



Contents lists available at ScienceDirect

Earth System Governance

journal homepage: www.journals.elsevier.com/earth-system-governance

Perspective

The 18th Sustainable Development Goal

Ingrid J. Visseren-Hamakers

Department of Geography, Planning and Environment, Institute for Management Research, Radboud University, P.O. Box 9108, 6500 HK Nijmegen, the Netherlands



ARTICLE INFO

Article history:

Received 29 December 2019
 Received in revised form
 11 March 2020
 Accepted 13 March 2020
 Available online 26 March 2020

Keywords:

Animal governance
 SDG
 Integrative governance
 Animal rights
 Sustainable development

ABSTRACT

This article makes the case for an 18th Sustainable Development Goal (SDG) on animal health, welfare and rights. We have neglected animal considerations in our discussions on sustainable development - including on the SDGs on food, water, sustainable consumption and production, conservation, and climate change. The paper first provides an overview of the relationships between, and academic and policy debates on, animal and sustainability governance. While the relationships between sustainable development and animal issues are highly complex, these debates have evolved in a rather disconnected manner. The paper then argues for the integrative governance of animal and sustainability concerns in order to avoid trade-offs and enable synergies. We should integrate the interests of the individual animal into our definition of sustainable development and the SDGs. By doing so, we can develop one overarching global guidance system on all aspects of sustainable development, namely human, environmental and animal concerns.

© 2020 The Author. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

As someone who is concerned about both animal and sustainability interests, I find it increasingly striking - and problematic - that these debates are taking place in such a separated manner. The systems governing animal and sustainability concerns are hardly connected at all levels of governance - from the global to local. Why have we neglected animal considerations in our discussions on sustainable development, including the United Nations (UN) 2030 Agenda for Sustainable Development and especially its Sustainable Development Goals (SDGs) on food, water, consumption and production, conservation and climate change? We need to mainstream the consideration of the individual animal into our thinking on sustainable development: **We need an 18th SDG on animal concerns** (see Fig. 1).

Perhaps one answer to the question of why we have neglected animal considerations in our approach to the SDGs is that sustainable development has been and remains a rather anthropocentric concept. Very few changes have been made to the original 1987 Brundtland definition of "meeting the needs of the present without compromising the ability of future generations to meet their own needs". However, values on the relationships between humans and non-humans are changing, and these emerging values are becoming increasingly recognized through initiatives, policies and laws around the world. Examples include:

- The recognition of animal rights in the German constitution;
- Recognition of rights of nature, e.g. in Ecuador, Colombia, India, New Zealand, and communities in the United States;
- Granting rights to rivers, e.g. the Whanganui river in New Zealand and the Ganges and Yamuna rivers in India;
- The United Nations World Charter for Nature;
- The Universal Declaration of Rights of Mother Earth;
- The Earth Charter; and
- The World Declaration on Great Apes.

In implementing the SDGs, we need to embrace these evolving values and explicitly integrate the interests of the individual animal into our thinking on sustainable development. This is necessary because while one might think that the relationship between sustainability and animal concerns would be naturally synergistic, in reality the relationships between these issues are much more complex. Both sustainability and animal interests are negatively impacted by some industries, such as animal agriculture and aquaculture. On other issues, such as conservation and the use of animal testing in sustainability research, there are synergies and/or trade-offs between sustainability and animal concerns. Despite these intricate relationships, the academic debates on, and the governance of, these two issues have developed in a rather separate manner, and the relationships between them are not well understood (Visseren-Hamakers, 2018a).

In order to highlight the complexity of the relationships, I below

E-mail address: i.visseren@fm.ru.nl.



Fig. 1. The 18th SDG¹

first discuss the three issues most relevant for the relationship between sustainability and animal concerns, namely animal agriculture and aquaculture; conservation; and the use of animal testing in sustainability research. I then briefly discuss the academic and policy debates on sustainable development and animal interests in order to contribute to their integration. The article ends by making the case for the integrative governance of sustainable development and animal concerns. The sustainability and animal governance systems can be defined as the total of all governance instruments at a specific level of governance, focused on sustainability concerns or animal health, animal welfare and animal rights, respectively, with governance instruments defined as public, private and/or public–private policies and rules (Visseren-Hamakers, 2018a).

The animal agriculture and aquaculture industries focus on producing meat, dairy, eggs, fish and seafood. While contributing to food security in developing countries, animal agriculture and aquaculture have profound impacts around the world in terms of animal health, welfare and rights, pollution, climate change, and conservation (Browman et al., 2018; Edwards, 2015; HLPE, 2016; Toni et al., 2019). These problems are especially urgent given the fact that the global production of different animal products is expected to double by 2050 (Steinfeld et al., 2006). Trade-offs exist between animal welfare and sustainability in animal agriculture, with greenhouse gas emissions generally lower per animal in intensive and specialized systems than in extensive, often more animal-friendly systems (Garnett et al., 2013; HLPE, 2016). Different governance instruments aim at resolving these issues, including through the promotion of consuming fewer animal products, reducing food losses and waste, and the development of more animal- or environmentally friendly production systems through “sustainable intensification”, “ecological intensification” or organic agriculture (FAO, 2011; Garnett et al., 2013; HLPE, 2016; Stolze and

Lampkin, 2009; UNCTAD, 2013).

For conservation, three issues are especially relevant for both animal and sustainability governance:

- Protecting ecosystems and species;
- Hunting and fishing (addressing illegal and unsustainable hunting, fishing and wildlife trade, and promoting trophy hunting to finance conservation); and
- Combatting Invasive Alien Species (IAS) (when individual animals are killed to conserve other species or ecosystems).

First, creating protected areas and enhancing their management are meant to protect biodiversity, including animal species, thereby enabling synergies between sustainability and animal concerns. Trade-offs occur when wildlife in these conservation areas are managed (killed), with the aim of managing the number of individuals of specific species, for conservation goals. Also, breeding, reintroduction and translocation are increasingly used in the conservation of endangered animal species, necessitated among others because of the impact of climate change (Harrop, 2011). Animal concerns here include: health and welfare during breeding and after release into the wild; the often high mortality rate after release; and the risk of disease (Kock et al., 2010; Seddon et al., 2007; Swaisgood, 2007; Teixeira et al., 2007).

A second major conservation issue with both trade-offs and synergies with animal concerns is hunting and fishing. The history of hunting and conservation are intrinsically linked; the practice of conservation started to protect game (Beinart and Coates, 1995; Organ et al., 2012), and sustainable hunting is often promoted as part of conservation (EC, 2013; IUCN, 2016; Organ et al., 2012). Especially in many sub-Saharan African countries, trophy hunting is promoted to finance conservation, although the practice remains contentious (Di Minin et al., 2016; Ochieng et al., 2018, Ochieng et al., 2020; Ripple et al., 2016; Treves et al., 2019). Synergies between conservation and animal concerns occur in combatting poaching, wildlife crime, illegal, unreported and unregulated (IUU) fishing, and overfishing (FAO, 2014; IISD, 2014; UNODC, 2016).

¹ Fig. 1 adds an 18th icon to the 17 UN SDG icons. The 18th SDG is a photo (copyright Nathalie Leeuwis) of cow Maartje at Stichting de Leemweg, rescue and retirement home for cows (www.koeienrusthuis.nl).

Third, IAS are those alien species that, when introduced to a new habitat, become established and harm human and environmental values (Fleming et al., 2017). IAS impact threatened or endangered native species, including wildlife (Pimentel et al., 2005). The main management strategies are prevention and, for invasive animals, capturing and killing (Keller et al., 2011; van Dooren, 2011). The trade-offs on IAS are thus not only between environmental and animal concerns, but also among the concerns of different animals – the one considered invasive, and the wildlife being protected from the IAS.

The issue of animal testing for sustainability is relatively under-researched. Animal testing is conducted for several sustainability issues, including research to test the environmental toxicity of chemicals (Abbott, 2005); ecological research for conservation (Hammerschlag and Sulikowski, 2011; Holt et al., 2003; Vucetich and Nelson, 2007); and research supporting efforts to address the environmental impact of animal agriculture (Hristov et al., 2013; Petersen et al., 2015). Also, relatively little social scientific research has been done on the use of laboratory animals (Davies et al., 2016). Significant progress has, however, been made in lowering the number of animals used in research through the “three Rs” approach: reduction in numbers of animals; refinement of experimental methods; and replacement of animals with non-animal techniques (Doke and Dhawale, 2015).

Despite these interlinkages between sustainability and animal concerns, both the academic and policy debates on these issues have remained notably disconnected. There are only a few links between the sustainability and animal governance systems, among others through the thinking on “compassionate conservation” (Bekoff, 2013). Other examples include the concepts of “one health” (Murtaugh et al., 2017) and “one welfare” (Garcia Pinillos et al., 2016), in which the health or welfare of humans, ecosystems and individual animals are viewed as one, be it from a rather anthropocentric perspective. Moreover, thinking on the relationships between the SDGs and animal concerns more specifically is still in its infancy and also rather anthropocentric in character, approaching animal health and welfare as supporting sustainable development (FAO, 2018; Keeling et al., 2019). Also, very few academics have studied the relationships between animal and sustainability concerns from a governance perspective (Visseren-Hamakers, 2018a), with mostly ecologists and veterinarians contributing to the debate.

The academic debate on animal governance, on the one hand, mainly includes philosophical and legal contributions, and is mostly framed in terms of animal liberation (Singer, 1975) and rights (Donaldson and Kymlicka, 2011; Regan, 1983). Discussions focus on, among others, the relationship between human and non-human animals, intrinsic value, and speciesism. Remarkably little empirical political science or International Relations work has been done on animal governance, with very few authors analyzing animal-related policies (see e.g. Wissenburg and Schlosberg, 2014). This despite the fact that policy development and implementation questions and broader comparative politics approaches, as applied to other empirical fields, would be highly relevant. Policy debates mainly revolve around the concepts of animal health and welfare, with the latter often operationalized in terms of the so-called “five freedoms” (freedom from hunger, thirst and malnutrition; freedom from fear and distress; freedom from discomfort and exposure; freedom from pain, injury and disease; and freedom to express normal behavior) (McCulloch, 2013; Mellor, 2016). The main international policy forum is the World Organization for Animal Health (Office International des Epizooties - OIE) (OIE, 2017a, 2017b; 2017c; Otter et al., 2012). The governance system mostly

focuses on kept animals in animal agriculture, aquaculture, research and education. Attempts to develop global animal welfare or rights treaties, including the Universal Declaration on Animal Welfare (UDAW), have so far remained unsuccessful (Bowman, 1988; Favre, 2011; Gibson, 2011; White, 2013).

The academic discourse on governing sustainable development, on the other hand, has a strong political science character with a longstanding tradition in empirical analyses of environmental governance (Burch et al., 2019). It also includes more philosophical contributions on rights of nature (Stone, 1972). Sustainability governance can be considered more developed than animal governance systems, with a decades-long experience with public and private environmental and sustainability policies at all levels of governance. In such policy debates, such as those under the Convention on Biological Diversity (CBD), the focus is on animals in the wild, which are considered as species, biodiversity, wildlife or natural resources, thereby overlooking the interests of the individual animal.

Based on this brief overview, I here want to make the case for the integrative governance (Visseren-Hamakers, 2018b) of animal and sustainability concerns. Only then can we avoid trade-offs and enable synergies between these important societal priorities. This is in line with current debates on the transformative change necessary for sustainable development, in which it is increasingly recognized that different sustainability concerns and SDGs need to be addressed in an integrative manner. Such transformative change is focused on the underlying causes of sustainability issues, including in terms of values (Díaz et al., 2019; IPBES, 2019; UNGA, 2015). I argue here that such transformative change must include a shift in our recognition of the individual animal. We cannot ignore the interests of billions of animals while developing sustainable food systems, enabling sustainable consumption and production, combatting and adapting to climate change, and rethinking our strategies for the conservation and sustainable and equitable use of biodiversity.

Therefore, the definition of sustainable development must be broadened to include the interest of the individual animal. The best way to do so is an 18th SDG on animal health, welfare and rights. In this manner, it becomes explicit that attention for the individual animal is an integral aspect of sustainable development. It also underscores that animal concerns are not only instrumental for human wellbeing but are a sustainable development goal in their own right, on equal footing with the other 17 goals. This also supports the further emancipation of the environmental SDGs (SDG 13 on climate change and SDG 14 and 15 on biodiversity) to support more ecocentric approaches towards these goals, and reflects the evolving values on the relationships between humans and non-humans described above. In this way, recognition of the individual animal can be incorporated into the integrative, nexus approach towards the SDGs: different nexuses, including the water-energy-food nexus, can be expanded to include the 18th SDG. By integrating the interests of the individual animal into the SDGs we broaden our perspective on what sustainable development entails to include the health, welfare and rights of individual animals. In this manner we can develop one overarching global guidance system on all aspects of sustainable development, including human, environmental and animal concerns.

Declaration of competing interest

I declare no conflicts of interest in the development, writing or publication of this paper.

References

- Abbott, A., 2005. More than a cosmetic change. *Nature* 438, 144.
- Beinart, W., Coates, P., 1995. *Environment and History: the Taming of Nature in the USA and South Africa*. Routledge, London and New York, NY.
- Bekoff, M. (Ed.), 2013. *Ignoring Nature No More: the Case for Compassionate Conservation*. University of Chicago Press, London.
- Bowman, M.J., 1988. The protection of animals under international law environmental law in the USSR and the United Kingdom: international and regional regulation of the environment. *Conn. J. Int. Law* 4, 487–500.
- Browman, H.I., Cooke, S.J., Cowx, I.G., Derbyshire, S.W.G., Kasumyan, A., Key, B., Rose, J.D., Schwab, A., Skiftesvik, A.B., Stevens, E.D., Watson, C.A., Arlinghaus, R., 2018. Welfare of aquatic animals: where things are, where they are going, and what it means for research, aquaculture, recreational angling, and commercial fishing. *ICES (Int. Coun. Explor. Sea) J. Mar. Sci.* 76, 82–92.
- Burch, S., Gupta, A., Inoue, C.Y.A., Kalfagianni, A., Persson, Å., Gerlak, A.K., Ishii, A., Patterson, J., Pickering, J., Scobie, M., Van der Heijden, J., Vervoort, J., Adler, C., Bloomfield, M., Djalante, R., Dryzek, J., Galaz, V., Gordon, C., Harmon, R., Jinnah, S., Kim, R.E., Olsson, L., Van Leeuwen, J., Ramasar, V., Wapner, P., Zondervan, R., 2019. New directions in earth system governance research. *Earth Syst. Govern.* 1, 100006.
- Davies, G.F., Greenhough, B.J., Hobson-West, P., Kirk, R.G.W., Applebee, K., Bellingan, L.C., Berdoy, M., Buller, H., Cassaday, H.J., Davies, K., Diefenbacher, D., Druglitrá, T., Escobar, M.P., Friese, C., Herrmann, K., Hinterberger, A., Jarrett, W.J., Jayne, K., Johnson, A.M., Johnson, E.R., Konold, T., Leach, M.C., Leonelli, S., Lewis, D.I., Lilley, E.J., Longridge, E.R., McLeod, C.M., Miele, M., Nelson, N.C., Ormandy, E.H., Pallett, H., Poort, L., Pound, P., Ramsden, E., Roe, E., Scalway, H., Schrader, A., Scotton, C.J., Scudamore, C.L., Smith, J.A., Whitfield, L., Wolfensohn, S., 2016. Developing a collaborative Agenda for humanities and social scientific research on laboratory animal science and welfare. *PLoS One* 11, e0158791.
- Di Minin, E., Leader-Williams, N., Bradshaw, C.J.A., 2016. Trophy Hunting Does and Will Support Biodiversity: a Reply to Ripple et al. *Trends Ecol. Evol.* 31, 496–498.
- Doke, S.K., Dhawale, S.C., 2015. Alternatives to animal testing: a review. *Saudi Pharmaceut. J.* 23, 223–229.
- Donaldson, S., Kymlicka, W., 2011. *Zoopolis: A Political Theory of Animal Rights*. Oxford University Press, Oxford, UK.
- Díaz, S., Settele, J., Brondizio, E.S., Ngo, H.T., Agard, J., Arneth, A., Balvanera, P., Brauman, K.A., Butchart, S.H.M., Chan, K.M.A., Garibaldi, L.A., Ichii, K., Liu, J., Subramanian, S.M., Midgley, G.F., Miloslavich, P., Molnár, Z., Obura, D., Pfaff, A., Polasky, S., Purvis, A., Razaqzade, J., Reyers, B., Chowdhury, R.R., Shin, Y.-J., Visseren-Hamakers, I., Willis, K.J., Zayas, C.N., 2019. Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science* 366, eaax3100.
- EC, 2013. Sustainable Hunting and Natura 2000. European Commission.
- Edwards, P., 2015. Aquaculture environment interactions: past, present and likely future trends. *Aquaculture* 447, 2–14.
- FAO, 2011. *Global Food Losses and Food Waste - Extent, Causes and Prevention*. Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2014. *The State of the World Fisheries and Aquaculture: Opportunities and Challenges*. Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2018. *World Livestock: Transforming the Livestock Sector through the Sustainable Development Goals*. Food and Agriculture Organization of the United Nations, Rome, p. 222. Licence: CC BY-NC-SA 3.0 IGO.
- Favre, D., 2011. An international treaty for animal welfare symposium article. *Anim. Law* 18, 237–280.
- Fleming, P.J.S., Ballard, G., Reid, N.C.H., Tracey, J.P., 2017. Invasive species and their impacts on agri-ecosystems: issues and solutions for restoring ecosystem processes. *The Rangeland Journal* 39, 523–535.
- García Pinillos, R., Appleby, M., Manteca, X., Scott-Park, F., Smith, C., Velarde, A., 2016. One Welfare - a Platform for Improving Human and Animal Welfare. *Veterinary Record*.
- Garnett, T., Appleby, M.C., Balmford, A., Bateman, I.J., Benton, T.G., Bloomer, P., Burlingame, B., Dawkins, M., Dolan, L., Fraser, D., Herrero, M., Hoffmann, I., Smith, P., Thornton, P.K., Toulmin, C., Vermeulen, S.J., Godfray, H.C.J., 2013. Sustainable intensification in agriculture: premises and policies. *Science* 341, 33.
- Gibson, M., 2011. The universal declaration of animal welfare. *Deakin Law Rev.* 16, 539–568.
- Hammerschlag, N., Sulikowski, J., 2011. Killing for conservation: the need for alternatives to lethal sampling of apex predatory sharks. *Endanger. Species Res.* 14, 135–140.
- Harrop, S., 2011. Climate change, conservation and the place for wild animal welfare in international law. *J. Environ. Law* 23, 441–462.
- HLPE, 2016. Sustainable agricultural development for food security and nutrition: what roles for livestock?. In: High Level Panel on Food Security and Nutrition of the Committee on World Food Security, Rome.
- Holt, W.V., Pickard, A.R., Rodger, J.C., Wildt, D.E. (Eds.), 2003. *Reproductive Science and Integrated Conservation*. Cambridge University Press.
- Hristov, A.N., Oh, J., Lee, C., Meinen, R., Montes, F., Ott, T., Firkins, J., Rotz, A., Dell, C., Adesogan, A., Yang, W., Tricarico, J., Kebreab, E., Waggoner, G., Dijkstra, J., Oosting, S., 2013. Mitigation of greenhouse gas emissions in livestock production - a review of technical options for non-CO2 emissions. In: Gerber, P.J., Henderson, B., Makkar, H.P.S. (Eds.), *FAO Animal Production and Health Paper No. 177*. FAO, Rome.
- IISD, 2014. *Policy Brief: International Wildlife Crime: an IISD Overview of Recent Events*. International Institute on Sustainable Development.
- IPBES, 2019. *Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES secretariat, Bonn, Germany.
- IUCN, 2016. *Informing decisions on trophy hunting: a briefing paper for European Union Decision-makers regarding potential plans for restriction on imports of hunting trophies*.
- Keeling, et al., 2019. Animal welfare and the united Nations sustainable development goals. *Front. Vet. Sci.* 6 article 336.
- Keller, R.P., Geist, J., Jeschke, J.M., Kühn, I., 2011. Invasive species in Europe: ecology, status, and policy. *Environ. Sci. Eur.* 23, 23.
- Kock, R.A., Woodford, M.H., Rossiter, P.B., 2010. Disease risks associated with the translocation of wildlife. *Rev. sci. tech. Off. int. Epiz.* 29, 329–350.
- McCulloch, S.P., 2013. A critique of FAWC's five freedoms as a framework for the analysis of animal welfare. *J. Agric. Environ. Ethics* 26, 959–975.
- Mellor, J.D., 2016. *Updating Animal Welfare Thinking: Moving beyond the "Five Freedoms" towards "A Life Worth Living"*. *Animals* 6.
- Murtaugh, M.P., Steer, C.J., Sreevatsan, S., Patterson, N., Kennedy, S., Sriramarao, P., 2017. The science behind One Health: at the interface of humans, animals, and the environment. *Ann. N. Y. Acad. Sci.* 1395, 12–32.
- Ochieng, A., Visseren-Hamakers, I., Duim, R., 2018. The battle over the benefits: analysing two sport hunting policy arrangements in Uganda. *Oryx* 52, 359–368.
- Ochieng, A., Visseren-Hamakers, I., Duim, R., 2020. Killing Nature to Save it? the Social and Ecological Impacts of Hunting in Uganda. *Conservation and Society*, Forthcoming.
- OIE, 2017a. *Terrestrial Animal Health Code*. World Organisation for Animal Health. www.oie.int. (Accessed 3 November 2017).
- OIE, 2017b. *Aquatic Animal Health Code*. World Organisation for Animal Health. www.oie.int. (Accessed 3 November 2017).
- OIE, 2017c. *OIE Global Animal Welfare Strategy*. World Organisation for Animal Health.
- Organ, J.F., Mahoney, S.P., Williams, S., Krausman, P.R., Batcheller, G.R., Decker, T.A., Carmichael, R., Nanjappa, P., Regan, R., Medellin, R.A., Cantu, R., McCabe, R.E., Craven, S., Vecellio, G.M., Decker, D.J., Geist, V., 2012. *The North American Model of Wildlife Conservation: the Wildlife Society Technical Review 12-4*. The Wildlife Society, Bethesda, MD.
- Otter, C., O'Sullivan, S., Ross, S., 2012. Laying the foundations for an international animal protection regime. *J. Anim. Ethics* 2, 53–72.
- Petersen, S.O., Hellwing, A.L.F., Brask, M., Højberg, O., Poulsen, M., Zhu, Z., Baral, K.R., Lund, P., 2015. Dietary nitrate for methane mitigation leads to nitrous oxide emissions from dairy cows. *J. Environ. Qual.* 44, 1063–1070.
- Pimentel, D., Zuniga, R., Morrison, D., 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecol. Econ.* 52, 273–288.
- Regan, T., 1983. *The Case for Animal Rights*. University of California Press, Berkeley, CA.
- Ripple, W.J., Newsome, T.M., Kerley, G.I.H., 2016. Does Trophy Hunting Support Biodiversity? A Response to Di Minin et al. *Trends Ecol. Evol.* 31, 495–496.
- Seddon, P.J., Armstrong, D.P., Maloney, R.F., 2007. Developing the science of reintroduction biology desarrollando la Ciencia de Biología de la Reintroducción. *Conserv. Biol.* 21, 303–312.
- Singer, P., 1975. *Animal Liberation*. Random House Inc., New York, NY.
- Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M., De Haan, C., 2006. *Livestock's Long Shadow: Environmental Issues and Options*. FAO.
- Stolze, M., Lampkin, N., 2009. Policy for organic farming: rationale and concepts. *Food Pol.* 34, 237–244.
- Stone, C.D., 1972. *Should Trees Have Standing? towards Legal Rights for Natural Objects*. William Kaufmann, Inc., Los Altos, CA.
- Swaigood, R.R., 2007. Current status and future directions of applied behavioral research for animal welfare and conservation. *Appl. Anim. Behav. Sci.* 102, 139–162.
- Teixeira, C.P., de Azevedo, C.S., Mendl, M., Cipreste, C.F., Young, R.J., 2007. Revisiting translocation and reintroduction programmes: the importance of considering stress. *Anim. Behav.* 73, 1–13.
- Toni, M., Manciocco, A., Angiulli, E., Alleve, E., Cioni, C., Malavasi, S., 2019. Review: assessing fish welfare in research and aquaculture, with a focus on European directives. *Animal* 13, 161–170.
- Treves, A., Santiago-Ávila, F.J., Popescu, V.D., Paquet, P.C., Lynn, W.S., Darimont, C.T., Artelle, K.A., 2019. Trophy hunting: insufficient evidence. *Science (New York, N.Y.)* 366, 435.
- UNCTAD, 2013. *Wake up before It's Too Late: Make Agriculture Truly Sustainable Now for Food Security in a Changing Climate*. Trade and Environment Review, 2013.
- UNGA, 2015. *Transforming Our World: the 2030 Agenda for Sustainable Development*. A/RES/70/1. United Nations General Assembly.
- UNODC, 2016. *World Wildlife Crime Report: Trafficking in Protected Species*.
- van Dooren, T., 2011. Invasive species in penguin worlds: an ethical taxonomy of killing for conservation. *Conserv. Soc.* 9, 286–298.
- Visseren-Hamakers, I.J., 2018a. A framework for analyzing and practicing Integrative Governance: the case of global animal and conservation governance. *Environment and Planning C: Politics and Space* 36, 1391–1414.

- Visseren-Hamakers, I.J., 2018b. Integrative governance: the relationships between governance instruments taking center stage. *Environ. Plann. C: Politics Space* 38, 1341–1354.
- Vucetich, J.A., Nelson, M.P., 2007. What are 60 warblers worth? *Killing Name Conservation. Oikos* 116, 1267–1278.
- White, S., 2013. Into the void: international law and the protection of animal welfare. *Global Policy* 4, 391–398.
- Wissenburg, M., Schlosberg, D. (Eds.), 2014. *Political Animals and Animal Politics*. Palgrave Macmillan, New York, NY.