hwpqrf6oRrrsEkDtOio3rNeE5](http://bradford.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwpV07T8MwED7xkBAS413xKCgrQ1Injh17QIXVCoEYgOyV6zgoErRAY8C_5y51WujAwhpnsO7i-z7f5bsD4EnEwpWYgDglmeW6VAVXiODSOkqhKaMzXehaBH_3qB66Mq9F_d1GGuPd3UTJOnQXE0tZ8w6CIYpThB99_fYe0hwpqrf6oRrrsEkDtOio3rNeE5)

- Lazurko, A. Moore, M.L., Haider, L.J., West, S. McCarthy, D.P.P. Reflexivity as a transformative capacity for sustainability science: Introducing a critical systems approach. *Global Sustainability*.
- Schmidt, L., Falk, T., Siegmund-Schultze, M., & Spangenberg, J. H. (2020). The Objectives of Stakeholder Involvement in Transdisciplinary Research. A Conceptual Framework for a Reflective and Reflexive Practise. *Ecological Economics*, 176(May), 106751. <https://doi.org/10.1016/j.ecolecon.2020.106751>
- Schneider, F., Giger, M., Harari, N., Moser, S., Oberlack, C., Providoli, I., Schmid, L., Tribaldos, T., & Zimmermann, A. (2019). Transdisciplinary co-production of knowledge and sustainability transformations: Three generic mechanisms of impact generation. *Environmental Science and Policy*, 102(July), 26–35. <https://doi.org/10.1016/j.envsci.2019.08.017>
- Scholz, R. W. (2017). The normative dimension in Transdisciplinarity, Transition Management, and Transformation Sciences: New roles of science and universities in sustainable transitioning. In *Sustainability (Switzerland)* (Vol. 9, Issue 6). <https://doi.org/10.3390/su9060991>
- Sellberg, M. M., Cockburn, J., Holden, P. B., & Lam, D. P. M. (2021). Towards a caring transdisciplinary research practice: navigating science, society and self. *Ecosystems and People*, 17(1), 292–305. <https://doi.org/10.1080/26395916.2021.1931452>
- Shackleton, S., Taylor, A., Gammage, L., Gillson, L., Sitas, N., Methner, N., Barmand, S., Thorn, J., McClure, A., Cobban, L., Jarre, A., & Odume, O. N. (2023). Fostering transdisciplinary research for equitable and sustainable development pathways across Africa: what changes are needed? *Ecosystems and People*, 19(1). <https://doi.org/10.1080/26395916.2022.2164798>
- Singer-Brodowski, M. (2023). The potential of transformative learning for sustainability transitions: moving beyond formal learning environments. *Environment, Development and Sustainability*, 0123456789. <https://doi.org/10.1007/s10668-022-02444-x>
- Spangenberg, J. H. (2011). Sustainability science: A review, an analysis and some empirical lessons. *Environmental Conservation*, 38(3), 275–287. <https://doi.org/10.1017/S0376892911000270>
- Staffa, R. K., Riechers, M., & Martín-López, B. (2022). A feminist ethos for caring knowledge production in transdisciplinary sustainability science. *Sustainability Science*, 17(1), 45–63. <https://doi.org/10.1007/s11625-021-01064-0D>
- Strand, M., Ortega-Cisneros, K., Niner, H. J., Wahome, M., Bell, J., Currie, J. C., Hamukuaya, H., la Bianca, G., Lancaster, A. M. S. N., Maseka, N., McDonald, L., McQuaid, K., Samuel, M. M., & Winkler, A. (2022). Transdisciplinarity in transformative ocean governance research - reflections of early career researchers. *ICES Journal of Marine Science*, 79(8), 2163–2177. <https://doi.org/10.1093/icesjms/fsac165E>
- van der Bijl-Brouwer, M., Kligyte, G., & Key, T. (2021). A Co-evolutionary, Transdisciplinary Approach to Innovation in Complex Contexts: Improving University Well-Being, a Case Study. *She Ji*, 7(4), 565–588. <https://doi.org/10.1016/j.sheji.2021.10.004>
- van Kerkhoff, L. (2014). Developing integrative research for sustainability science through a complexity principles-based approach. *Sustainability Science*, 9(2), 143–155. <https://doi.org/10.1007/s11625-013-0203-y>
- Wibeck, V., Eliasson, K., & Neset, T. S. (2022). Co-creation research for transformative times: Facilitating foresight capacity in view of global sustainability challenges. *Environmental Science and Policy*, 128, 290–298. <https://doi.org/10.1016/j.envsci.2021.11.023>
- Wiek, A., Ness, B., Schweizer-Ries, P., Brand, F. S., & Farioli, F. (2012). From complex systems analysis to transformational change: A comparative appraisal of sustainability science projects. *Sustainability Science*, 7(SUPPL. 1), 5–24. <https://doi.org/10.1007/s11625-011-0148-y>
- Wittmayer, J. M., & Schöpke, N. (2014). Action, research and participation: roles of researchers in sustainability transitions. *Sustainability Science*, 9(4), 483–496. <https://doi.org/10.1007/s11625-014-0258-4>