



Bridging the gap between policy and knowledge
on Biodiversity in Europe

Document of Work (DoW)
Request “Biodiversity and pandemics”

Version 07/06/2022;

Final version





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1) Preamble

Eclipse was granted additional funding by the European Commission, under the H2020 Green Deal Call, as part of the EU response to the COVID-19 pandemic in order to answer policy-relevant needs for evidence related to Biodiversity and Pandemics. An online cross-sectoral workshop was co-organised in May 2021 by Eclipse and the European Commission- Knowledge Centre for Biodiversity (EC-KCBD) to explore these needs and identify highly policy-relevant topics. The workshop brought together representatives from a range of European Commission services together with experienced scientists to identify challenges and evidence needs related to the links between Biodiversity and Human Health, including zoonotic and infectious diseases (for more information about the workshop, see section Summary of the scoping activities and Annexes 1 & 2).

During the workshop, seven policy-relevant knowledge needs (hereafter referred to as “Requests”) were identified, and three of them were ranked with higher relevance:

- I. Developing a strategic research agenda on Biodiversity and pandemics, jointly with all relevant agencies and aligned with relevant sectoral policy agendas;
- II. A better understanding of the impact of EU policies generally on the emergence and spread of Emerging Infectious Diseases (EID) in third countries and potential links with Biodiversity and its loss; this could be expanded to consider the fair implementation on local people of policies intended to mitigate the emergence of EIDs and the loss of Biodiversity.
- III. Identification and prioritisation of monitored ecosystems/biodiversity/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP, One Sustainable Health, and others).

In order to select which request will be processed by an independent and interdisciplinary Eclipse [Expert Working Group \(EWG\)](#) (selected following an Eclipse Call for Experts – see Annex 6) and to ensure the selected request will meet all Eclipse criteria to start the answering process (see Table 1), a series of steps were undertaken by the Eclipse Scoping Group:

1. **A literature screening and a Call for Knowledge** of the three requests were organised to gather relevant knowledge to be considered during the selection process and to search for existing or planned initiatives that may (partly) answer the requests. Both activities are essential during the Scoping Phase to avoid duplication of ongoing efforts and ensure the outputs are timely developed (for more information about this step and its results, see section Summary of the scoping activities and Annexes 3, 4 & 4bis).
2. An online **Focus Group** was then organised **to target which request will be processed and narrowed down**. The invited participants to the Focus Group were asked to discuss and select the request(s) whose results and outputs would be useful for their work and / or feed in a key policy process. This focus group led to the selection of the first request **I.** and the creation of a cross-





sectoral consortium of requesters that will follow up the Eclipse process and contribute to the dissemination, uptake and impact of the outputs. At the end of the Focus Group the narrowing down and framing exercises led to this provisional formulation of the request: “make sense/some analysis of the existing research agendas/knowledge gap analyses to extract the priorities in the view of interlinkages (between sectors).” For more information about the focus group, please see section 3) Summary of the scoping activities and Annex 5.

3. As a final step, the **request was reformulated by the Eclipse scoping group** (see below), and the final reformulation was agreed upon by the consortium of requesters (see Table 4 below and hereafter referred to as “Request Biodiversity and Pandemics”).

Request Biodiversity and Pandemics
Building on existing relevant work on research agendas and knowledge gap analysis, identifying interdisciplinary research [and action] priorities that contribute to a strategic research agenda on biodiversity and pandemics addressing the critical interlinkages between relevant sectors needed to make future actions more effective.
The request process would include: <ul style="list-style-type: none">• Mapping of existing research agendas and knowledge gap analysis• Filtering or analyzing research recommendations related to biodiversity and pandemics• Prioritize the identified research recommendations, based on their potential for maximizing the impact on policies for relevant sectors.

This Document of Work (DoW) describes and compiles the results of the scoping activities and the background of the request. The information in this document is also the basis for the next step in [Eclipse process](#): i.e. the Call for Experts (CfE), to select the members of an Eclipse Working Group (EWG) that will work on answering the request (see Call for Expert in Annex 6). It explores the existing knowledge in this area, how the request relates to existing policy processes at the EU level, identifies plausible and relevant methodologies and the timeline for answering this request.

2) Background and context of the request Biodiversity and Pandemics

Background

The COVID-19 crisis has revealed how fragile and vulnerable our societies are to pandemics and how challenging informed political and policy responses become when faced with such an emergency. As a global community, we were not prepared. The potential risk of zoonoses linked to unprecedented land degradation and land conversion, unleashed consumption of natural resources, increasing livestock production, and acceleration of biodiversity loss had been identified and did not come as a surprise to the scientific community. The pandemic has revealed a broad range of science-policy challenges and knowledge gaps. Addressing these will better prepare us for the next crisis that emerges.

Policy relevance and timeliness of the request

The scientific community has long identified the potential risk of zoonoses linked to unprecedented land degradation, unleashed consumption of natural resources and acceleration of biodiversity loss. However, the actual emergence of COVID-19 has highlighted gaps in our knowledge and our ability to put this knowledge into practice through policy-making. Therefore, generating and synthesising knowledge to fill these gaps while also ensuring the uptake of knowledge into decision-making and implementation should become a high priority.

The request Biodiversity and Pandemics focuses on how to improve our understanding and application of the science of pandemics to optimise coordination and coherence across policy sectors, building better resilience and response strategies (proactive and reactive approaches) in the context of the interface between Biodiversity and Pandemics. Moreover, the creation of a cross-sectoral consortium of requesters working with the European Commission's Directorate-General for Research and Innovation (EC-DG RTD), co-developing the knowledge needs and expecting the knowledge synthesis will ensure that the produced evidence will be jointly and timely taken up by policy.

Also, as a follow-up to the workshop in May 2021 and based on the discussion and the identified policy needs, EC-DG RTD requested Eklipse to contribute to the drafting of the topic "Prevention of zoonotic emerging diseases & biodiversity" for the next Horizon Europe work programme 2023-2024. Eklipse Scoping Group on "Biodiversity and Pandemics" and four out of the nine relevant experts contacted by Eklipse provided their contributions to the document.

The added value of Eklipse:

While addressing specific topics in response to societal and policy needs, [Eklipse process](#) hold many [added values](#) leading to the ethical, credible, transparent, timely and jointly developed evidence reports (and other targeted outputs), for which Eklipse is recognized for (see e.g. the role of Eklipse in the [Science Service](#)). One of these added values is that Eklipse only accepts to process a request if the following criteria are met and justified (see Table 1).

Table 1. Eklipse criteria for processing a request and related justification for the request "Biodiversity and Pandemics"

Criteria for Eklipse to accept processing the request	Justification to process this request on Biodiversity and Pandemics
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A clear mandate and a strong willingness /support from policy or other societal actors to follow the Eclipse process will contribute to the dissemination, uptake and impact of the output.	Establishment of a cross-sectoral consortium of 8 requesters from policy and key initiatives interested in the outputs of the requests and who agreed to contribute to the dissemination, uptake and impact of the outputs. (see Table 4 in section Summary of the scoping activities).
Policy relevance and its timeline needs to be ensured.	Policy relevance was discussed and ensured through different activities: Online Workshop: “Biodiversity in Post-Covid cross-sectoral challenges”, Call for Knowledge (CfK), Online Focus group “Biodiversity and pandemics” (see Table 2 in section Summary of the scoping activities).
Scale: The request should be of European or at least of a wide region relevance.	The request is clearly of European relevance as well as of international relevance for its contribution to a global Strategic Research Agenda.
No duplication: Eklipse should ensure that there is no known work already done or planned on the topics (coinciding with the period of the request).	The Call for Knowledge and the discussion in the Focus Group identified potential overlaps with existing or future initiatives. But the reformulation of the request through the first step of the answering request process (“Mapping of existing research agendas and knowledge gap analysis”) should avoid any remaining duplication of existing or future efforts.
Cross-sectoral approach: The request would need to go beyond the core Biodiversity and ES policies (e.g. by addressing Health, agriculture or other issues)	The cross-sectoral approach is ensured through an interdisciplinary consortium (see Table 4 in section Summary of the scoping activities) and will be built in the answering process.
Feasibility to process the request in the time and resource allocated (see section Suggested methods and timeline for answering the process).	With the support of the Eklipse Methods Expert Group (MEG) , the most suitable methods to answer the request considering time and resources will be selected (see suggested methods in the section 5)

3) Summary of the scoping activities

Overview of the Scoping phase

The scoping phase is the second step within the [Eklipse process](#). It aims to refine the question, identify how Eklipse could provide an added value by being involved, seek knowledge and expertise on the refined question via an open Call for Knowledge (CfK), and provide suggestions regarding methods and resources needed to answer the request. Table 2 shows the key scoping activities that were followed to refine the request on Biodiversity and Pandemics.

Table 2. Overview of the different steps for refining the request “Biodiversity and Pandemics”.

Timeline	Key activities / events	Requester	Outcomes / Formulation of the evidence need
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Dec 2020	Additional funding to identify key policy needs	EC-DG RTD	<i>Original request: COVID 19 and Biodiversity</i>
Jan - Feb 2021	Call for KCB ¹ member expert on Biodiversity and Health	EC-DG RTD	<i>Serge Morand joined the Eklipse KCB¹. Serge is the focal point responsible of overseeing the Biodiversity and Pandemics request process.</i>
Mar 2021	Set up of the Eklipse Scoping Group (see Table 2)	EC-DG RTD	<i>Overall question sent as preparation for the online workshop: The aim of the workshop is to identify urgent challenges and/or evidence needs related to the links between biodiversity and human health, including zoonotic and infectious diseases.</i>
31 May 2021	Online workshop: "Biodiversity in Post-Covid cross-sectoral challenges."	EC-DG RTD	<i>Request reformulation: Developing a strategic research agenda on Biodiversity and pandemics, jointly with all relevant agencies and aligned with relevant sectoral policy agendas; would involve further workshops, building on the initial workshop, identifying a more comprehensive set of research needs and supporting the integration of existing and proposed initiatives to promote effective and efficient uptake of research recommendations.</i>
Jul 2021- Oct 2021	Survey to rank the policy needs identified in the workshop	EC-DG RTD	<i>N/A</i>
Nov 2021- Feb 2022	Call for Knowledge – "Biodiversity and Pandemics" (CfK 1/2021)	EC-DG RTD	<i>Reformulation: Developing a knowledge gap analysis and subsequent research agenda on Biodiversity and pandemics, jointly with all relevant agencies and aligned with relevant sectoral policy agendas</i>
28 Apr 2022	Online focus group "Biodiversity and pandemics."	Consortium of requesters (see Table 4)	<i>Reformulation: Make sense/some analysis of the existing research agendas/knowledge gap analyses to extract the priorities in the view of interlinkages (between sectors)</i>

¹ KCB: Eklipse [Knowledge Coordination Body](https://www.eklipse.eu)





May 2022	Final request agreed by all focus group participants	Consortium of requesters (see Table 4)	Agreed reformulation: Building on existing relevant work on research agendas and knowledge gap analysis, identifying interdisciplinary research [and action] priorities that contribute to a strategic research agenda on Biodiversity and pandemics addressing the critical interlinkages between relevant sectors needed to make future actions more effective.
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Members of the Eclipse Scoping Group

The scoping phase is guided by a subgroup composed by members of the [Eclipse Knowledge Coordination Body \(KCB\)](#), the [Eclipse Methods Expert Group \(MEG\)](#) and the [Eclipse Management Body \(EMB\)](#) (see Table 3 below).

Table 3. Members of the Eclipse Scoping Group

Eclipse body	Name	Affiliation
Knowledge Coordination Body (KCB)	Serge Morand <i>(co-chair)</i>	CNRS – CIRAD, Faculty of Veterinary Technology, Kasetsart University, Bangkok
	Carla Washbourne <i>(co-chair)</i>	University College London, UK
	Salla Rantala	Finnish Environment Institute, Finland
	Ana Lillebø	University of Aveiro (CESAM), Portugal
	Ute Jacob	Helmholtz Institute for Functional Marine Biodiversity, University of Oldenburg (HIFMB), Germany
Methods Expert Group (MEG)	Nils Bunnefeld	University of Stirling, UK

	Alister Scott	University of Northumbria, UK
<u>Eclipse Management Body</u>	Marie Vandewalle	Helmholtz Centre for Environmental research (UFZ), Germany
	Karla E. Locher-Krause	Helmholtz Centre for Environmental research (UFZ), Germany
	Candice Pouget	Helmholtz Centre for Environmental research (UFZ), Germany

Consortium of Requesters

One key milestone of the scoping phase was to create a cross-sectoral consortium of requesters working with EC-DG RTD² to act as key points of contact to further co-develop the knowledge needs and follow the knowledge synthesis process. Regular exchanges and feedback occur between Eclipse and the consortium of requesters in the different steps of the process (see Table 4 below).

Table 4. Consortium of Requesters

Requesters	Description	Agreement with final reformulation
DG Research and Innovation (EC-DG RTD)	Responsible for EU research agenda.	Yes
DG Environment (EC - DG ENV)	Responsible for EU policy on the environment.	Yes
DG Health Emergency preparedness and Response Authority (EC – DG HERA)	Responsible for preventing, detecting, and rapidly responding to health emergencies by anticipating threats and potential health crises through intelligence gathering and building the necessary response capacities.	Yes

² European Commission's Directorate-General for Research and Innovation





<p>DG Agriculture and Rural Development (EC - DG AGRI)</p>	<p>Responsible for EU policy and research on agriculture and rural development and deals with all aspects of the common agricultural policy (CAP).</p>	<p>Yes</p>
<p>Project HERA (Health Environment Research Agenda for Europe)</p>	<p>EU funded project that involves 15 European countries, an international organisation and a European NGO, thus 24 partners in total who are working hard to prepare the Health and Environment Research Agenda 2020-2030. The aim was to set the priorities for an environment, climate and health research agenda in the EU.</p>	<p>Yes</p>
<p>Norwegian Veterinary Institute (NRI)</p>	<p>Norwegian national biomedical institute delivers research-based knowledge and contingency support in animal health, fish health, and food safety.</p>	<p>Yes</p>
<p>PREZODE</p>	<p>International initiative with the ambition to understand the risks of the emergence of zoonotic infectious diseases and develop and implement innovative methods to improve prevention, early detection, and resilience to ensure rapid response to the risks of emerging infectious diseases of animal origin.</p>	<p>Yes</p>
<p>One Health High-Level Expert Panel (OHHLEP)</p>	<p>An initiative supported by the heads of FAO³, OIE⁴, UNEP⁵ and WHO⁶, and the governments of France and Germany, to further enhance the cross-sectoral collaboration, enhance strategic orientations and coordination and provide high political visibility on the subject of One Health.</p>	<p>Yes</p>

First screening of literature and initiatives and Open Call for Knowledge

The Call for Knowledge and literature screening resulted in a compilation of existing relevant literature, projects and initiatives:

- **Literature review collected by the Eclipse Management Body (EMB):**

³ The Food and Agriculture Organization (FAO)

⁴ World Organisation for Animal Health (OIE)

⁵ United Nations Environment Programme (UNEP)

⁶ World Health Organisation (WHO)

<https://docs.google.com/spreadsheets/d/1H-7SoAVoEAKUdrQyKia0D8lrTNRUFv5fPwKBta-HOXA/edit#gid0>

- **List of initiatives/projects/networks collected by the EMB:**

<https://docs.google.com/spreadsheets/d/171PHarAsfRgK7ro9iEPURLjX74YwWuX4s4cvOPDLw2g/edit#gid=1770112322>

- **Literature collected in the Call for Knowledge (see Annex 4).**

4) *Refined request question*

Following the focus group “Biodiversity and pandemics”, 28 April 2022 (see Annex 5), the Eklipse scoping group of the request on “Biodiversity and pandemics” met again and developed the following reformulated request with the elements gathered during the focus group:

Building on existing relevant work on research agendas and knowledge gap analysis, identifying interdisciplinary research [and action] priorities that contribute to a strategic research agenda on Biodiversity and pandemics addressing the critical interlinkages between relevant sectors needed to make future actions more effective.

The request process would include:

- Mapping of existing research agendas and knowledge gap analysis
- Filtering and analysing research recommendations related to Biodiversity and pandemics
- Prioritise the identified research recommendations based on their potential for maximising the impact on policies for relevant sectors.

5) *Selection of the Expert Working Group (EWG)*

The EWG is the group of selected experts that will be in charge of answering the request “Biodiversity and Pandemics” based on the [Eklipse process](#). They are individual experts who will nominate themselves following the call for experts (see Annex 6). The final selection of the EWG will be carried out by the Knowledge Coordination Body (KCB), which will ensure the best possible coverage in terms of disciplines, geographic and gender balance. The selected EWG will consist of scientists and practitioners and will be supported by dedicated members from the KCB, the MEG and the EMB ([see Guidance Note 6](#)). As in similar science-policy processes, Eklipse activities rely on in-kind contributions.





Criteria for selecting the experts (See full list of criteria in the Call for Expert (See Annex 6))

The individual experts that nominate themselves should have demonstrated expertise or experience in the following disciplines:

- disease ecology, disease transmission in wildlife, potentially zoonotic diseases or studying spillover.
- conservation medicine, wildlife health and conservation
- veterinary health, epidemiology and surveillance of infectious diseases, including zoonoses, in domestic animals and potentially at the interface with wildlife
- environmental health (public health)
- epidemiology and prevention, exposome, emerging entities from changing environment
- ecosystem health, ecosystem functioning and disease regulation ecosystem service
- environmental law and governance of One Health national and international legislation and other documents (treaties, conventions) on biodiversity and health (global health, one health)
- economics and sustainable development integration of biodiversity and health (pandemics) in economy (ecological transition, trade, ...)

Participants should have **either direct experience** in knowledge synthesis or experience in qualitative research. Specific techniques/experiences that are especially valued include:

- Systematic Review
- Systematic mapping
- Multi-criteria decision analysis
- Delphi
- Semi-structured interviews
- Focus groups
- Workshops

Invited participants to the Focus Group, as well as Eclipse KCB and EMB members are **not eligible**.

Selected Experts will have to **comply with the principles and rules of Eclipse**: e.g. conflicts of interest policy, Code of Conduct, etc... (see Eclipse [ethical framework](#) for more details).

6) Suggested methods and timeline for the answering process

During the scoping phase, the members of the [Eclipse Methods Expert Group \(MEG\)](#) discussed potential knowledge synthesis methods suitable for this request (more information on knowledge synthesis methods in [Dicks et al. 2018](#) and the [methods webpage](#) of the Eclipse website).

Methods suggested by the MEG

No single method addresses all the methodological challenges in the request “Biodiversity and Pandemics”. Rather, a bundle of techniques will be needed to tackle three distinct knowledge synthesis aims:

- a. **Literature-based knowledge synthesis methods** to identify and assess published peer-reviewed literature, wider grey literature and policy documents. Methods include [systematic map](#); [scoping review](#); [systematic review](#); [rapid evidence review](#).
- b. **People-based knowledge synthesis methods** to access current activities setting research agendas. This involves a range of consultation methods, either as part of a wider deliberative process (method 3) or as a stand-alone process. Methods include [multiple expert consultations](#), involving a workshop or an online [Delphi process](#), or a series of [focus groups](#), with the aim of identifying and assessing what is currently being developed but not yet in the public domain.
- c. **People-based decision methods** to support prioritisation/decisions. This builds on stage 2 but aims to rank, sort or prioritise the research agenda items already identified. Methods include deliberative tools like the [Delphi process](#), or prioritisation or ranking techniques such as [multi-criteria decision analysis](#) (MCDA) or [structured decision making](#).

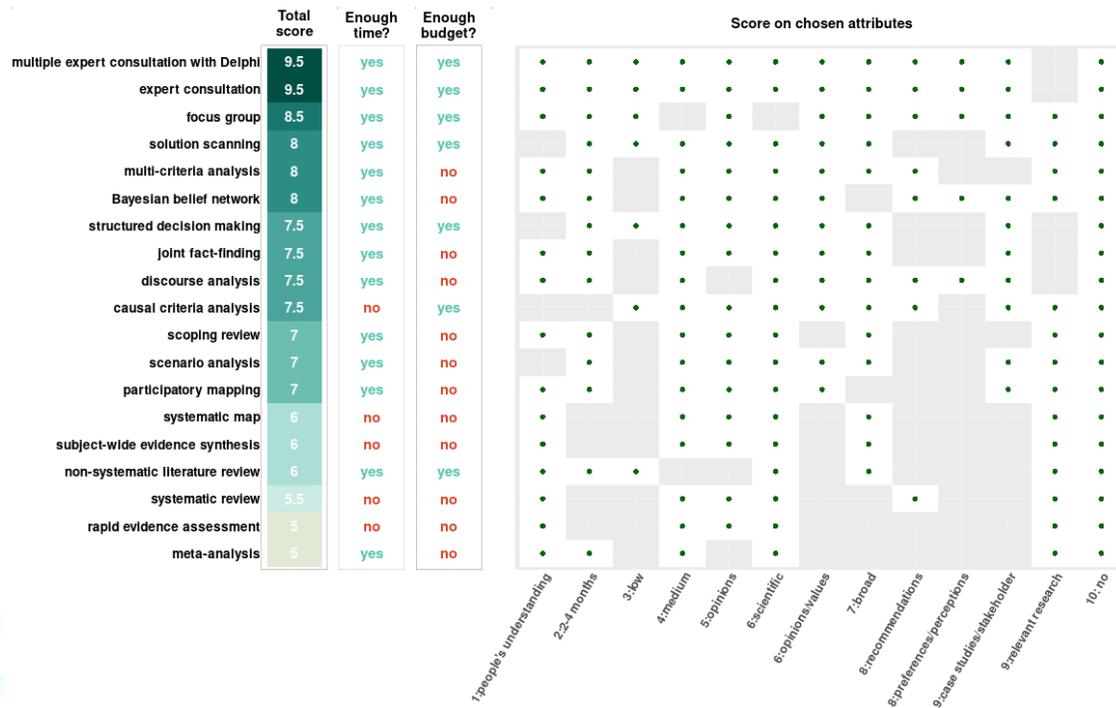
To help the EWG understand what tools might best address the three method pathways outlined above, the MEG recommends collectively using the [MAGICKS](#) tool. This guides a dialogue about the characteristics of the required knowledge synthesis, and prioritisation decisions, matches these characteristics to the expected attributes of different methods, and provides concise guidance on how to conduct each method. An example output is shown below in Figure 1.

The final decision on which method or combination of methods will be used to process the request “Biodiversity and Pandemics” will be made after a thorough dialogue between the EWG and the MEG. The description and justification for the selected method(s) will be part of the first mandatory deliverable the EWG will have to deliver, i.e. the Method Protocol. All Eclipse Method Protocols are peer-reviewed, open for public consultation, and once revised they are published on Eclipse website (sometimes in Scientific article) and broadly disseminated.





Figure 1. Example of the use of MAGICKS (Method Application and Guidance in Conducting Knowledge Syntheses) to help guide the process of choosing a method of knowledge synthesis.



Timeline

The Scoping Group has developed a provisional timeline to give an orientation of the steps and duration of the answering process until the final outputs (see Table 5).

As key component of the method protocol, the EWG will develop a refined timeline for answering the request considering the needs of the requesters, the relevant policy process(es), the complexity of the request and the selected tailored methods.

Table 5. Suggested timeline

Suggested timeline	Key activities	Actions or feedback from requesters
Deadline application 20/06/2022	Open Call for Experts https://eclipse.eu/calls/	Dissemination of the call
Week of 20 June 2022	Selection of the Expert Working Group	None
Last week of June	Online kick-off meeting of the EWG	Participation in the first part of the meeting to explain the specific

		interest in the request and answer key questions of clarifications from the experts
The second week of September	Call for Open consultation and Peer Review of the Methodological Protocol	Dissemination of the call Requesters can submit a review
<u><i>Duration of the answering phase of the Eklipse process</i></u> Between 3 and 8 months, depending on the selected method(s)	Call for Open consultation and Peer Review of the synthesis report	Dissemination of the call Requesters can submit a review
	Launch of the final report	Dissemination and contribution to ensure the uptake of the evidence produced by EWG by research and policy, i.e. ensuring the usefulness of the results /evidence

7) Logbook

The logbook records all events and exchanges within the Eklipse Scoping group (see Table 3. in section Summary of the scoping activities) and with the requester(s) (see Table 4. in section Summary of the scoping activities).

Table 6. Logbook

Date	Participants	Topic	Platform
December 2020	European Commission and Eklipse	Confirmation of additional funding to identify key policy needs on COVID-19 and Biodiversity	
January - February 2021	Eklipse	First brainstorming meetings and preparation for the Call for KCB member experts on Biodiversity and Health and selection of the new KCB member	Online (Zoom)
March 2021	KCB 1 st scoping group meeting	Work planning and preparation of the workshop	Online (Zoom)



March-May 2021 regular meetings	Eclipse and EC- Knowledge Centre for Biodiversity (KCBD)	Close collaboration with the EC-KCBD and Contact with several DGs of the European Commission Design and organisation of the Online Workshop: “Biodiversity in Post-covid cross-sectoral challenges”, Preparation of invitation letters	Online (Zoom)
May 31 st 2021	Eclipse scoping group, EC - KCBD, EC - DG RTD, several DGs, and experts	One-day online Workshop: “Biodiversity in Post-covid cross-sectoral challenges.”	Online (Zoom), Mural, Mentimeter
June 2021 regular meetings	Eclipse + Knowledge Centre for Biodiversity (KCBD)	Development of the Workshop’s report Creation of a survey for the participants	Online (Zoom)
July – October 2021	Eclipse	Survey to rank the identified policy needs sent to all workshop participants, KCB, SAB Preparation of interviews	Google form
October 2021	Eclipse Strategic Advisory Board (SAB)	SAB meeting: Strategic discussion on next steps to overcome the status quo	Online (Zoom)
November 2021 - present Weekly meetings every Monday at 11:30 am (CET)	Eclipse scoping group	Preparation of the Call for Knowledge (CfK) Dissemination strategy for the CfK Create links with other initiatives Listing and identification of potential requesters Creation of a 4-pager for the European Commission Writing of letter of support Organisation of meetings with initiatives in relation to the topic Preparation of presentations for various event Compilation and analysis of the call for knowledge Design and organisation of the online focus group Writing the Workshop’s report Writing of the Document of Work (DoW) Preparation of the Call for Experts (CfE)	Online (Zoom), Website, google form, social media

January 2022	Eklipse and Helmholtz Institute for One Health (HIOH)	Meeting with the new Helmholtz Institute for One Health (HIOH) in the frame of the call for knowledge.	Online (Zoom)
February 10 th 2022	SAB and scoping group	SAB meeting: Strategic discussion on next steps to overcome the status quo: Potential options to move the requests forward and decision to organize a focus group	Online (Zoom)
February 11 th 2022	Scoping group	PREZODE virtual event within the framework of the French Presidency of the Council of the European Union, "Joining forces to escape the era of pandemics" Eklipse presentation.	Online (Zoom)
February 2022	Scoping Group	Compilation Call for Knowledge, compilation of Initiatives Support letter from PREZODE	Google docs and online (Zoom)
March 2022	Eklipse (Nils Bunnefeld, Ute Jacob, Serge Morand, Marie Vandewalle) and EC-DG AGRI (Jean-Charles Cavitte)	Meeting with Jean-Charles Cavitte from EC-DG AGRI	Online (Zoom)
April 21 st 2022	Marie Vandewalle	Presentation of the Eklipse request "Biodiversity and Pandemics" in a PREZODE event.	Online (Zoom)
April 28 th 2022	Eklipse scoping group, EC - DG RTD, several DGs, and relevant experts	Participation in a half-day online Focus group, "Biodiversity and pandemics."	Online (Zoom)



8) Annexes

Annex 1: Description of scoping phase activities.

Step 1: Online Workshop on Biodiversity in post-covid cross-sectoral challenges (21 May 2021)

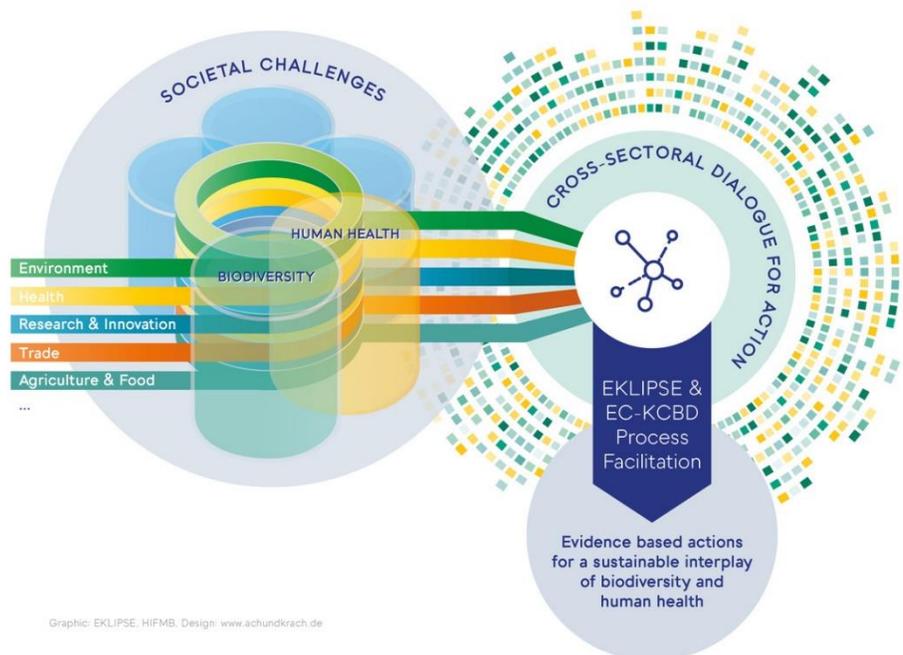
Objective:

Eclipse received at the end of 2020 a request from EC - DG RTD to answer policy-relevant needs for evidence related to Biodiversity and Pandemics. Eclipse organised, together with the EC- Knowledge Center for Biodiversity, a cross-sectoral workshop in May 2021 (for more information, please see the Agenda in Annex 1 below and consult the [Workshop's report](#) on the Eclipse website). This event gathered 40 participants, including representatives from selected European Commission services (available policy DGs representatives from relevant sectors to the workshop topic) and a great range of experts and journalists. Participants were invited:

- to reflect on the drivers of pandemics, how these drivers are linked to EU policies and what key actions could be started to address these drivers, and;
- to think of what knowledge/evidence needs could leverage these actions and how these evidence needs could be formulated into policy-driven requests.

One or two requests will be answered as part of Eclipse's H2020 Green Deal extension scoping study.

Framing cross-sectoral evidence needs to help improve pandemic prevention



Aims of the Workshop:

- Clarify the interlinkages between different sectors, Biodiversity and Health and;
- Explore how cross-sectoral approaches/actions can help prevent pandemics (root causes) and be better prepared when they occur and;
- Identify knowledge needs to support these cross-sectoral approaches/actions

Results of the Workshop:

On the basis of the identified evidence needs to support these cross-sector actions, the participants formulated seven potential requests to Eklipse and ranked them

1. *Developing a strategic research agenda on Biodiversity and pandemics, jointly with all relevant agencies, and aligned with relevant sectoral policy agendas; this would involve further workshops, building on the initial Workshop, identifying a more comprehensive set of research needs and supporting the integration of existing and proposed initiatives to promote effective and efficient uptake of research recommendations*
2. *How to catalyze change through One Health, especially in translating the information to more stakeholders and new generations: a mixture of ways of messaging, nudging, education, and capacity building.*
3. *Developing a framework for joint monitoring of the right indicators (including social) for Biodiversity and change.*
4. *Better understanding of the impact of EU policies generally on the emergence and spread of Emerging Infectious Diseases in third countries; this could be expanded to consider the fair implementation on local people of policies intended to mitigate the emergence of Emerging Infectious Diseases; (i.e., do European policies that relate to Biodiversity and emerging infectious disease impact fairly on local people and other stakeholders).*
5. *Identification and prioritisation of monitored ecosystems/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases in order to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP...)*
6. *Developing a policy support framework on socioeconomic considerations of prevention measures.*
7. *Identifying the best mechanism (with due consideration of ethics and data sharing and existing barriers to sharing the most relevant data.*

Step 2: Selection of three requests with the higher policy potential

After the cross-sectoral Workshop organised in May 2021, a survey was circulated among the participants of the Workshop, the Eklipse Knowledge Coordination Body (KCB) and the Strategic Advisory Board (SAB) to define the requests with the greater policy relevance /relevance to better prepare for future pandemics, the lowest risk of duplication and the best potential to enhance cross-sectoral dialogue for action. Following the collected results, the KCB, together with the SAB, selected three of the seven requests identified in the Workshop:

→ Request n°1: *Developing a strategic research agenda on Biodiversity and pandemics, jointly with all relevant agencies and aligned with relevant sectoral policy agendas*





→ Request n°2: *A better understanding of the impact of EU policies generally on the emergence and spread of Emerging Infectious Diseases (EID) in third countries; could be expanded to consider the fair implementation of local people of policies intended to mitigate the emergence of EIDs and the loss of Biodiversity*

→ Request n°3: *Identification and prioritisation of monitored ecosystems/biodiversity/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP).*

Step 3: Call for knowledge

In December 2021, Eklipse launched a CALL FOR KNOWLEDGE FOR INITIAL SCOPING (read the [call \(CfK 01/2021\)](#) on the Eklipse website), inviting scientists, policy-makers, practitioners and other societal actors to share their knowledge on the following topic: “Developing a strategic research agenda on Biodiversity and pandemics, aligned with relevant sectoral policy agendas”. The main objective of this Call for Knowledge was to launch an initial scoping process on the request meant to identify available assessments, existing studies, and other resources to avoid duplication of ongoing efforts and ensure the outputs are jointly and timely developed.

The participants were asked to answer the following questions:

1. *Do you know of any major or overlooked projects, papers, reports, grey literature that could support our preparedness for future pandemics?*
2. *Could you share your experiences of on-the-ground actions aiming at understanding the emergence of zoonotic and infectious diseases and their prevention. These can be actions that worked or didn't work as expected– we can learn from both!*
3. *Do you have any suggestions on what knowledge (from science, policy, or societal experience) is needed to better understand the emergence of zoonotic and infectious diseases, their different stages and their prevention?*
4. *Are you aware of any knowledge gap analysis concerning any of these items:*
 - a. *Catalysing transformative change through the ‘One Health’ approach, especially in translating the information to more stakeholders and younger generations.*
 - b. *Developing a framework for joint monitoring key indicators (including social) for Biodiversity and change in order to prevent future pandemics.*
 - c. *Better understanding of the impact of EU policies generally on the emergence and spread of Emerging Infectious Diseases (EID) in third countries and potential links with Biodiversity and its loss; this could be expanded to consider the fair implementation on local people of policies intended to mitigate the emergence of EIDs and the loss of Biodiversity.*
 - d. *Identification and prioritisation of monitored ecosystems/biodiversity/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP, One Sustainable Health, and others).*
 - e. *The implementation of nature- or ecosystem-based solutions to prevent the risk of emergence of zoonoses.*

f. Developing a policy support framework on socioeconomic and Biodiversity considerations of pandemics prevention measures.

Results from the Call for Knowledge (CfK)

This call resulted in documented suggestions from 11 different experts. The outcomes include 26 projects, key global organisations and initiatives, plus a full list of all EU-funded projects. Furthermore, and to complement the literature collected by the Eklipse Management Body (see reference section), we received a total of 28 scientific references, 11 reports and five materials such as bulletins and workshop brochures. This literature has a broad range of geographical coverage and shows a high number of initiatives as well as a considerable interest in the topic.

To have more details of the CfK results, please see Annex 4.

Step 4: Online Focus group

Objective:

Co-develop a cross-sectoral request/question to Eklipse on Biodiversity and pandemics (see Annex 4 for the agenda and read the [Focus group report](#) online)

The focus group was organised to target which request will be processed by an independent and interdisciplinary Eklipse Expert Working Group (EWG) (selected following an Eklipse Call for Experts) in the next few months. It involved 19 participants coming from relevant EU Commission DGs (namely DG RTD, DG ENV, DG AGRI, and DG HERA), key experts and initiatives (namely PREZODE, OHHLEP, IPBES, Ecohealth) and Eklipse governance body representatives (KCB, MEG, EMB). The invited participants to the Focus Group were asked to discuss and select the request(s) whose results and outputs would be useful for their work and/or feed into a key policy process. The expected outcome of this focus group was to create a cross-sectoral consortium of requesters that will follow up on the Eklipse process. In preparation for the Workshop, three questions were asked to all the invited participants and answers were compiled.

Aims:

- To co-develop a cross-sectoral request /question to Eklipse on Biodiversity and pandemics to target which request will be processed by an independent and interdisciplinary Eklipse Expert Working Group (EWG).
- To create a cross-sectoral consortium of requesters that will follow up the Eklipse process.

Results of the focus group:

After discussing the requests among the participants, request n° 1 was unanimously supported by the different DGs and experts present at the Workshop, as a potential final request to Eklipse; with the following provisional formulation:





“Make sense /some analysis of the existing research agendas/knowledge gap analyses to extract the priorities in the view of interlinkages (between sectors).”

It was commented that the final formulation of the request would be reworked by the scoping group and the information will be sent to the focus group’s participants. The following participants accepted to follow up on the Eklipse process:

European Commission: Christina PANTAZI, DG RTD., Jean-Charles CAVITTE, DG AGRI

Experts: Anais DEVOUGE, Project HERA; Carlos GONCALO DAS NEVES, Norwegian Veterinary Institute (NRI); Pierre DUSSORT, PREZODE. Thomas Mettenleiter (OHHLEP)



Annex 2: Agenda of the Online Workshop “Biodiversity in post-covid cross-sectoral challenges” (May, 31st 2021)

Online Workshop: “Biodiversity in post-covid cross-sectoral challenges” May 31st 2021 - 09:30 – 16:30 CEST - by invitation only Agenda Workshop facilitated by Estelle Balian (FEAL)	
09:30 – 09:55	Introduction to the workshop, background and objectives. <ul style="list-style-type: none"> ★ Estelle Balian (FEAL) - Facilitator ★ Ute Jacob (HIFMB) - Eklipse KCB Co-chair ★ Ivan Kulis (EC-JRC-Head of Unit Knowledge for Sustainable Development & Food Security) ★ Christine Estreguil (EC-JRC) - EC-KCBD ★ Marie Vandewalle (UFZ) - Head of Eklipse Management Body
09:55 – 10:15	Tour de table and icebreaker
10:15 – 10:20	Introduction to morning session
10:20 - 11:15	A conversation on biodiversity and pandemics Panel discussion with <ul style="list-style-type: none"> ★ Marie-Monique Robin (journalist, film director, author of “Making Pandemics: Preserving Biodiversity, an Imperative for Planetary Health”) ★ Serge Morand (Eklipse KCB Health Ecology expert, CNRS - CIRAD - Faculty of Veterinary Technology, Kasetsart University, Bangkok) ★ Thomas Mettenleiter (One Health High Level Expert Panel (OHHLEP), Friedrich-Loeffler-Institut) ★ Doreen Robinson (United Nations Environment Programme, dep. Biodiversity and land)
11:15 – 11:30	Virtual Coffee break with delicious cookies
11:30 - 12:10	Break-out Group session I : Exploring the past to understand linkages between EU Policy sectors, the biodiversity crisis and pandemics and to reflect on lessons learned in terms of science-policy challenges. for preventing pandemics

12:10 - 12:25	Reporting from the Break-out Groups
12:25 – 12:30	Wrap-up of morning session
12:30 - 13:30	Lunch break
13:30 - 13:50	Introduction to the afternoon session and reporting on morning results
13:50 – 14:20	Introduction to existing initiatives on infectious disease emergence prevention: <ul style="list-style-type: none"> ★ Pierre Dussort (INRAE, PREZODE) ★ Hans Keune (INBO, European OneHealth/Ecohealth Community of Practice)
14:20 - 14:35	Introduction to Eklipse Request Formulation and knowledge synthesis methods
14:35 – 14:45	Introduction Break-out Groups
14:45 – 15:00	Virtual Coffee break with delicious cookies
15:00 – 15:45	Break-out Group session II : Exploring scenarios for the future and how evidence based key policy actions could contribute to prevent future pandemics
15:45 - 16:15	Reporting from the breakout groups and discussion
16:15 - 16:30	Workshop conclusions and next steps Christine Estreguil - EC KCB Marie Vandewalle - Eklipse



Annex 3: Call for Knowledge

CALL FOR KNOWLEDGE FOR INITIAL SCOPING

Eclipse- CfK 01/2021

TOPIC:

Developing a strategic research agenda on Biodiversity and pandemics, aligned with relevant sectoral policy agendas

December 2021

1. Invitation to share knowledge for informed decision-making

Eclipse invites you to contribute your knowledge on Biodiversity and pandemics, including zoonotic diseases supporting the identification of research gaps and policy needs, by answering the questions below.

Background:

The COVID-19 crisis has revealed how fragile and vulnerable our societies are to pandemics and how challenging informed political and policy responses become when faced with such an emergency. As a global community, we were not prepared!

The potential risk of zoonoses linked to unprecedented land degradation and land conversion, unleashed consumption of natural resources, increasing livestock production, and acceleration of biodiversity loss had been identified and did not come as a surprise to the scientific community. The pandemic has revealed a broad range of science-policy challenges and knowledge gaps. Addressing these will better prepare us for the next crisis that emerges.

To support the identification of knowledge needs related to managing the links between Biodiversity and human Health, including zoonotic and infectious diseases, Eclipse organised together with the EC-Knowledge Center for Biodiversity a workshop bringing together invited participants, including representatives from a range of European Commission services together with key experts. This Workshop highlighted the need to develop a strategic research agenda on Biodiversity and pandemics, jointly with all relevant agencies, and aligned with relevant sectoral policy agendas.

Eclipse invites scientists, policy makers, practitioners and other societal actors to share their knowledge on the topics. The main aim of this Call for Knowledge is to gather all relevant knowledge to be

considered during the [Eclipse process](#). This is to avoid duplication of ongoing efforts and to ensure the outputs are jointly and timely developed.

1. Do you know of any major or overlooked projects, papers, reports, grey literature that could support our preparedness for future pandemics?
2. Could you share your experiences of on-the-ground actions aiming at understanding the emergence of zoonotic and infectious diseases and their prevention. These can be actions that worked or didn't work as expected– we can learn from both!
3. Do you have any suggestions on what knowledge (from science, policy, or societal experience) is needed to understand better the emergence of zoonotic and infectious diseases, their different stages and their prevention?
4. Are you aware of any knowledge gap analysis concerning any of these items:
 - a. Catalysing transformative change through the 'One Health' approach, especially in translating the information to more stakeholders and younger generations.
 - b. Developing a framework for joint monitoring key indicators (including social) for Biodiversity and change in order to prevent future pandemics.
 - c. Better understanding of the impact of EU policies generally on the emergence and spread of Emerging Infectious Diseases (EID) in third countries and potential links with Biodiversity and its loss; this could be expanded to consider the fair implementation on local people of policies intended to mitigate the emergence of EIDs and the loss of Biodiversity.
 - d. Identification and prioritisation of monitored ecosystems/biodiversity/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP, One Sustainable Health, and others).
 - e. The implementation of nature- or ecosystem-based solutions to prevent the risk of emergence of zoonoses.
 - f. Developing a policy support framework on socioeconomic and Biodiversity considerations of pandemics prevention measures.

2. How to contribute?

Please contribute your comments and knowledge/initiatives/references through the [Eclipse Survey](#) or through [social media](#) using the hashtag: #BiodiversityPandemics. Feel free to send us an email directly if you prefer or request a meeting with us, using emb@eklipse.eu.

We invite you to add any information that you think is relevant for this request and justify its inclusion (e.g. additional information from countries, scales, or disciplinary perspectives not covered sufficiently). We also warmly encourage you to help us disseminating broadly this call for knowledge.

Relevant information should be grouped under the following: (1) Initiatives/projects (indicating if completed, ongoing or planned), (2) literature reviews, (3) empirical studies/practical experiences, (4) modelling studies, and (5) conceptual papers.





Contributions may include: (a) links to websites or contact details, (b) to open access papers, (c) links to published and unpublished grey literature or case studies, (d) descriptions of ongoing research projects or knowledge compilations expected to deliver results within the next year, or (e) your on-the-ground experiences in this field.

3. Objective of the call and request to be addressed by this call

The final framing of the request is being developed through an interactive dialogue between Eklipse, the main requester (EU Commission - DG RTD), and will be further discussed with DGs including DG ENV, DG SANTÉ, DG TRADE, DG AGRI, DG CLIMA, DG INTPA; EFSA, the Environment and Health Observatory from the EEA and JRC.ISPRA; to ensure relevance for policy making regarding biodiversity and ecosystem services. We want to explore the amount of knowledge that exists in this area, who the main knowledge holders and initiatives are and, if after scoping we decide to answer this request, we want to identify the most suitable knowledge synthesis methodology for answering it.

Eklipse coordinates innovative and transparent approaches for science, policy and societal actors to jointly provide the best available evidence for better-informed decision-making and identify current and future research priorities. A request on Biodiversity and pandemics, focusing on knowledge gaps, was proposed by the EU Commission– DG RTD. The objective of this call for knowledge is to launch an initial scoping process on the request meant to identify available assessments, existing studies and other resources. For further details on Eklipse background see [link](#), its functions see [link](#) and the process how it addresses requests from policy and society see [link](#).

The Eklipse Scoping Team

Serge Morand - Eklipse KCB Focal point - “Biodiversity and Pandemics” expert, CNRS - CIRAD, Faculty of Veterinary Technology, Kasetsart University, Bangkok.

Carla Washbourne - Eklipse KCB Focal point, University College London.

Salla Rantala - Eklipse KCB Focal point deputy, Finish Environment Institute.

Nils Bunnefeld - Eklipse MEG Focal point, University of Stirling, UK.

Alister Scott - Eklipse MEG Focal point, University of Northumbria, UK.

Ana Lillebø - Eklipse KCB, University of Aveiro (CESAM).

Ute Jacob - Eklipse KCB Co-chair, Helmholtz Institute for Functional Marine Biodiversity, University of Oldenburg (HIFMB).

And the [Eklipse Management Body](#).

Annex 4: Results Call for Knowledge

Summary

This call resulted in documented suggestions from 11 different experts. The outcomes include 26 projects, key global organisations and initiatives, plus a full list of all EU-funded projects. Furthermore, and to complement the literature collected by the Eklipse Management Body (see reference section), we received a total of 28 scientific references, 11 reports and five materials such as bulletins and workshop brochures. This literature has a broad range of geographical coverage and shows a high number of initiatives as well as a considerable interest in the topic.

The literature highlights that destructive human activity, e.g. land-use change, wildlife hunting, and trade, amplifies the risk of emergence and further spread of pathogens, particularly originating from livestock, domestic animals or wildlife. They show that epidemic and endemic zoonoses, including neglected tropical zoonotic diseases, account for approximately 1 billion disease cases and millions of deaths each year worldwide, one of the greatest burdens on human health and livelihoods and a persistent regional health problem worldwide. Moreover, the collected research and initiatives seek to identify and clarify gaps in health risks linked to wildlife and the environment that affect pandemic prevention and preparedness, emphasising also the need for policy changes as well as creating and implementing resilient surveillance systems.

Literature review from the Call for Knowledge (CfK)

Literature that could support the preparedness for future pandemics:

Projects, initiatives:

- Impact of land-use change and biodiversity loss funded by the DFG (Charite and Makerere University from Uganda and Bonn)
- CRC future rural Africa and the subproject on infectious diseases <https://www.crc228.de/projects/project-b02-future-infections/>
- One Health Graduate School at ZEF <https://ww3w.zef.de/onehealth.html>
- Biosecurity Research Initiative at St Catherine's: www.caths.cam.ac.uk/research/biorisc
- USAID PREDICT1-2 and EU LACANET projects, Through PREDICT, over 6,000 professionals were trained in wildlife, livestock, and community disease surveillance and One Health approaches, including government and university staff, rangers, community members and scientists; and assisted national laboratories to identify over 1,100 viruses of which 140 novel viruses, including zoonotic diseases of public health concern such as Bombali Ebolavirus, and novel coronaviruses closely related to COVID-19. Project findings and collaborations highlighted key factors and activities for amplification of pandemic risk, including commercial wildlife trade, and have been instrumental in guiding policy changes and in the creation of surveillance and pandemic prevention networks, such as WildHealthNet (<https://oneworldonehealth.wcs.org/Initiatives/WildHealthNet.aspx>) in Vietnam, Lao PDR and Cambodia, designed to integrate with national One Health platforms to facilitate rapid response.





- WildHealthNet has detected H5N1 HPAI in wild birds, ASF in wild boar, Lumpy skin disease in banteng, and other high-consequence pathogens in wildlife (brief case studies on ASF and H5N1 HPAI can be found here: <https://oneworldonehealth.wcs.org/Initiatives/WildHealthNet.aspx>).
- Spatial Monitoring and Reporting Tool (SMART) is currently deployed in close to 1,000 protected areas, with >50,000 rangers trained in its use globally. Recognising this unprecedented network of eyes-in-the-field in biodiverse areas identified as hotspots for disease spillover, WCS recently created a Health module (SMART for Health - <https://oneworldonehealth.wcs.org/SMARThealth.aspx>)
- A full list of EU-funded projects supporting research to tackle the COVID-19 pandemic can be found here: https://ec.europa.eu/info/research-and-innovation/research-area/health-research-and-innovation/coronavirus-research_en

Reports, scientific literature:

- Petrovan, S.O., Aldridge, D.C., Bartlett, H., Bladon, A.J., Booth, H., Broad, S., Broom, D.M., Burgess, N.D., Cleaveland, S., Cunningham, A.A., Ferri, M., Hinsley, A., Hua, F., Hughes, A.C., Jones, K., Kelly, M., Mayes, G., Radakovic, M., Ugwu, C.A., Uddin, N., Verissimo, D., Walzer, C., White, T.B., Wood, J.L. and Sutherland, W.J. (2021), Post COVID-19: a solution scan of options for preventing future zoonotic epidemics. *Biol Rev*, 96: 2694-2715. <https://doi.org/10.1111/brv.12774>
- Sutherland, W. J. et al. (2021) 'A solution scan of societal options to reduce transmission and spread of respiratory viruses: SARS-CoV-2 as a case study', *Journal of Biosafety and Biosecurity*, 3(2), pp. 84–90. doi: <https://doi.org/10.1016/j.jobbb.2021.08.003>.
- World Bank's 'People, Pathogens and Our Planet' 2012 (<https://openknowledge.worldbank.org/handle/10986/11892>)
- <https://c532f75abb9c1c021b8c-e46e473f8aadb72cf2a8ea564b4e6a76.ssl.cf5.rackcdn.com/2020/05/22/8zqrkmzuna> Links between ecological integrity and EIDs originating from wildlife.pdf
- The COVID-19 pandemic and Indigenous Peoples and Local Communities: protecting people, protecting rights: <https://c532f75abb9c1c021b8c-e46e473f8aadb72cf2a8ea564b4e6a76.ssl.cf5.rackcdn.com/2020/06/29/66o8ub6lop> WCS COVID 19 PandemicAndIndigenousPeoples.pdf
- Machalaba C, Uhart M, Ryser-Degiorgis M-P, Karesh WB. 2021. Gaps in health security related to wildlife and environment affecting pandemic prevention and preparedness, 2007–2020. *Bulletin of the World Health Organization* 99:342-350B. Available from <http://www.who.int/entity/bulletin/volumes/99/5/20-272690.pdf>.
- Gruetzmacher, K., Karesh, W. B., Amuasi, J. H., Arshad, A., Farlow, A., Gabrysch, S., Jetzkowitz, J., Lieberman, S., Palmer, C., Winkler, A. S., & Walzer, C. (2021). The Berlin principles on one Health – Bridging global Health and conservation. *Science of The Total Environment*, 764, 142919. <https://doi.org/10.1016/j.scitotenv.2020.142919>.
- Figueroa DM et al. 2021. Development and validation of portable, field-deployable Ebola virus point-of-encounter diagnostic assay for wildlife surveillance. *One Health Outlook* 3:9. *One Health Outlook*. Available from <https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-021-00041-y>.
- Kuisma E et al. 2019. Long-term wildlife mortality surveillance in northern Congo: a model for the detection of Ebola virus disease epizootics. *Philosophical Transactions of the Royal Society B*:

Biological Sciences 374:20180339. Available from <https://linkinghub.elsevier.com/retrieve/pii/S120197121834606X>.

- FRB report on Biodiversity and Covid: <https://www.fondationbiodiversite.fr/wp-content/uploads/2020/05/FRB-Covid19-English-version-2021-05.pdf>
- Gibb et al 2022 on the instability of mammalian virus diversity estimates due to acceleration of discovery effort <U+FOE0> be careful about the conclusion on the contribution of different host taxa to spillover. <https://doi.org/10.1098/rsbl.2021.0427>
- Morand and Eloit. The conversation. Biogrowth or bio-solidarity (sorry it is in French) <https://theconversation.com/bio-croissance-ou-bio-solidarite-la-convention-sur-la-diversite-biologique-a-lheure-des-choix-169668>
- Harvard task force report
- Lancet countdown report
- Tripartite + report
- Kock., R. and Caceres-Escobar, H. (2022). Situation analysis on the roles and risks of wildlife in the emergence of human infectious diseases. Gland, Switzerland: IUCN. <https://portals.iucn.org/library/sites/library/files/documents/2022-004-En.pdf>
- https://media.4-paws.org/0/f/a/f/Ofafab297790f41ccbf97b741c72188be99d582f/FOUR-PAWS_Pandemic-Futur-Study-Brochure_EN_211019.pdf
- CASE STUDY: BENEFITS OF DIGITISING COLLECTIONS - How digitizing bat specimens in museum collections is helping research into coronaviruses in paper Popov D, Roychoudhury P, Hardy H, Livermore L, Norris K (2021) The Value of Digitizing Natural History Collections. Research Ideas and Outcomes 7: e78844. <https://doi.org/10.3897/rio.7.e78844>, and references therein.
- WCS Policy on Preventing Epidemics and Pandemics of Zoonotic Origin: The role of Wild Meat Markets and Wildlife Trade: www.wcs.org/get-involved/updates/wcs-policy-preventing-epidemics-and-pandemics-of-zoonotic-origin
- WCS Recommendations How the EU Biodiversity Strategy Can Help Reduce the Risk of Pandemics of Zoonotic Origin: <https://programs.wcs.org/Portals/0/Brussels/WCS-ENVI-hearing.pdf?ver=2021-01-07-211640-147>
- Faculty Reviews 11:(2) <https://doi.org/10.12703/r/11-2>
- <https://www.gbif.org/article/1ye7qAa9Z2HVSn85bfSmLP/who-are-the-gbif-biodiversity-open-data-ambassadors>)
- How landscape change drives zoonotic disease emergence is almost entirely based on correlational and observational studies (Gottendenker et al. 2014).
- Remotely sensed data on land use is correlated with the incidence of pathogen emergence (e.g., Allen et al. 2017; Rulli et al. 2017) or the presence of zoonotic reservoirs (Gibb et al. 2020).
- Basic viral discovery and opportunistic wildlife health surveillance in wildlife is also indicated as we only know about 1% of the global virome (Carlson et al. 2019) and only 10% of potential virus-mammal pairs have likely been documented (<https://arxiv.org/abs/2105.14973>).
- Carlson, C. J., Zipfel, C. M., Garnier, R., & Bansal, S. (2019). Global estimates of mammalian viral diversity accounting for host sharing. *Nature Ecology & Evolution*, 3(7), 1070-1075.
- Hatchuel, A., & Weil, B. (2003). A new approach of innovative Design: an introduction to CK theory. In DS 31: Proceedings of ICED 03, the 14th International Conference on Engineering Design, Stockholm.
- Hatchuel A., Le Masson P., Weil B. (2009). Design theory and collective creativity: a theoretical framework to evaluate KCP Process, Int. Conf. on Engineering Design, ICED'09, Stanford, CA, USA.





- Prost, L., Berthet, E. T., Cerf, M., Jeuffroy, M. H., Labatut, J., & Meynard, J. M. (2017). Innovative design for agriculture in the move towards sustainability: scientific challenges. *Research in Engineering Design*, 28(1), 119-129.
- Vourc'h, G, J Brun, C Ducrot, JF Cosson, P Le Masson, B. Weil. Using design theory to foster innovative cross-disciplinary research: lessons learned from a research network focused on antimicrobial use and resistance in animals. <https://doi.org/10.1016/j.vas.2018.04.001>
- Brun J, MH Jeuffroy, C Pénicaud, M Cerf, JM Meynard. 2021. Designing a research agenda for coupled innovation towards sustainable agrifood systems. *Agricultural System*. <https://doi.org/10.1016/j.agsy.2021.103143>
- Pluchinotta, I., A. O. Kazakçi, R. Giordano, and A. Tsoukià. 2019. Design theory for generating alternatives in public decision making processes. *Group Decision and Negotiation* 28:341–375. <https://www.ck-theory.org/?lang=en>
- Design Theory workshop: <https://www.tmci.minesparis.psl.eu/wp-content/uploads/2021/05/Save-the-date-SIG-2022-email-version-1.pdf>

Literature about developing a framework for joint monitoring the key indicators (including social) for Biodiversity and change, in order to prevent future pandemics:

- Existing standards and frameworks on how to build FAIR (Wilkinson et al. 2016) and transparent data sharing and network tools to jointly monitor key indicators across sectors.
- Trans-sectoral nature of networks for a successful approach to One Health (Grützmacher et al. 2020)
- Machalaba et al. 2021 evaluates global gaps in national wildlife health surveillance.

Literature about Identification and prioritisation of monitored ecosystems/biodiversity/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases in order to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP, One Sustainable Health, and others):

- WCS has applied for a SNAPP working group with a diverse membership to improve wildlife health surveillance systems globally. If funded, part of this effort would be to document and synthesise data to assess and address knowledge gaps.
- Recent gap analyses on what is known in terms of the global virome (Carlson et al. 2020, Carroll et al. 2018) and suggest that monitoring and targeting are still based on extremely limited knowledge of known pathogens.
- IUCN report and gap maps, Kock., R. and Caceres-Escobar, H. (2022). Situation analysis on the roles and risks of wildlife in the emergence of human infectious diseases. Gland, Switzerland: IUCN. <https://portals.iucn.org/library/sites/library/files/documents/2022-004-En.pdf> (already mentioned)

Literature about the implementation of nature- or ecosystem-based solutions to prevent the risk of emergence of zoonoses:

- <https://doi.org/10.1111/brv.12774>
- The SNAPP working group Ecological Levers for Health developed a large review paper tentatively titled, 'Diversity and evidence gaps among potential win-win solutions for

conservation and human infectious disease control', with first and corresponding author Skylar Hopkins (skylar_hopkins@ncsu.edu)

- PEPR, a research program financed by the French Investment for the Future (PIA) funding projects on the links between human activities and zoonosis emergence and re-emergence; on sustainable strategies for preventing the emergence of zoonoses; or aiming to develop innovative methods to improve the surveillance of pathogens.

Literature about developing a policy support framework on socioeconomic and Biodiversity considerations of pandemics prevention measures (f):

- <https://doi.org/10.1111/brv.12774>
- Last December, the World Health Assembly agreed to initiate a process to form an international pandemic treaty, an idea initially launched by EU Council President Charles Michel, <https://medium.com/one-planet-one-health-one-future/a-new-international-pandemic-treaty-must-include-prevention-at-source-771110faf04b>

Key EU and/or global organisations, initiatives with a close connection to the topic:

- Sandra Junglen at the Charite, Makerere University in Uganda, the One Health Graduate School at ZEF
- Biosecurity Research Initiative at St Catherine's: www.caths.cam.ac.uk/research/biorisc
- WHO, FAO are well aware; EDCTP and Horizon Europe may help, also the BMGF; recent initiatives such as Prezode or OSH
- Preventing Pandemics at the Source: Nigel.Sizer@dalberg.com (<https://www.preventingfuturepandemics.org/>)
- International Alliance against Health Risks in Wildlife Trade: constanze.riedle@giz.de (<https://alliance-health-wildlife.org/event-preventing-pandemics/>)
- Belgian One Health Network - WHO, OIE, FAO and UNEP
- Global Virome Project - Viral Emergence Research Initiative (VERENA) - USAID's STOP Spillover - DEEP VZN projects
- Prezode
- New Alliance run by the Germans Alliance against health risks in wildlife trade.
- GBIF has enabled a series of studies about human Health that use species occurrence data published through the infrastructure. To provide higher visibility to them, GBIF created a specific page focused and aggregating these studies (see <https://www.gbif.org/health>).



Annex 4 (bis): Full Responses from Participants to the Call for Knowledge:

1. Do you know of any major or overlooked projects, papers, reports, grey literature that could support the preparedness for future pandemics?

Reviewer 1: Together with colleagues from the Charite and Makerere University from Uganda, I will start a new project on the impact of land use change and biodiversity loss funded by the DFG spring next year. We do not have any results yet but I am happy to share the proposal and any future results. I would furthermore recommend you to have a look at the CRC future rural Africa and the subproject on infectious diseases <https://www.crc228.de/projects/project-b02-future-infections/> as well as the One Health Graduate School at ZEF <https://www.zef.de/onehealth.html>

Reviewer 2: Petrovan, S.O., Aldridge, D.C., Bartlett, H., Bladon, A.J., Booth, H., Broad, S., Broom, D.M., Burgess, N.D., Cleaveland, S., Cunningham, A.A., Ferri, M., Hinsley, A., Hua, F., Hughes, A.C., Jones, K., Kelly, M., Mayes, G., Radakovic, M., Ugwu, C.A., Uddin, N., Verissimo, D., Walzer, C., White, T.B., Wood, J.L. and Sutherland, W.J. (2021), Post COVID-19: a solution scan of options for preventing future zoonotic epidemics. *Biol Rev*, 96: 2694-2715. <https://doi.org/10.1111/brv.12774>

Sutherland, W. J. et al. (2021) 'A solution scan of societal options to reduce transmission and spread of respiratory viruses: SARS-CoV-2 as a case study', *Journal of Biosafety and Biosecurity*, 3(2), pp. 84–90. doi: <https://doi.org/10.1016/j.job.2021.08.003>.

Biosecurity Research Initiative at St Catherine's: www.caths.cam.ac.uk/research/biorisc

Reviewer 3: yes

Reviewer 4: *no comment*

Reviewer 5: The entire field of environmental history - a branch of research combining history with several natural scientific disciplines such as paleoecology, paleoclimatology or historical epidemiology that looks at how past social-ecological systems functioned and coped with environmental stress.

Reviewer 6: Between 2009-2020, the Wildlife Conservation Society (WCS) was a lead partner in the USAID PREDICT1-2 and EU LACANET projects. Through PREDICT, over 6,000 professionals were trained in wildlife, livestock, and community disease surveillance and One Health approaches, including government and university staff, rangers, community members and scientists; and assisted national laboratories to identify over 1,100 viruses of which 140 novel viruses, including zoonotic diseases of public health concern such as Bombali Ebolavirus, and novel coronaviruses closely related to COVID-19. Project findings and collaborations highlighted key factors and activities for amplification of pandemic risk, including commercial wildlife trade, and have been instrumental in guiding policy changes and in the creation of surveillance and pandemic prevention networks, such as WildHealthNet (<https://oneworldonehealth.wcs.org/Initiatives/WildHealthNet.aspx>) in Vietnam, Lao PDR and Cambodia, designed to integrate with national One Health platforms to facilitate rapid response.

Wildlife and wildlife interfaces with people and livestock are essential One Health surveillance targets for zoonotic disease threats with pandemic potential, given that over 70% of emerging zoonoses have wildlife origins. WildHealthNet addresses the often-overlooked problem that current One Health surveillance investments are highly unbalanced, with human and domestic animal health sectors receiving staggering

levels of attention and funding compared to the environmental or wildlife sectors. This is reflected in a recent assessment of 107 national plans finding, 'wildlife and environmental considerations are neglected in health security priorities and plans' (Machalaba et al. 2021) and the World Bank's 'People, Pathogens and Our Planet' 2012 (<https://openknowledge.worldbank.org/handle/10986/11892>) report which found annual wildlife health service spending amounted to US\$50k/country. In comparison, the World Bank's \$657 million REDISSE Program in West Africa has focused on strengthening surveillance and response systems for humans and domestic animals. WildHealthNet is a first-of-its-kind One Health initiative to implement sustainable wildlife health surveillance systems in LMICs. Operating in Cambodia, Lao PDR, and Vietnam, WildHealthNet has detected H5N1 HPAI in wild birds, ASF in wild boar, Lumpy skin disease in banteng, and other high-consequence pathogens in wildlife (brief case studies on ASF and H5N1 HPAI can be found here: <https://oneworldonehealth.wcs.org/Initiatives/WildHealthNet.aspx>).

WCS co-led the development and implementation of the Spatial Monitoring and Reporting Tool (SMART) which is currently deployed in close to 1,000 protected areas, with >50,000 rangers trained in its use globally. Recognising this unprecedented network of eyes-in-the-field in biodiverse areas identified as hotspots for disease spillover, WCS recently created a Health module (SMART for Health - <https://oneworldonehealth.wcs.org/SMARThealth.aspx>) for rangers and health teams permitting collection of observations and samples (for individuals trained on biosecurity measures) with date, time, location and individual-level information about wildlife mortality events. Connection of SMART for Health to a web-based wildlife health data management system called the Wildlife Health Intelligence Platform (WHIP), developed by the Canadian Wildlife Health Cooperative, an OIE collaborating center, is underway, bearing enormous potential for worldwide implementation of a systematic, standardised and centralised wildlife health database. Once wildlife or livestock carcasses are identified as suspicious, it is essential that efficient diagnostic capacity exists. Thus, WCS is also pairing new surveillance opportunities with new technological tools to ensure increasingly rapid testing combined with high biosafety standards. In Republic of Congo, the national laboratory we support, now successfully handles the safe analysis of ebolavirus.

See the following documents:

1. Links between ecological integrity, emerging infectious diseases originating from wildlife, and other aspects of human Health - an overview of the literature: [https://c532f75abb9c1c021b8c-e46e473f8aad72cf2a8ea564b4e6a76.ssl.cf5.rackcdn.com/2020/05/22/8zqrkmzuna Links between ecological integrity and EIDs originating from wildlife.pdf](https://c532f75abb9c1c021b8c-e46e473f8aad72cf2a8ea564b4e6a76.ssl.cf5.rackcdn.com/2020/05/22/8zqrkmzuna%20Links%20between%20ecological%20integrity%20and%20EIDs%20originating%20from%20wildlife.pdf)
2. The COVID-19 pandemic and Indigenous Peoples and Local Communities: protecting people, protecting rights: [https://c532f75abb9c1c021b8c-e46e473f8aad72cf2a8ea564b4e6a76.ssl.cf5.rackcdn.com/2020/06/29/66o8ub6lop WCS COVID 19 PandemicAndIndigenousPeoples.pdf](https://c532f75abb9c1c021b8c-e46e473f8aad72cf2a8ea564b4e6a76.ssl.cf5.rackcdn.com/2020/06/29/66o8ub6lop%20WCS%20COVID%2019%20PandemicAndIndigenousPeoples.pdf)
3. Machalaba C, Uhart M, Ryser-Degiorgis M-P, Karesh WB. 2021. Gaps in health security related to wildlife and environment affecting pandemic prevention and preparedness, 2007–2020. Bulletin of the World Health Organization 99:342-350B. Available from <http://www.who.int/entity/bulletin/volumes/99/5/20-272690.pdf>.
4. Gruetzmacher, K., Karesh, W. B., Amuasi, J. H., Arshad, A., Farlow, A., Gabrysch, S., Jetzkowitz, J., Lieberman, S., Palmer, C., Winkler, A. S., & Walzer, C. (2021). The Berlin principles on one Health – Bridging





global Health and conservation. Science of The Total Environment, 764, 142919. <https://doi.org/10.1016/j.scitotenv.2020.142919>.

5. Figueroa DM et al. 2021. Development and validation of portable, field-deployable Ebola virus point-of-encounter diagnostic assay for wildlife surveillance. One Health Outlook 3:9. One Health Outlook. Available from <https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-021-00041-y>.

6. Kuisma E et al. 2019. Long-term wildlife mortality surveillance in northern Congo: a model for the detection of Ebola virus disease epizootics. Philosophical Transactions of the Royal Society B: Biological Sciences 374:20180339. Available from <https://linkinghub.elsevier.com/retrieve/pii/S120197121834606X>.

Reviewer 7: I guess you have all the major publication and reports. Just in case a few report/papers

- FRB report on biodiversity and Covid: <https://www.fondationbiodiversite.fr/wp-content/uploads/2020/05/FRB-Covid19-English-version-2021-05.pdf>
- Gibb et al 2022 on the instability of mammalian virus diversity estimates due to acceleration of discovery effort <U+FOE0> be careful about the conclusion on the contribution of different host taxa to spillover. <https://doi.org/10.1098/rsbl.2021.0427>
- Morand and Eloit. The conversation. Biogrowth or bio-solidarity (sorry it is in French) <https://theconversation.com/bio-croissance-ou-bio-solidarite-la-convention-sur-la-diversite-biologique-a-lheure-des-choix-169668>

Reviewer 8: Ipbes workshop, Harvard task force report, Lancet countdown report, Tripartite + report

Reviewer 9: YES, NEW REPORT FROM IUCN DUE OUT NEXT MONTH SITUATION ANALYSIS SYNOPSIS ALREADY AVAILABLE data set arising from literature review is provided in an open source <https://doi.org/10.6084/m9.figshare.13392275.v2>.

Reviewer10: https://media.4-paws.org/0/f/a/f/Ofafab297790f41ccbf97b741c72188be99d582f/FOUR-PAWS_Pandemic-Futur-Study-Brochure_EN_211019.pdf

Reviewer 11: Text Box: CASE STUDY: BENEFITS OF DIGITISING COLLECTIONS - How digitising bat specimens in museum collections is helping research into coronaviruses in paper Popov D, Roychoudhury P, Hardy H, Livermore L, Norris K (2021) The Value of Digitising Natural History Collections. Research Ideas and Outcomes 7: e78844. <https://doi.org/10.3897/rio.7.e78844>, and references therein.

A full list of EU-funded projects supporting research to tackle the COVID-19 pandemic can be found here: https://ec.europa.eu/info/research-and-innovation/research-area/health-research-and-innovation/coronavirus-research_en

2. Could you share your experiences of on-the-ground actions aiming at understanding the emergence of zoonotic and infectious diseases and their prevention. These can be actions that worked or didn't work as expected. Please let us know why these experiences were positive or negative? What made them useful or not?

Reviewer 1: As we have not yet started the project, I do not have anything to share here yet.

Reviewer 2: *no comment*

Reviewer 3: yes

Reviewer 4: My point here is probably different from what we are being told every day as the mainstream message saying that pandemics will increase as a consequence of loss of Biodiversity. Although this statement is obviously true, to me it is incomplete, and ignores a significant part of examples of the opposite. I will elaborate briefly on this, on the basis of examples. We are currently experiencing an absolutely dramatic crisis leading to biodiversity extinction. This also includes extinction of insects, and as such, of vectors and the pathogens they transmit. My point here is to provide some balance because we have to recognise that in some situations, this may also help to control, even eliminate and thus sustainably prevent some of these diseases. Let me illustrate this with an example: the famous tsetse fly, vector of the terrible trypanosomes causing sleeping sickness in humans, and “nagan” in animals, is currently experiencing a dramatic loss of the surface it used to occupy historically. This is poorly documented so far at a global scale, but we have examples at local scales. In Burkina Faso, due to warming and to consequences of land use by humans that lead to deforestation and poaching among others, tsetse have lost 70000 km² in 30 years without any vector control campaign (Courtin et al., 2010 IJERPH). This example can be extrapolated to other countries (Chad, Cote d’Ivoire, etc.), and also to other insect vectors of pathogens in other continents (Latin America, Asia and even Europe), to some extent. Such examples show that we should try to document and report these realities, because they may be of significant help to sustainably control these vector-borne diseases at lower costs than before. The number of cases of sleeping sickness is at an historically low level (Franco et al., 2020), putting “elimination of transmission” (which is the objective of the 2030 WHO NTD roadmap, and is part of SDG 3.3 target) as a reachable objective. This is the result of extraordinary field work by national programmes and their partners in several countries. But this has been certainly helped, although not deliberately, by the environmental situation and these crises we are experiencing. Understanding how, and to what extent, this is currently occurring throughout the world, would provide basis to do the same for other vector-borne neglected tropical diseases. It would also provide the opportunity to know where the reverse may be true, e.g. local situations where these insect vectors have colonised new areas because of changes in temperature or humidity as also reported (Lord et al., 2018 Plos Medicine), and so to accurately know where the risk has become higher than before. One important point here of my message is that focus and priorities should not be given only to “pandemic preparedness” based on spectacular events, but should include sustaining the gains of existing control of endemic diseases, because it significantly helps prevention on the long term. “so called” emerging disease” have been in reality here for very long, but were often not considered as serious problems until they re-emerged.

Reviewer 5: I study climate change and epidemics in Europe in the last three thousand years and lead a multi-disciplinary research group working on this topic. We look in particular at how infectious diseases spread in the past, how this process was influenced by climatic variability, and what were the ecological effects of the spread on landscape and Biodiversity (e.g. <https://www.researchsquare.com/article/rs-581474/v1>). My experience is generally good, in the sense that we achieve interesting results that could feed into the One Health paradigm, and which could also serve as important educational material for the general public and relevant branches of public and private organisations to understand and follow the One Health approach (and detach it from the current - often catastrophic - contexts, so enable better absorption of knowledge). Our - and our field’s in general - integrated approach helps in weighing together





the different causal role of economic vs climatic etc. mechanisms, which can also have significance in the consideration of current mitigation and adaptation strategies vis-a-vis the pandemics, as well as provide the idea of the role of economy/climate-driven biodiversity transformations in pandemic development (in the past, but also with relevance for today).

Reviewer 6: Governments and multilateral agencies must break down their sectoral silos, rethink economic policies, and collaborate around the common goal of preventing future pandemics. A critical first step is the recognition of the intrinsic links between human, animal, and plant health, and the foundational importance of an intact and functioning environment for our Health and wellbeing.

To have a meaningful impact on significant reduction of the risk of future pandemics of zoonotic origin, all efforts must be made to prevent pathogen spillover from wildlife in the first place. This means, first, protecting intact ecosystems and stopping deforestation and environmental encroachment and conversion to limit the human-wildlife interface; second, strictly restricting legal and stopping illegal commercial wildlife markets and trade that facilitate spillover conditions. Experience with avian influenza has shown that efforts to sanitise commercial trade and markets are not sufficient, and symptomatic surveillance of farmed wildlife can miss emerging pathogens with pandemic potential, given wild animal hosts are often asymptomatic.

A fully integrated trans-sectoral “One Health” approach will provide the necessary framework for recovery from COVID-19 while generating co-benefits across a globalised world pommelled by climate change, biodiversity loss, and social injustice. A new international treaty can help catalyse this change. Last December, the World Health Assembly agreed to initiate a process to form an international pandemic treaty. Such new treaty must focus on pandemic prevention at source, not solely on preparedness.

See the following documents: 1. WCS Policy on Preventing Epidemics and Pandemics of Zoonotic Origin: The role of Wild Meat Markets and Wildlife Trade: www.wcs.org/get-involved/updates/wcs-policy-preventing-epidemics-and-pandemics-of-zoonotic-origin 2. WCS Recommendations How the EU Biodiversity Strategy Can Help Reduce the Risk of Pandemics of Zoonotic Origin: <https://programs.wcs.org/Portals/0/Brussels/WCS-ENVI-hearing.pdf?ver=2021-01-07-211640-147>

Reviewer 7: * Ground action: virus discovery → did not prevent the emergence of disease. We better know what is out there, but we do not prevent from emerging. * Ground action: living lab: long term ecological observatories → useful to have territories transformation

Reviewer 8: Prezode partners can be contacted for that

Reviewer 9: Wildlife are really not the proximate source of pandemics even if Biodiversity is the source of all microbial life - this “wildlife as a threat” narrative has been generated mostly from institutions with vested interests in this picture and is not evidence based. Suggest you look at Faculty Reviews 11:(2) <https://doi.org/10.12703/r/11-2> for a very good and unbiased perspective on this subject. I have worked for 42 years in veterinary research and interventions in Africa and Asia and my field experience is extensive and I have not found any evidence of some looming pandemic threat from wildlife it is largely blamed for events like COVID etc. but the evidence is very slim for its role especially wild animals living in nature. Captive or farmed wildlife and domestic animals on the other hand do present a significant risk for zoonosis but even there this is poorly quantified in human burden of disease. EID is very complex and does not lend itself to generalisations.

Reviewer 10: *no comment*

Reviewer 11: I do not have relevant experience to report, other than the work with natural history collections in facilitating open data publication about specimens in collections. These data are relevant to identify holdings by museums of species known to host coronavirus (e.g. bats), which sequencing might help to understand the origin of zoonotic species. By making data available, speed of discovery and access is reduced, dramatically. On another front, the advocacy about open data is also a relevant contribution (<https://www.gbif.org/article/1ye7qAa9Z2HVSn85bfSmLP/who-are-the-gbif-biodiversity-open-data-ambassadors>). The role of open data in monitoring of outbreaks globally was determinant to support decision making on the control of the pandemic, both globally and locally.

3. Do you have any suggestions on what knowledge (from science, policy, or societal experience) is needed to better understand the emergence of zoonotic and infectious diseases, their different stages and their prevention?

Reviewer 1: After discussions with my colleagues for the development of the proposal I think we urgently need to understand drivers of the emergence of zoonotic diseases and which policy measures are effective in counteracting those.

Reviewer 2: *no comment*

Reviewer 3: yes

Reviewer 4: local field surveys together with GIS and modeling would help to document and report on local extinctions/reinvasions of insect vectors of pathogens, as an example. for deciders and funders, the message is to not focus only on the most spectacular diseases

Reviewer 5: More focus on the interaction of different human (e.g. economic) and non-human (e.g. climatic) factors. Timescales of analyses exceeding the usual few-year approach of economics or the social-science.

Reviewer 6: Our present understanding of how landscape change drives zoonotic disease emergence is almost entirely based on correlational and observational studies (Gottendenker et al. 2014). For example, remotely sensed data on land use is correlated with the incidence of pathogen emergence (e.g., Allen et al. 2017; Rulli et al. 2017) or the presence of zoonotic reservoirs (Gibb et al. 2020). These studies indicate associations between environmental change and pathogen emergence, but they do not reveal the mechanisms driving the process. To societally engineer effective interventions that stop spillover we need to first establish a strong understanding of the component parts, their interactions, and how the entire system responds to environmental stressors. In the wake of COVID-19, we need to rapidly deepen our mechanistic understanding of pandemic threats linked to land use change and ecosystem degradation.

It is known that wildlife extraction and trade are associated with emergence, with unsanitary conditions that contribute to unnatural interactions among of diverse species, amplified detection rates of zoonotic pathogens, and the potential for viral re-assortment and recombination events in captive populations that are immunocompromised. Further studies of viral pathogen diversity in farmed and traded species along wildlife trade chains can help deepen our understanding of these activities and provide further evidence for policies to regulate this high-risk spillover interface. Basic viral discovery and opportunistic wildlife health surveillance in wildlife is also indicated as we only known about 1% of the global virome (Carlson





et al. 2019) and only 10% of potential virus-mammal pairs have likely been documented (<https://arxiv.org/abs/2105.14973>).

Carlson, C. J., Zipfel, C. M., Garnier, R., & Bansal, S. (2019). Global estimates of mammalian viral diversity accounting for host sharing. *Nature ecology & evolution*, 3(7), 1070-1075.

Reviewer 7: The key point to my mind is to understand how we can modify our development so that it has less impact on the environment and limit the emergence of zoonoses.

For that we really need “transformative sciences”, based on, on one end, long-term integrative socio-ecological studies and on the other end on how to change large scale politics

One of the approaches I found interesting is innovative design (CK theory). CK theory or design theory is a theory of generativity to design new “object” that can be production, action plan, process, when the context is complex, with lots of unknown, lots of fixed idea and requires multidisciplinary approach. It would be interested to use this approach in the problematic of zoonoses emergence, either locally or on a topic at larger scale. See for instance:

Hatchuel, A., & Weil, B. (2003). A new approach of innovative Design: an introduction to CK theory. In DS 31: Proceedings of ICED 03, the 14th International Conference on Engineering Design, Stockholm.
Hatchuel A., Le Masson P., Weil B. (2009). Design theory and collective creativity: a theoretical framework to evaluate KCP Process, Int. Conf. on Engineering Design, ICED’09, Stanford, CA, USA.
Prost, L., Berthet, E. T., Cerf, M., Jeuffroy, M. H., Labatut, J., & Meynard, J. M. (2017). Innovative design for agriculture in the move towards sustainability: scientific challenges. *Research in Engineering Design*, 28(1), 119-129.
Vourc’h, G, J Brun, C Ducrot, JF Cosson, P Le Masson, B. Weil. Using design theory to foster innovative cross-disciplinary research: lessons learned from a research network focused on antimicrobial use and resistance in animals. <https://doi.org/10.1016/j.vas.2018.04.001>
Brun J, MH Jeuffroy, C Pénicaud, M Cerf, JM Meynard. 2021. Designing a research agenda for coupled innovation towards sustainable agrifood systems. *Agricultural System*. <https://doi.org/10.1016/j.agsy.2021.103143>
Pluchinotta, I., A. O. Kazakçi, R. Giordano, and A. Tsoukià. 2019. Design theory for generating alternatives in public decision making processes. *Group Decision and Negotiation* 28:341–375. <https://www.ck-theory.org/?lang=en>
Design Theory workshop: <https://www.tmci.minesparis.psl.eu/wp-content/uploads/2021/05/Save-the-date-SIG-2022-email-version-1.pdf>

Reviewer 8: In May 2021 started a large consultation process based on co-construction workshops with key actors (scientists, stakeholders, decision makers) at global and regional levels to define the strategic research agenda and the operational plan 2021-2025 of the PREZODE initiative. More specifically we aim to identify knowledge and operational needs around the 5 pillars of the initiative. On each pillar we will propose solutions to address the link between science and policy. The workshops outputs are currently being analysed, and will be completed by upcoming events such as the international scientific Workshop that will be held mid-February. Here is a preliminary list of the main knowledge needs that emerged up to now: Improvement of the dialogue between science and policy Improving our understanding of the link between biological conservation and emergence of infectious diseases Improving our understanding of the contacts between animals and humans (how pathogen transmission in animals translates to human exposure?) Improving pathogen surveillance in wildlife We are ready to share with you a more detailed and finalised list of knowledge needs to ensure synergies between our two initiatives.

Reviewer 9: First sort out opinion speculation and political narrative from science and evidence. The you can focus on pandemic risk.

Reviewer 10: *no comment*

Reviewer 11: Further research to develop the inventory of species that can be zoonotic disease pools, including their occurrence in nature.

4. In a preliminary workshop, we identified the following knowledge needs. Are you aware of any knowledge gap analysis for any of these items?

a. Catalysing transformative change through the 'One Health' approach, especially in translating the information to more stakeholders and younger generations.

Reviewer 1: I think a major problem is that pandemics are usually managed in a reactive way. Proactive approaches would require a much closer collaboration between land use and climate change modelers as well as social and political scientists to prevent the emergence of infectious diseases and spillover events.

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: I believe there is little use of environmental history in educating stakeholders and younger generations. Creating a proper alliance of public/NGO actors with relevant academic institutions could be transformative here in developing applied knowledge. There is also still need for more widespread application of One-Health-styled approaches in historical and archaeological research.

Reviewer 6: One Health approaches need to be integrated into the medical and veterinary medical curriculums. WCS has extensive experience developing these through tight academic integration and roles. In the BP: Invest in educating and raising awareness for global citizenship and holistic planetary health approaches among children and adults in schools, communities, and universities while also influencing policy processes to increase recognition that human Health ultimately depends on ecosystem integrity and a healthy planet.

Reviewer 7: *no comment*

Reviewer 8: This is in line with a changing need identified during our regional workshops, promoting One Health approach by providing standardised training and improving multisectoral communication.

Reviewer 9: Yes of course but this is all very general but good in principle still evidence is lacking so does not matter what sector you are in the ignorance is largely equal

Reviewer 10: *no comment*

Reviewer 11: *no comment*

b. Developing a framework for joint monitoring of the key indicators (including social) for Biodiversity and change, in order to prevent future pandemics.

Reviewer 1: The early emergence of zoonotic diseases and its drivers are still not completely understood.





Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: There are existing standards and frameworks on how to build FAIR (Wilkinson et al. 2016) and transparent data sharing and network tools to jointly monitor key indicators across sectors. This could be used to address the trans-sectoral nature of networks for a successful approach to One Health (Grützmaier et al. 2020). Machalaba et al. 2021 evaluates global gaps in national wildlife health surveillance.

Reviewer 7: *no comment*

Reviewer 8: We identified this need and we are proposing the development of socio-ecosystems based on identification of key indicators.

Reviewer 9: Until you have clear defined and plausible risk factors quantified you cannot set indicators. The emergence of pandemics are complex multifactorial events and hard to predict. Yes, we can prevent many pandemics like influenza if we stop farming poultry and pigs. But we have to be realistic in all of this. Yes, biodiversity recovery will probably lead to more stability in host pathogen dynamics but will not prevent pandemics.

Reviewer 10: *no comment*

Reviewer 11: *no comment*

c. Better understanding of the impact of EU policies generally on the emergence and spread of Emerging Infectious Diseases (EID) in third countries and potential links with Biodiversity and its loss; this could be expanded to consider the fair implementation on local people of policies intended to mitigate the emergence of EIDs and the loss of Biodiversity.

Reviewer 1: I guess this would be related to land use change due to trade of agricultural commodities and so-called telecoupling effects.

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: N/A

Reviewer 7: *no comment*

Reviewer 8: The role of Europe activities in the contribution of “remote risk of zoonose emergence” is one of the topic address in European workshops.

Reviewer 9: High income countries and global finance are largely behind EIDs but it is complex and really a byproduct of development. An externality if you like but we need to take more attention to it.

Reviewer 10: *no comment*

Reviewer 11: *no comment*

d. Identification and prioritisation of monitored ecosystems/biodiversity/areas or methodologies to improve the surveillance systems for the prevention of zoonotic emerging diseases in order to render them more resilient and sustainable inspired by past/best initiatives (EFSA, PREZODE, HERA, OHHLEP, One Sustainable Health, and others).

Reviewer 1: *no comment*

Reviewer 2: *no comment*

Reviewer 3: *no comment*

Reviewer 4: please ensure that these initiatives take into account the above

Reviewer 5: *no comment*

Reviewer 6: As mentioned above, the absence of surveillance systems for environmental and wildlife sectors, needs more than just improvement: it first needs creation in many countries. WCS has applied for a SNAPP working group with diverse membership to improve wildlife health surveillance systems globally. If funded, part of this effort would be to document and synthesise data to assess and address knowledge gaps.

There are recent gap analyses on what is known in terms of the global virome (Carlson et al. 2020, Carroll et al. 2018) and these all suggest that monitoring and targeting is still based on extremely limited knowledge of known pathogens. Gap assessments moving forward need to account for this hazard and mitigate risk from unknown pathogens.

Reviewer 7: *no comment*

Reviewer 8: Yes

Reviewer 9: Waste of time - where and how? Our analysis shows approximately 1 confirmed zoonosis published from wildlife trade for example per year for the last 30 years globally. See IUCN report and gap maps in link given earlier. Insertion of HACCP processes into wildlife trade will not doubt be a good thing at least to the standard for domestic animals but beyond that is likely to bring little benefit. The 400 million + dollar investment in EPT from USAID produced only one new virus that was potentially a human pathogen from work in Africa - an ebolavirus of a particular species. Not a great return!

Reviewer 10: *no comment*





Reviewer 11: *no comment*

e. The implementation of nature- or ecosystem-based solutions to prevent the risk of emergence of zoonoses.

Reviewer 1: I think it is not possible to detect all diseases before they emerge. But policies protecting Biodiversity are also likely to have a positive impact on preventing the emergence and transmission of zoonotic diseases. We need to understand what the potential impact of land use policies would be on the prevention of zoonotic diseases.

Reviewer 2: <https://doi.org/10.1111/brv.12774>

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: *no comment*

Reviewer 6: The SNAPP working group Ecological Levers for Health developed a large review paper tentatively titled, 'Diversity and evidence gaps among potential win-win solutions for conservation and human infectious disease control', with first and corresponding author Skylar Hopkins (skylar_hopkins@ncsu.edu). It was last submitted to a journal on 20 April, 2021, and contains detailed analyses of proposed nature-based solutions for human infectious disease control, inclusive of the risk of emergence of zoonoses, published or proposed by experts.

Reviewer 7: *no comment*

Reviewer 8: This is a knowledge need that we included in our PEPR, a research program financed by the French Investment for the Future (PIA) funding projects on the links between human activities and zoonosis emergence and re emergence; on sustainable strategies for preventing the emergence of zoonoses; or aiming to develop innovative methods to improve the surveillance of pathogens

Reviewer 9: Improvements in nature and ecosystems will be valuable but I am not sure it will make any significant difference on emergence of novel organisms actually EID have declined overall based on wide definitions quite rapidly since the 1980s.

Reviewer 10: *no comment*

Reviewer 11: *no comment*

f. Developing a policy support framework on socioeconomic and Biodiversity considerations of pandemics prevention measures.

Reviewer 1: see my comment above. I recently submitted a proposal going into this direction to the VW foundation and hope it will be funded. I will know this in spring (please keep this information confidential)

Reviewer 2: <https://doi.org/10.1111/brv.12774>

Reviewer 3: *no comment*

Reviewer 4: *no comment*

Reviewer 5: I think more research is needed on how to harvest the vast amount of data on past pandemics, societies, economic and Biodiversity for current policy-making. This topic is completely understudied and it is extremely difficult to get potential stakeholders into funding it.

Reviewer 6: Last December, the World Health Assembly agreed to initiate a process to form an international pandemic treaty, an idea initially launched by EU Council President Charles Michel. Such new treaty must focus on pandemic prevention at source, not solely on preparedness.

See here: <https://medium.com/one-planet-one-health-one-future/a-new-international-pandemic-treaty-must-include-prevention-at-source-771110faf04b>

Reviewer 7: *no comment*

Reviewer 8: *no comment*

Reviewer 9: I would not hang too much on pandemics and Biodiversity but biodiversity is fundamentally important for many reasons. The focus though should be on reducing animal based food systems mostly domestic animals rather than linking wildlife to this.

Reviewer 10: *no comment*

Reviewer 11: *no comment*

5. Are you aware of any key EU and/or global organisations /initiatives which you think should be contacted because of their close connection to the topic?

Reviewer 1: My colleague Sandra Junglen at the Charite, Makarere University in Uganda, the One Health Graduate School at ZEF

Reviewer 2: Biosecurity Research Initiative at St Catherine's: www.caths.cam.ac.uk/research/biorisc

Reviewer 3: yes

Reviewer 4: WHO, FAO are well aware; EDCTP and Horizon Europe may help, also the BMGF; recent initiatives such as Prezode or OSH may also help if they take this point into account.

Reviewer 5: European Society for Environmental History

Reviewer 6: - Preventing Pandemics at the Source: Nigel.Sizer@dalberg.com (<https://www.preventingfuturepandemics.org/>) - International Alliance against Health Risks in Wildlife Trade: constanze.riedle@giz.de (<https://alliance-health-wildlife.org/event-preventing-pandemics/>) - Belgian One Health Network - WHO, OIE, FAO and UNEP - Global Virome Project - Viral Emergence Research Initiative (VERENA) - USAID's STOP Spillover - DEEP VZN projects

Reviewer 7: see general responses for the above question by PREZODE





Reviewer 8: We are currently developing a large screening analysis of the main One Health initiatives tackling emerging zoonotic risks.

Reviewer 9: Many emerging projects you mention quite a few and a good one is the new Alliance run by the Germans Alliance against health risks in wildlife trade.

Reviewer 10: *no comment*

Reviewer 11: GBIF has enabled a series of studies about human Health that use species occurrence data published through the infrastructure. To provide higher visibility to them, GBIF created a specific page focused and aggregating these studies (see <https://www.gbif.org/health>).



Annex 5: Agenda of the online Focus group (April, 28th 2022)

LINK TO CONNECT

<https://us02web.zoom.us/j/84071824700?pwd=ZjZNVlN6bG1PcU84REswSkRZWkZQQT09>

Meeting ID: 840 7182 4700, Password: 042022

09:45 – 09:55	Introduction to the workshop, background and objectives.
09:55 – 10:10	Getting to know participants
10:10 – 10:25	Introduction to Eklipse and the request process
10:25 - 10:50	Part 1: Clarification of the different questions/requests*
10:50 - 11:20	Experts Panel discussion with interactive Q&A
11:20– 11:30	Virtual Coffee break
11:30 - 12:00	Part 2: Priorities and interests of represented sectors
12:00 - 12:20	Taking stock
12:20 – 12:40	Refining and Elaborating further the selected request
12:40 - 13:00	Plan for action and conclusions
13:00	End of the Focus group



Annex 6: Call for Experts (CfE)



Bridging the gap between policy and knowledge
on biodiversity in Europe

CALL FOR EXPERTS (CfE 11/2022)
Eclipse – June 2022

Deadline for Call: **June 20th, 2022** before midnight (CEST)

Identified policy-relevant knowledge need requiring expertise:

Building on existing relevant work on research agendas and knowledge gap analysis, identifying interdisciplinary research [and action priorities that contribute to a strategic research agenda on biodiversity and pandemics addressing the critical interlinkages between relevant sectors needed to make future actions more effective.

Eclipse is inviting experts to join an Expert Working Group (EWG) to contribute to answer an identified policy-relevant knowledge need that requires an in-depth analysis or consolidated views from science and other knowledge holders: see formulation above and hereafter referred to as "Request (Biodiversity and Pandemics)". This request was initially put forward by the European Commission's Directorate-General for Research and Innovation (EC-DG RTD) and has since been endorsed by a cross-sectoral consortium of relevant EC- Directorate Generals and key initiatives (hereafter referred to as "(Consortium of) Requesters" - see Table 1 in section 1.1), who jointly co-developed the evidence need and will contribute to the dissemination, policy uptake and impact of the outputs. For further information about the request, see the Eclipse website under Request > ["Biodiversity and pandemics"](#).

The EWG will cover diverse and complementary skills (including multi- and trans-disciplinary skills and broad geographical coverage – see section 5). The EWG will closely interact with relevant members of the [Eclipse governance bodies](#) to ensure appropriate methodological choices and uptake of outputs, as well as to guide them through the ethical and robust [Eclipse process](#). Selected experts will have to comply with the [Eclipse Code of Ethics](#) to integrate the EWG.

In order to create this EWG, we are seeking expressions of interest from experts from a broad range of disciplines. Before applying, please consider the following questions below. Please consider the list of disciplines/expertise as non-exhaustive, as we are happy to consider others that you may think relevant to answer the request.

- **Are you an expert on one or several of the following disciplines?**
 - disease ecology, disease transmission in wildlife, zoonotic diseases, vector-borne diseases or studying spillover,
 - conservation medicine, wildlife health and conservation,
 - veterinary health, epidemiology and surveillance of infectious diseases, including zoonoses and vector-borne diseases, in domestic animals and at the interface with wildlife.
 - public and environmental health, epidemiology and prevention, exposome, emerging entities from changing environment
 - ecosystem functions and ecosystem services related to disease regulation
 - environmental law and governance of One Health national and international legislation and other documents (treaties, conventions) on biodiversity and health (global health, one health)
 - environmental/ecological economics, sustainable development, the integration of biodiversity and health (pandemics) in economics (ecological transition, trade)
- **Do you have either direct experience in knowledge synthesis or experience in qualitative research, and/or would you like to learn more about knowledge synthesis methods?**
- **Would you like to contribute directly to a policy-relevant process in your field of expertise?**
- **Would you like to expand your network and learn?**
- **Are you interested in collaborating in a trans-disciplinary and multi-cultural setting?**

Further information on the criteria can be found in section 5.

Please read the information below to apply to the call.





Important dates and information:

How to apply: <http://eklipse.eu/calls/>

Deadline to apply: June 20th, 2022, before midnight (CEST).

Expert Working Group (EWG) selection: week of June 20th 2022.

Online kick-off meeting and training of the EWG: 2 sessions of 2 hours each between June 29th and July 1st 2022

Expected duration of the process: Between 3 and 8 months, depending on the selected method(s) (see section 3).

The participation in this EWG will require **approximately 10% of your time** (see Eklipse [Guidance note n°6](#)). As in similar science-policy processes, Eklipse activities rely on in-kind contributions.

For further information on the request, please read the Document of Work (DoW) on the Eklipse website under Request > [“Biodiversity and pandemics”](#).

Should you require any further information or support, please contact the **Eklipse Management Body (EMB) at emb@eklipse.eu**

1. Request to be addressed by this call

1.1 Background to the request Biodiversity and Pandemics

The COVID-19 crisis has revealed how fragile and vulnerable our societies are to pandemics and how challenging informed political and policy responses become when faced with such an emergency. As a global community, we were not prepared. The potential risk of zoonoses linked to unprecedented land degradation and land conversion, unleashed consumption of natural resources, increasing livestock production, and acceleration of biodiversity loss had long been identified and did not come as a surprise to the scientific community. However, the pandemic has highlighted gaps in our knowledge and our ability to put this knowledge into practice through policy-making. Therefore, generating and synthesising knowledge to fill these gaps while also ensuring the uptake of knowledge into decision-making and implementation should become a high priority.

The request focuses on how to improve our understanding and application of the science of pandemics to optimise coordination and coherence across policy sectors, building better resilience and response strategies (proactive and reactive approaches) in the context of the interface between Biodiversity and

Pandemics. Moreover, the creation of a cross-sectoral consortium of requesters working with EC-DG RTD, co-developing the knowledge needs and expecting the knowledge synthesis process results will ensure that the produced evidence will be jointly and timely taken up by policy (See Table 1 below).

Table 1: Consortium of Requesters

Requesters	Description	More information
DG Research and Innovation (EC-DG RTD)	Responsible for EU research agenda.	
DG Environment (EC - DG ENV)	Responsible for EU policy on the environment.	
DG Agriculture and Rural Development (EC-DG AGRI)	Responsible for EU policy and research on agriculture and rural development and deals with all aspects of the common agricultural policy (CAP).	
PREZODE	International initiative with the ambition to understand the risks of the emergence of zoonotic infectious diseases and develop and implement innovative methods to improve prevention, early detection, and resilience to ensure rapid response to the risks of emerging infectious diseases of animal origin.	
One Health High-Level Expert Panel (OHHLEP)	An initiative supported by the heads of FAO, OIE, UNEP and WHO, and the governments of France and Germany, to further enhance the cross-sectoral collaboration, enhance strategic orientations and coordination and provide high political visibility on the subject of One Health.	
Norwegian Veterinary Institute (NRI)	Norwegian national biomedical institute delivers research-based knowledge and contingency support in animal health, fish health, and food safety.	





<u>Project HERA</u> (Health Environment Research Agenda for Europe)	EU funded project that involves 15 European countries, an international organisation and a European NGO, thus 24 partners in total who are working hard to prepare the Health and Environment Research Agenda 2020-2030. The aim was to set the priorities for an environment, climate and health research agenda in the EU5.	
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1.2 First screening of literature/initiatives and Open Call for Knowledge

A literature screening during the Scoping Phase resulted in a compilation of existing relevant literature, projects and initiatives:

- **(Non-exhaustive) Literature review collected by the Eklipse Management Body (EMB):**
<https://docs.google.com/spreadsheets/d/1H-7SoAVoEAKUdrQyKiaOD8lrTNRUFv5fPwKBta-HOXA/edit?usp=sharing>
- **(Non-exhaustive) List of initiatives/projects/networks collected by the EMB:**
<https://docs.google.com/spreadsheets/d/171PHarAsfRgK7ro9iEPURLjX74YwWuX4s4cvOPDLw2g/edit#gid=1770112322>

Following this first screening exercise, a Call for Knowledge (CfK 1/2021) related to this request was launched in November 2021 and was open until January 2022 (for more information, please refer to the Eklipse website under “[Calls](#)” on our website). The CfK 1/2021 was broadly disseminated through the different Eklipse social media platforms, i.e. LinkedIn, ResearchGate, Twitter, Facebook, and Instagram, as well as via different mailing lists and networks. The screening and the call for knowledge aim to gather relevant knowledge to be considered during the selection process and to search for existing or planned initiatives that may (partly) answer the requests. Both activities were essential during the Scoping Phase to avoid duplication of ongoing efforts and ensure the outputs will be timely developed. For more details on the literature collected in the Call for Knowledge, see Annex 4 in Document of Work (DoW) published on the Eklipse website under **Request** > [“Biodiversity and pandemics”](#).

2. Suggested methods

Subject to discussion with the EWG, the request process was suggested to include a series of steps:

- Mapping of existing research agendas and knowledge gap analysis
- Filtering and analysing research recommendations related to Biodiversity and pandemics
- Prioritising the identified research recommendations based on their potential for maximising the impact on policies for relevant sectors.

During the scoping phase, the members of the [Eklipse Methods Expert Group \(MEG\)](#) discussed potential knowledge synthesis methods suitable for this request (more information on knowledge synthesis methods in [Dicks et al. 2018](#) and on the Eklipse website under the “[Methods](#)” webpage).

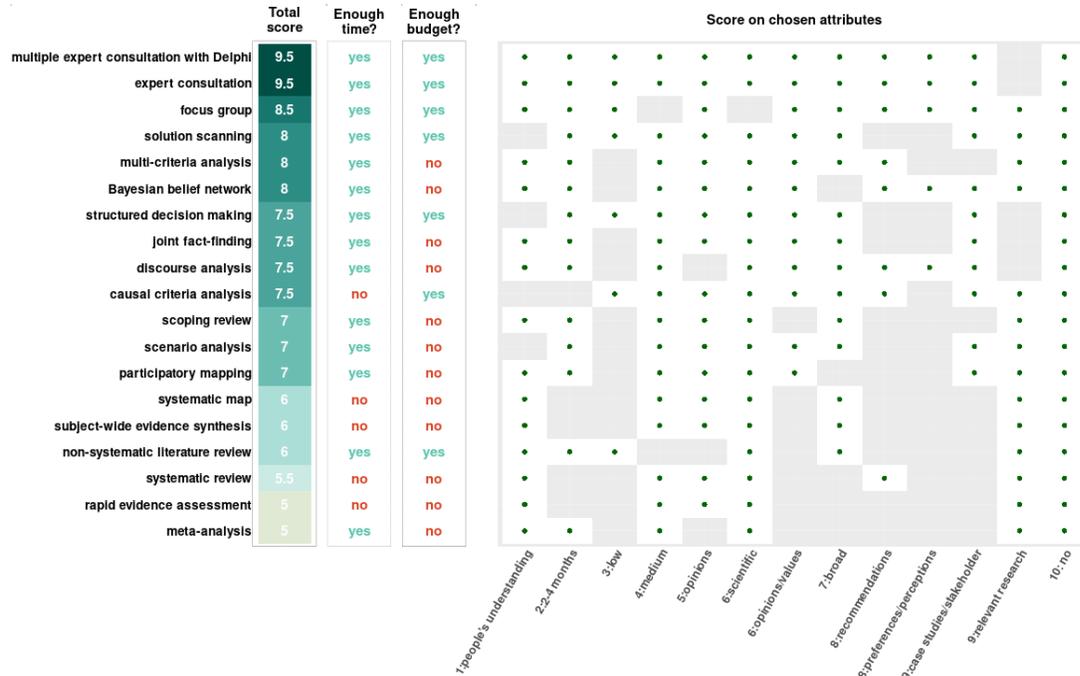
Methods suggested by the MEG

No single method addresses all the methodological challenges in the request “Biodiversity and Pandemics”. Rather, a bundle of techniques will be needed to tackle three distinct knowledge synthesis aims:

- a. **Literature-based knowledge synthesis methods** to identify and assess published peer-reviewed literature, wider grey literature and policy documents. Methods include [systematic map](#); [scoping review](#); [systematic review](#); [rapid evidence review](#).
- b. **People-based knowledge synthesis methods** to access current activities setting research agendas. This involves a range of consultation methods, either as part of a wider deliberative process (method 3) or as a stand-alone process. Methods include [multiple expert consultations](#) involving a workshop or an online [Delphi process](#), or a series of [focus groups](#), with the aim of identifying and assessing what is currently being developed but not yet in the public domain.
- c. **People-based decision methods** to support prioritisation/decisions. This builds on stage 2 but aims to rank, sort or prioritise the research agenda items already identified. Methods include deliberative tools like the [Delphi process](#), or prioritisation or ranking techniques such as [multi-criteria decision analysis](#) (MCDA) or [structured decision making](#).

To help the EWG understand what tools might best address the three method pathways outlined above, the MEG recommends collectively using the [MAGICKS](#) tool. This guides a dialogue about the characteristics of the required knowledge synthesis, and prioritisation decisions matches these characteristics to the expected attributes of different methods and provides concise guidance on how to conduct each method. An example output is shown below in Figure 1.

Figure 1. Example of the use of MAGICKS (Method Application and Guidance in Conducting Knowledge Syntheses) to help guide the process of choosing a method of knowledge synthesis.



The final decision on which method or combination of methods will be used to process the request “Biodiversity and Pandemics” will be made after a thorough dialogue between the EWG and the MEG. The description and justification for the selected method(s) will be part of the first deliverable the EWG will have to deliver, i.e. the Method Protocol. All Eklipse Method Protocols are peer-reviewed, open for public consultation, and once revised, they are published on the Eklipse website (sometimes in scientific articles) and broadly disseminated.

For more information on the range of methods, please refer to the [Eklipse report](#) on knowledge synthesis methods.

3. Implementation steps and timeline

The work of the EWG is expected to follow the [Eklipse knowledge synthesis process](#). The Scoping Group has developed a provisional timeline to give an orientation of the milestones and duration of the answering process until the final outputs (see Table 2 below). A key component of the method protocol, the EWG will develop a refined timeline for answering the request considering the needs of the requesters, the relevant policy process(es), the complexity of the request and the selected tailored methods. Please note that a kick-off dialogue meeting between the Expert Working Group and the consortium of requester(s) will be held the last week of June (doodle will be sent to selected experts). This kick-off meeting will be facilitated by the [Eklipse Knowledge Coordination Body \(KCB\)](#) and aims to ensure a common understanding of the request among experts.

Table 2. Suggested timeline

Suggested timeline	Key activities	Actions or feedback from requesters
Last week of June Two sessions of 2 hours each between June 29th and July 1st 2022	Online kick-off meeting of the EWG	Participation in the first part of the meeting to explain the specific interest in the request and answer key questions of clarifications from the experts
The second week of September	Call for Open consultation and Peer Review of the Methodological Protocol	Dissemination of the call Requesters can submit a review
<u>Duration of the answering phase of the Eklipse process</u> Between 3 and 8 months, depending on the selected method(s)	Call for Open consultation and Peer Review of the synthesis report	Dissemination of the call Requesters can submit a review
	Launch of the final report	Dissemination and contribution to ensure the uptake of the evidence produced by EWG by research and policy, i.e. ensuring the usefulness of the results /evidence

4. Support provided by Eklipse

Eklipse team: The Expert Working Group (EWG) will be supported in all steps by the [Eklipse Management Body](#) (EMB) in logistics, communication, documentation (via the Eklipse website), and dissemination of products required for this request. The working group will be supported thematically and strategically by the [Knowledge Coordination Body](#) (KCB) and the [Methods Expert Group](#) (MEG) on the choice and use of knowledge synthesis methods.

Financial support: Eklipse activities rely on in-kind contributions as in similar science-policy processes. The benefits for experts and institutions arise from the networking in and beyond the group, capacity building and the visibility of expertise to policy and society via the products. Eklipse will actively support the visibility of experts and their institution's contributions. In addition, travel costs to potential events hosted physically by Eklipse will be covered via Eklipse funds as needed (depending on travel restrictions following lockdown development).

Technical support: Access to literature databases will be facilitated if needed. Eklipse will cover the layout, printing, and dissemination of interim and final products.



5. Eligibility and applicant information

a. Selection criteria for the composition of the Expert Working Group (EWG)

The EWG is the group of selected experts that will be in charge of answering the request “Biodiversity and Pandemics” based on the [Eclipse process](#). They are individual experts who will nominate themselves following the call for experts. The final selection of the EWG will be carried out by the Knowledge Coordination Body (KCB), which will ensure the best possible coverage in terms of disciplines, geographic and gender balance (see [Guidance note 7c. “Preparing and managing Calls for Experts”](#) for more information). The selected EWG will consist of scientists and practitioners and will be supported by dedicated members from the KCB, the MEG and the EMB (see [Guidance Note 6. “Expert working groups \(EWGs\)”](#)). As in similar science-policy processes, Eclipse activities rely on in-kind contributions. The EWG should cover all relevant disciplines, including natural, social, economic and planning sciences. Gender balance and geographical diversity of EU countries will be considered in the selection. KCB may decide to open a follow-up, more tailored Call for Experts to this one to complement the EWG with additional expertise.

The working group is expected to have between 10 and 15 experts.

b. Selection criteria for individual experts

- The individual experts that nominate themselves should have demonstrated expertise or experience in one or several of the following disciplines:
 - disease ecology, disease transmission in wildlife, zoonotic diseases, vector-borne diseases or studying spillover,
 - conservation medicine, wildlife health and conservation,
 - veterinary health, epidemiology and surveillance of infectious diseases, including zoonoses and vector-borne diseases, in domestic animals and at the interface with wildlife.
 - public and environmental health, epidemiology and prevention, exposome, emerging entities from changing environment
 - ecosystem functions and ecosystem services related to disease regulation
 - environmental law and governance of One Health national and international legislation and other documents (treaties, conventions) on biodiversity and health (global health, one health)
 - environmental/ecological economics, sustainable development, the integration of biodiversity and health (pandemics) in economics (ecological transition, trade)

- Some individual experts of the EWG should have **either direct experience** in knowledge synthesis or experience in qualitative research. Specific techniques/experiences that are especially valued include:
 - Systematic Review
 - Systematic mapping

- Multi-criteria decision analysis
- Delphi
- Semi-structured interviews
- Focus groups
- Workshops

Experience in **European policy processes** will be regarded during the selection discussion.

Important information:

- Eklipse highly encourages all applicants to provide a **letter of support from their organisation**.
- Selected Experts will have to comply with the principles and rules of Eklipse: e.g. conflicts of interest policy, Code of Conduct, etc. (for more details, see the Eklipse website under "[Ethical framework](#)").
- Invited participants to the Focus Group, as well as Eklipse KCB and EMB members, are **not eligible**. Please note that two members of Eklipse MEG with relevant knowledge synthesis methods will be selected from the MEG team to integrate the EWG but will not need to apply to the Call for Experts. Please note that the MEG is composed of experts selected for a mandate of 3 years to integrate EWGs.

5.1 Data and information policy

All results will be made publicly available through the Eklipse website, and transparent procedures will apply, following Creative Commons Agreement 4.0⁷, which includes the reference of authorship and involvement.

5.2 Information to provide

The Eklipse application form should be completed, including a list of relevant publications outlining relevant experience on the topic and details of experience in previous assessments or knowledge synthesis processes.

Eklipse highly encourages all applicants to provide a letter of support from your organisation.

6. Application and notification of results

6.1 How to apply

⁷ See <http://creativecommons.org/licenses/by/4.0/>. It permits unrestricted use, distribution, and reproduction in any medium, provided appropriate credit is given to the original author(s) and the source, provides a link to the Creative Commons license, and indicates if changes were made.





The Eklipse application form can be found on the website under [“Open calls”](#). The completed form should be completed **by midnight on June 20th 2021**. Should you require any further information, do not hesitate to contact us: emb@eklipse.eu

b. Announcement of the results

Successful applicants will be notified directly by Eklipse Management Body (EMB) during **the week of June 20th, 2022**. As soon as they accept the nomination, selected experts' names will be made public on the Eklipse website.

