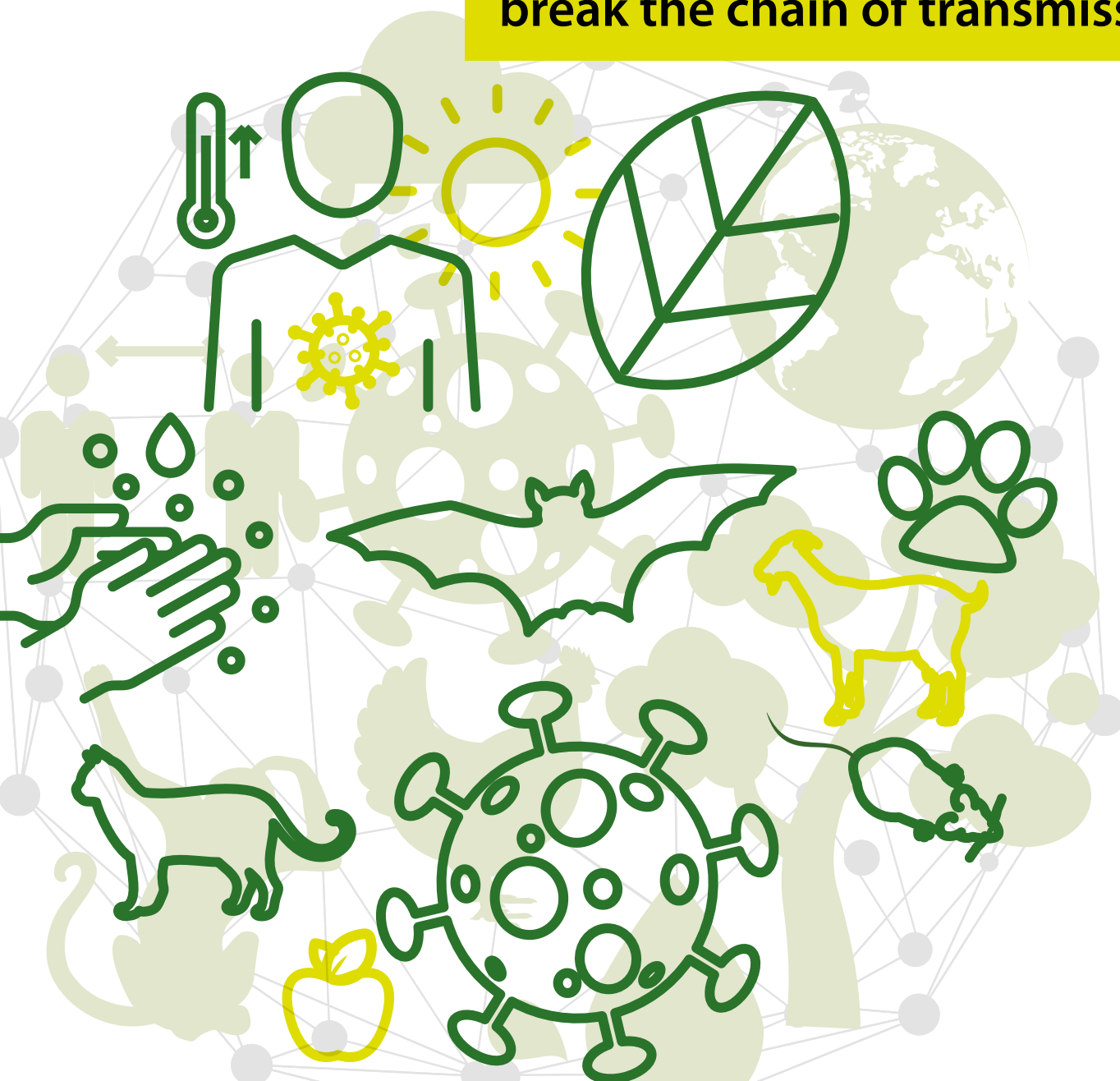


PREVENTING THE NEXT PANDEMIC

Zoonotic diseases and how to break the chain of transmission



A Scientific Assessment with Key Messages for Policy-Makers
A Special Volume of UNEP's *Frontiers Report Series*

© 2020 United Nations Environment Programme

ISBN No: 978-92-807-3792-9

Job No: DEW/2290/NA

This publication may be reproduced in whole or in part and in any form for educational or non-profit services without special permission from the copyright holder, provided acknowledgement of the source is made. The United Nations Environment Programme (UNEP) would appreciate receiving a copy of any publication that uses this publication as a source.

No use of this publication may be made for resale or any other commercial purpose whatsoever without prior permission in writing from UNEP. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Communications Division, United Nations Environment Programme, P. O. Box 30552, Nairobi 00100, Kenya.

Disclaimers

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations Environment Programme concerning the legal status of any country, territory or city or its authorities, or concerning the delimitation of its frontiers or boundaries. For general guidance on matters relating to the use of maps in publications, please go to <https://www.un.org/Depts/Cartographic/english/htmain.htm>

Mention of a commercial company or product in this document does not imply endorsement by UNEP or the authors. The use of information from this document for publicity or advertising is not permitted. Trademark names and symbols are used in an editorial fashion with no intention on infringement of trademark or copyright laws.

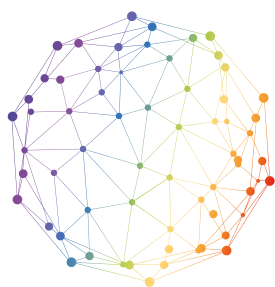
© Maps, photos, and illustrations as specified.

Suggested citation

United Nations Environment Programme and International Livestock Research Institute (2020). Preventing the Next Pandemic: Zoonotic diseases and how to break the chain of transmission. Nairobi, Kenya.

Production

Science Division | United Nations Environment Programme | P.O. Box 30552, Nairobi, 00100, Kenya
Tel: +254 20 7621234 | Email: unep-publications@un.org | www.unep.org

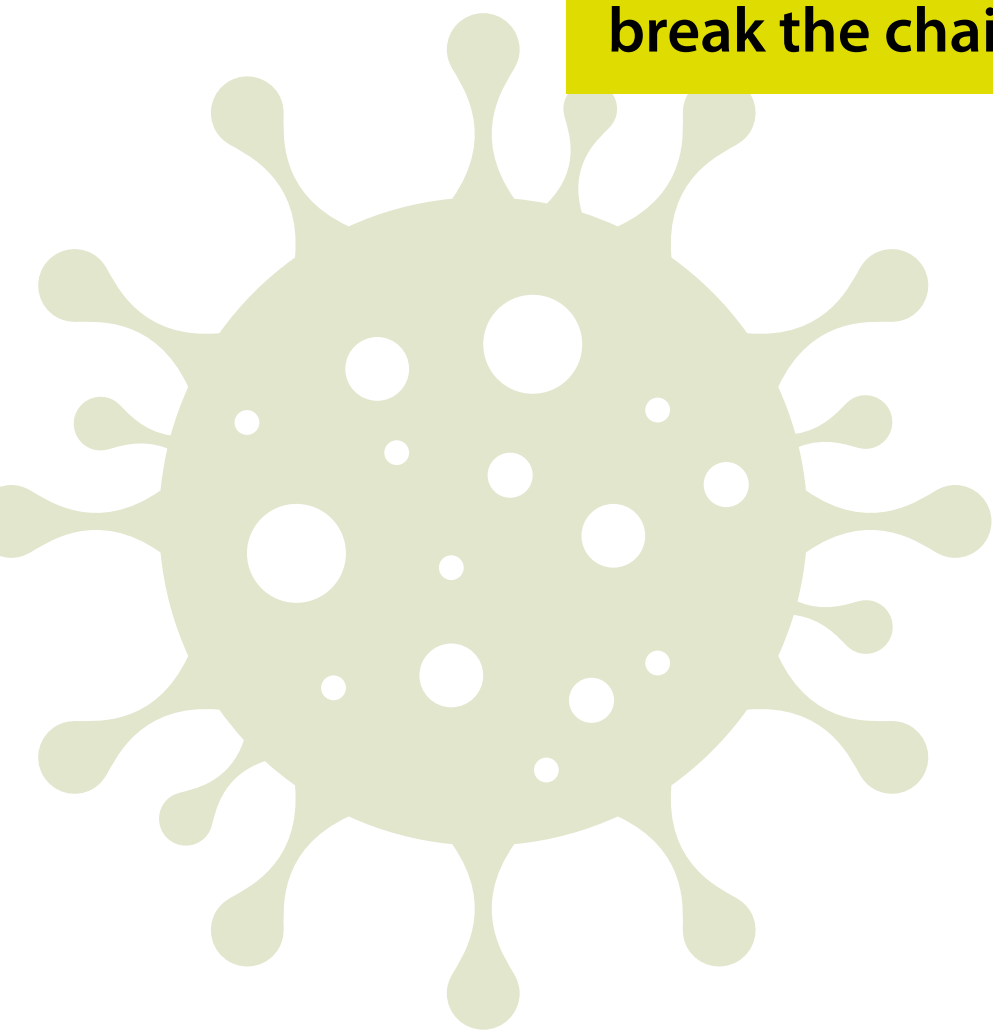


A Special Volume of UNEP's *Frontiers* Report Series

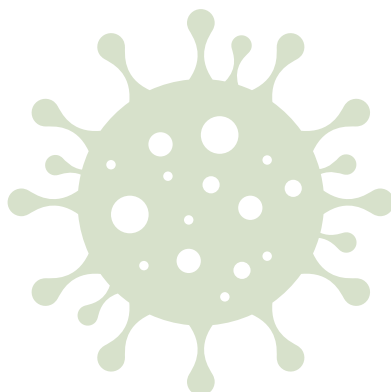
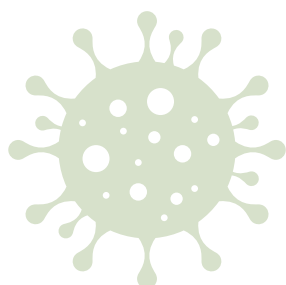
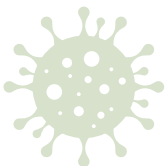
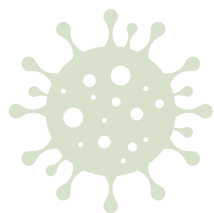
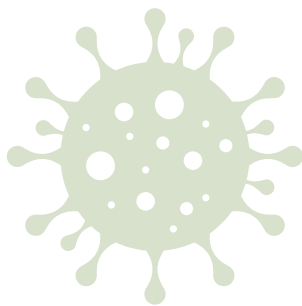
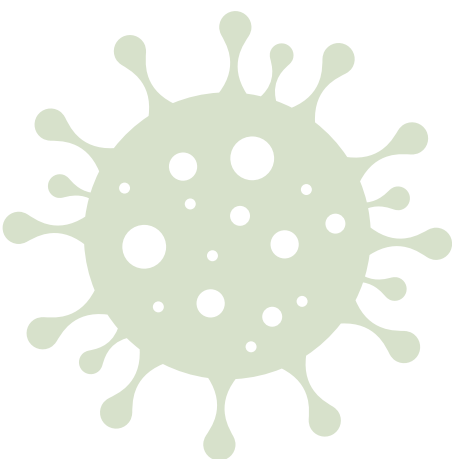
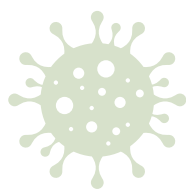
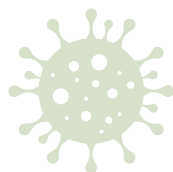
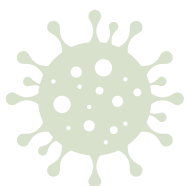
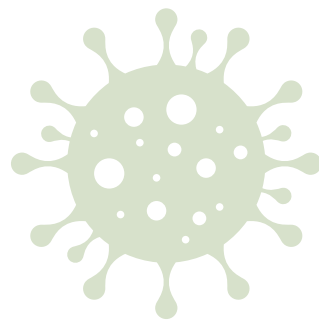
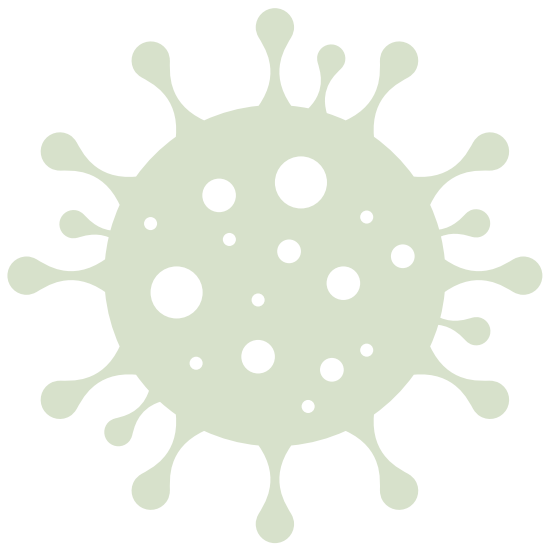
UNEP promotes environmentally sound practices globally and in its own activities. Our distribution policy aims to reduce UNEP's carbon footprint.

PREVENTING THE NEXT PANDEMIC

**Zoonotic diseases and how to
break the chain of transmission**



**A Scientific Assessment with Key Messages for Policy-Makers
A Special Volume of UNEP's *Frontiers* Report Series**



Acknowledgements

The United Nations Environment Programme (UNEP) would like to thank the authors, reviewers and the supporting organizations for their contribution to the preparation of this rapid scientific assessment report.

Lead Author

Delia Grace Randolph (Natural Resources Institute, NRI, of the University of Greenwich, and International Livestock Research Institute, ILRI, Nairobi, Kenya).

Co-Authors

Johannes Refisch (UNEP, Nairobi, Kenya), Susan MacMillan (International Livestock Research Institute, ILRI, Nairobi, Kenya), Caradee Yael Wright (South African Medical Research Council, SAMRC, Pretoria, South Africa), Bernard Bett (International Livestock Research Institute, ILRI, Nairobi, Kenya), Doreen Robinson (UNEP, Nairobi, Kenya), Bianca Wernecke (South African Medical Research Council, SAMRC, Pretoria, South Africa), Hu Suk Lee (International Livestock Research Institute, ILRI, Nairobi, Kenya), William B. Karesh (EcoHealth Alliance, New York, USA), Catherine Machalaba (EcoHealth Alliance, New York, USA), Amy Fraenkel (Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals, CMS, Bonn, Germany), Marco Barbieri (Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals, CMS, Bonn, Germany) and Maarten Kappelle (UNEP, Nairobi, Kenya).

UNEP Frontiers series editors

Maarten Kappelle and Pinya Sarasas (both: UNEP, Nairobi, Kenya).

Reviewers

Hilary Allison (World Conservation Monitoring Centre, UNEP-WCMC, Cambridge, UK), Neville Ash (World Conservation Monitoring Centre, UNEP-WCMC, Cambridge, UK), Daniel Bergin (GlobeScan, Hong Kong SAR, People's Republic of China), Tianna Brand (World Organisation for Animal Health, OIE, Paris, France), Alessandro Broglia (Italian Office, Vétérinaires Sans Frontières, VSF, Legnano, Italy), Randy Burd (Long Island University, Brookville, NY, USA), Neil D. Burgess (World Conservation Monitoring Centre, UNEP-WCMC, Cambridge, UK), H. David Cooper (Secretariat of the Convention on Biological Diversity, CBD, Montreal, Canada), Miguel Cardo (Portuguese Office, Vétérinaires Sans Frontières, VSF, Lisbon, Portugal), Ketu Chachibaia

(United Nations Development Programme, UNDP, New York, NY, USA), Katie Clow (Canadian Office, Vétérinaires Sans Frontières (VWB/VSF), Ottawa, Ontario, Canada), Patricia Cremona (International Union for Conservation of Nature, IUCN, Gland, Switzerland), Sergey Dereliev (Secretariat of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds, AEWA, Bonn, Germany), Logan Ende (UNEP, Washington DC, USA), Lisa Farroway (United Nations Development Programme, UNDP, New York, NY, USA), Francesco Gaetani (Latin American and Caribbean Regional Office, UNEP, Panama City, Panama), Susan Gardner (UNEP, Nairobi, Kenya), Suren Gazaryan (Secretariat of the Agreement on the Conservation of Populations of European Bats, EUROBATS, Bonn, Germany), Thomas R. Gillespie (Emory University, Atlanta, GA, USA), Margherita Gomasca (Vétérinaires Sans Frontières, VSF, Brussels, Belgium), Danny Govender (South African National Parks, SANParks, Pretoria, South Africa), Jason Jabbour (North American Regional Office, UNEP, Washington, DC, USA), Luc Janssens de Bisthoven (Royal Belgian Institute of Natural Sciences, Brussels, Belgium), Margaret Kinnaird (World Wide Fund For Nature – International, WWF-INT, Gland, Switzerland), Richard Kock (Royal Veterinary College, RVC, University of London, London, UK), Fabian Leendertz (Robert Koch Institute, Berlin, Germany), Jian Liu (UNEP, Nairobi, Kenya), Brian Lutz (United Nations Development Programme, UNDP, New York, NY, USA), Riks Maas (Wageningen Bioveterinary Research, Wageningen University and Research Center, WUR, Lelystad, Netherlands), Kelly Malsch (World Conservation Monitoring Centre, UNEP-WCMC, Cambridge, UK), Stefano Mason (Agronomes et Vétérinaires sans Frontières, AVSF, Nogent-sur-Marne, France), Paige McClanahan (UNEP, Nairobi, Kenya), Wander Meijer (GlobeScan, Hong Kong SAR, People's Republic of China), Stefano Messori (World Organisation for Animal Health, OIE, Paris, France), E.J. Milner-Gulland (Interdisciplinary Centre for Conservation Science and Oxford Martin Programme on Illegal Wildlife Trade, University of Oxford, and GCRF TRADE hub, Oxford, UK), Marco de Nardi (Safe Food Solutions, SAFOSO, Kőniz, Switzerland), Maryam Niamir-Fuller (Formerly UNEP – Global Environment Facility, UNEP-GEF, Virginia, USA), Scott Newman (Food and Agriculture Organization, FAO, Rome, Italy), James O'Rourke (Chadron State College, Chadron, NE, USA), Midori Paxton (United Nations Development Programme, UNDP, New York, NY, USA), Kathryn Phillips (World Conservation Monitoring Centre, UNEP-WCMC, Cambridge, UK), Gert Polet (World Wide Fund For Nature – Netherlands, WWF-NL, Zeist, Netherlands), Kristina Rodina (Food and Agriculture Organization, FAO, Rome, Italy), Cristina Romanelli (World



Health Organisation, WHO, Geneva, Switzerland), Pinya Sarasas (UNEP, Nairobi, Kenya), Tim Scott (United Nations Development Programme, UNDP, New York, NY, USA), Alexander Shestakov (Secretariat of the Convention on Biological Diversity, CBD, Montreal, Canada), Roy Small (United Nations Development Programme, UNDP, New York, NY, USA), Emily Tagliaro (World Organisation for Animal Health, OIE, Paris, France), Edouard Timmermans (Vétérinaires Sans Frontières, VSF, Brussels, Belgium), Gregorio Torres (World Organisation for Animal Health, OIE, Paris, France), Gregorio Velasco Gil (Food and Agriculture Organization, FAO, Rome, Italy), Kaavya Varma (United Nations Development Programme, UNDP, New York, NY, USA), Yolanda Vaz (Portuguese Office, Vétérinaires Sans Frontières, VSF, Lisbon, Portugal), Ana Vukoje (Asia-Pacific Regional Office, UNEP, Bangkok, Thailand), Chris Walzer (Wildlife Conservation Society (WCS), New York, NY, USA), Christopher Whaley (Scientific and Technical Advisory Panel of the Global Environment Facility, GEF-STAP, Washington, DC, USA), Derek Wu (GlobeScan, Hong Kong SAR, People's Republic of China), Michelle Wyman (National Council for Science and the Environment, NCSE, Washington, DC, USA), Makiko Yashiro (Asia-Pacific Regional Office, UNEP, Bangkok, Thailand), Edoardo Zandri (UNEP, Nairobi, Kenya), Jinhua Zhang (Asia-Pacific Regional Office, UNEP, Bangkok, Thailand) and Max Zieren (Asia-Pacific Regional Office, UNEP, Bangkok, Thailand).

Secretariat and project coordination

Maarten Kappelle, Pinya Sarasas, Sofia Méndez Mora and Allan Lelei (all: UNEP, Nairobi, Kenya).

Language editing

Susan MacMillan (International Livestock Research Institute, ILRI, Kenya), Maarten Kappelle, Paige McClanahan and Pinya Sarasas (all: UNEP, Nairobi, Kenya).

Graphics, design and layout

Audrey Ringler, UNEP, Nairobi, Kenya.

Communications, media and outreach

Daniel Cooney, Atif Ikram Butt, Salome Mbeyu Chamanje, David Cole, Nicolien De Lange, Florian Fusstetter, Maria Galassi, Nancy Groves, Paige McClanahan, Neda Monshat, Pooja Munshi, Moses Osani, Andrew Raven, Lisa Rolls, Keishamaza Rukikaire, Sajni Shah, Rajinder Sian, Neha Sud and Richard Waiguchu (all: UNEP, Kenya); David Aronson, Annabel Slater and Michael Victor (all: ILRI, Kenya); and Matthew Davis and Michelle Geis Wallace (both: BURNES, Bethesda, MD, USA).

Thanks also to:

Jimmy Smith (ILRI); Judith Akoth, Inger Andersen, Magda Biesiada, Alexander Caldas, Harsha Dave, Angeline Djampou, Sandor Frigyi, Tito Kimathi, Emily Kilonzi, Rachel Kosse, Fred Lerionka, Jian Liu, Lu Liu, Janet Macharia, Isabel Martínez, Nada Matta, Joyce Mavoungou, Abdelmenam Mohamed, Joyce Msuya, Pascal Muchesia, Jane Muriithi, Daniel Nthiwa, David Osborn, Rafael Peralta, Julia Rugo, Nandita Surendran, Ying Wang, Edoardo Zandri and Jing Zheng (all: UNEP, Nairobi, Kenya); and David Berman (independent).

Partners

The United Nations Environment Programme would like to express its gratitude to the International Livestock Research Institute (ILRI, Nairobi, Kenya), the South African Medical Research Council (SAMRC, Pretoria, South Africa) and the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn, Germany) for their extraordinary support to the development, launch and communication of this rapid scientific assessment report.

UNEP and ILRI are thankful for the support received from the following organisations:



Convention on
Biological Diversity



EMORY
UNIVERSITY



Research, Innovation, Sustainability.



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET



LONG ISLAND UNIVERSITY



WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future



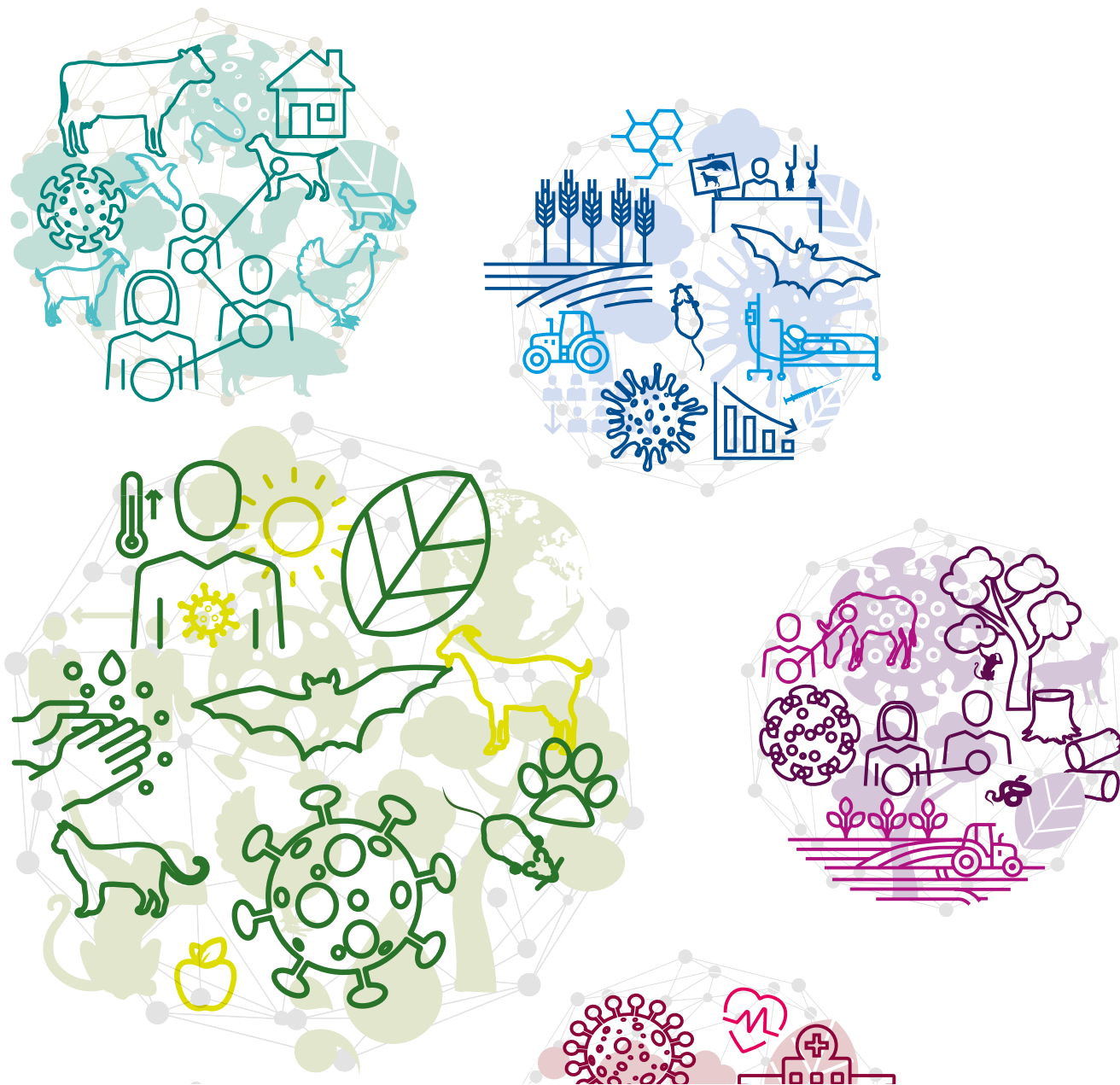
National Council for
Science and the Environment



SCIENTIFIC AND TECHNICAL
ADVISORY PANEL
*An independent group of scientists that advises
the Global Environment Facility*



VSF INTERNATIONAL
VÉTÉRINAIRES
SANS FRONTIÈRES



预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_13864

