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# Linking humans, their animals, and the environment again: a decolonized and more-than-human approach to “One Health”

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## **Title**

Linking humans, their animals, and the environment *again*:  
A decolonized and more-than-human approach to 'One Health'

## **Abstract**

This article considers a broad perspective of 'OneHealth' that includes local and animal knowledge. Drawing from various colonial efforts to link human, animal, and environmental health, it first shows that the current 'OneHealth' initiative takes its roots during the colonial engagement and coinciding with a need to secure the health of administrators (controlling that of local populations) while pursuing exploitation of resources. In our contemporary period of repeated epidemic outbreaks, it then discusses the necessity for greater inclusion of social scientists works for a better understanding of complex socio-ecological systems. The paper shows how taking anthropology and allied sub-disciplines (anthropology of Nature, medical anthropology and human-animal studies), highlights local knowledge on biodiversity as well as the way social scientists investigate it in relations with other forms of knowledge. Acknowledging recent approaches developed, notably multispecies ethnography, it then purposes to include not only local knowledge but also non-human knowledge for a better prevention of epidemic outbreaks. Finally, the conclusion stresses the need to put on a same symmetrical line scientific and profane knowledge as a way to decolonize One Health, as well as to engage in a more-than-human approach including non-human animals as object-subject of research.

**Keywords:** One Health, (multispecies) ethnography, knowledge, decolonization , global health

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21  
22 **Résumé:** Cet article envisage une perspective élargie de 'One Health' qui inclut les  
23 connaissances locales et celles des animaux. S'inspirant de divers efforts coloniaux pour relier  
24 la santé humaine, animale et environnementale, il montre d'abord que l'initiative "One Health"  
25 prend ses racines durant la période coloniale et coïncide avec la nécessité de garantir la santé  
26 des administrateurs (contrôlant celle des populations locales) tout en poursuivant l'exploitation  
27 des ressources. Dans notre période contemporaine d'épidémies à répétition, il aborde ensuite la  
28 nécessité d'une plus grande inclusion des travaux des chercheurs en sciences sociales pour une  
29 meilleure compréhension des systèmes socio-écologiques complexes. L'article montre  
30 comment la mobilisation de l'anthropologie et des sous-disciplines connexes (anthropologie de  
31 la nature, anthropologie médicale et études homme-animal), met en évidence les connaissances  
32 locales sur la biodiversité ainsi que la façon dont les chercheurs en sciences sociales l'étudient  
33 en relation avec d'autres formes de connaissances. Prenant en compte les approches récentes  
34 développées dans le domaine, notamment l'ethnographie multi-espèces, il vise alors à inclure

35 non seulement les connaissances profanes mais aussi les connaissances non-humaines pour une  
36 meilleure prévention des épidémies. La conclusion souligne la nécessité de mettre sur une  
37 même ligne symétrique les connaissances scientifiques et profanes comme moyen de  
38 décoloniser One Health, ainsi que de s'engager dans une approche désanthropocentrée en  
39 incluant les animaux non humains comme objet-sujet de recherche.

40

41

#### 42 **b. Introduction: The colonial root of “One Health”**

43 The “One Health” initiative, a tripartite collaboration launched in 2008 between the World  
44 Health Organization (WHO), the World Organisation for Animal Health (OIE), and the Food  
45 and Agriculture Organization of the United Nations (FAO), advocates a rapprochement  
46 between human and veterinary medicine for a better understanding of infectious diseases that  
47 spread across species and how they interact in the environment. While tracing the history of  
48 such convergence, scholars often acknowledge American veterinary epidemiologist Calvin W.  
49 Schwabe [42] for his proposal of ‘One Medecine’ [58]. Actually, what is currently referring to  
50 the One Health initiative traces its root longer back, during the colonial era. This period is rich  
51 in attempts to link human, animal and environmental health. And one has to recall that it is also  
52 a period marked by a strong distinction between the colonial science administrators and the  
53 local populations they controlled.

54

55 In this paper we first intend to dig further into this colonial origin and show how the current  
56 holistic approach as initially promoted resonates in our contemporary period. Let us precise that  
57 we are not veterinarian nor medical doctor by ourselves, but an anthropologist interested in  
58 human-animal relations and a health ecologist sharing a common interest in studying the links  
59 between health, societies, and biodiversity. Drawing on recent development in Social Sciences  
60 methodologies, we then aim at initiate a preliminary reflexion on how the entanglement of all  
61 living beings in a socio-ecological system could be better taken in consideration for future  
62 research in this area.

63

64 Back in 1959, a striking quote from Thomas Logan, a doctor of the Californian “New Frontier”,  
65 highlights the fact that complex links between the environment and health were early  
66 recognized in public health: “*A knowledge of the etiology of diseases can best be attained by*  
67 *studying the affections of different localities in connection with every condition and*  
68 *circumstance calculated to operate prejudicially or otherwise upon the health of the*

69 *inhabitants. Such philosophical investigation is particularly useful in tracing the modifications*  
70 *diseases may undergo from the agency of causes of a local or special character; and being also*  
71 *calculated to elucidate the relationship of diseases to climate, to the prevailing geological*  
72 *formations— the fauna, the vegetables, the minerals, the waters, which vary with the earth's*  
73 *crust, ...”* (Thomas Logan, Transactions of the American Medical Association, 1859, quoted in  
74 Nash [35]). At that time, Thomas Logan and its colleagues were confronted with diseases  
75 affecting their fellow European citizens who were colonizing the “New Frontier” habitats -that  
76 is to say without including native Amerindian populations. To tackle with diseases Logan  
77 proposed an environmental and geographical approach to human health. He was certainly aware  
78 and inspired by the writings of Alexander Von Humboldt, the founder of the modern  
79 biogeography with his “*Essay on the Geography of Plants*” [55].

80

81 As remind by Tilley [50] the era of “interventionist” colonialism encompassed agriculture,  
82 public health, natural resource use, disease control, labor recruitment and conservation  
83 measures culminated in the first half of the twentieth century.

84 As for forest exploitation, colonial administrations introduced scientifically based policies for  
85 the management of their Empires. As remind by the Indian historian Ravi Rajan the settings of  
86 forest departments, and other agencies, “*resulted in the creation of a homogeneous and*  
87 *assertive pancolonial community of foresters*” [38]. Indeed, as demonstrated by the  
88 environmental historian Richard Grove, the colonial forestry has to be seen as the root and  
89 origins of environmentalism [15]. At that time, all European foresters shared a common  
90 representation that new forestry should preserve forests from the mis-management by local  
91 populations, who were blamed for forest degradation, a discourse that has continued until  
92 recently, taking the form of neocolonialism conservation. For example, French foresters saw  
93 themselves as “engineers” concerned with the impacts of deforestation on watersheds by putting  
94 forward the connection between “forest cover, healthy watersheds, and agricultural  
95 productivity” [38], an interesting link echoing the more recent “healthy landscapes” [1].

96

97 Looking at the socio-economic development of colonies, Julian Huxley is probably one of the  
98 most preminent British activists of the new colonial science [50]. In the 1920's, He made a  
99 tour sponsored by the Britain's Committee on Native Education in Tropical Africa. The  
100 committee asked him how biological science and knowledge of the natural world might be  
101 integrated into general educational efforts. Huxley replied the Committee by suggesting that  
102 African studies center should adopt an ecological framework: “*At the present moment, it is clear*

103 *that many if not most problems of applied biology can only be satisfactorily solved by reference*  
104 *to a background of ecological ideas, by whose aid the interrelations of different branches of*  
105 *biological science can be studied”* (quoted by Tilley [50]). Huxley also claimed that “*it is often*  
106 *possible for the ecologist to point out to this or that specialist new lines of approach to his*  
107 *particular problem—disease of man or of domestic animals may prove to be correlated with a*  
108 *cycle of abundance and scarcity in some wild animal . . . game migrations or . . . climatic cycles*  
109 *or variations in mineral content of foodplants.”* (quoted by Tilley [50]). On that, Huxley  
110 emphasized the importance on a “*close liaison between the Department of Ecology and any*  
111 *Anthropological work prosecuted in the School of African Studies, and with medical work*  
112 *bearing on Africa.”* A proposal resumed by Tilley as: “*This triumvirate—ecology,*  
113 *anthropology, and medicine— was central to colonial Africa’s economic and social*  
114 *development”.*

115

116 In the 1930s, The African Research Survey emerged as a network of academics and officials  
117 (i.e, the London and Liverpool Schools of Tropical Medicine, the Imperial Forestry Institute in  
118 Oxford, the Imperial Agricultural Bureaux) under its director Malcolm Hailey and the scientific  
119 adviser Edgar Barton Worthington, authored of “*Science in Africa*”, a book summarizing the  
120 works done [56]. One diagram included is fascinating (Fig. 1), even more is the way it was  
121 presented by Worthington [56]: “*The picture really presented by Africa is one of movement, all*  
122 *branches of physical, biological and human activity reacting on each other, to produce what*  
123 *biologists would refer to as an ecological complex”* (quoted by Tilley [50]). For contemporary  
124 health policy makers such figure is very striking and resembles many of today’s one.

125

126 Environmental influences on health were analyzed by two French geographers Maximilien  
127 Sorre [48], who was credited with the concept of pathogenic complex, and Jacques May [31],  
128 the founder of modern medical geography. Sorre [48] argued that the emergence of diseases  
129 depends on physical, biological and social factors and more specifically on the climate, the  
130 natural biological environment and the anthro-geographical environment (see Oppong &  
131 Harold [36]). For Sorre, the environmental conditions, the living conditions of the pathogen and  
132 the characteristics of individuals influence the appearance of a disease. The approach of May,  
133 who started his career as a medical doctor in French Indochina, focused on the role of the  
134 environment in the formation of human diseases and the importance of geography in mapping  
135 pathological trends. May provided a theoretical framework for studying the environment and

136 geographical factors (in his words, “geogenetics”) of pathogen emergence. He continued his  
137 career in the US where he used to work for the USAID and the WHO.

138

139 One has to remind that just at the end of the World War II, and at the starting of the  
140 decolonization period, Julien Huxley, after co-founding the WWF and initiating the creation of  
141 the IUCN, was appointed as the first director of the newly created UNESCO,. Later on, in 1968,  
142 the links between societies, health and biological conservation were addressed at the Unesco  
143 Biosphere Conference, in which the scientific basis for the rational use and conservation of  
144 biosphere resources were drafted. In terms of health, the loss of biological diversity was directly  
145 associated with the deterioration of physical and mental health: “*Whether the challenges come*  
146 *from physical or social forces, the diversity of environments is of crucial importance for the*  
147 *evolution of man and his societies because the ultimate results of a stereotyped and equalized*  
148 *environment can be and often is an impoverishment of life, a progressive loss of the qualities*  
149 *that we identify with humanness and a weakening of physical and mental health. Our policy*  
150 *should be to preserve or to create as many diversified environments as possible” [52].*  
151 Interestingly, in the Recommendation 3 “Research on Human Ecology” of the final report of  
152 the conference after considering that “*man is an integrated part of most ecosystems, not only*  
153 *influencing but being influenced; that his physical and mental health, now and in the future,*  
154 *are intimately linked with the dynamic systems of natural objects, forces and processes that*  
155 *interact with the biosphere and including also the man’s culture”*, made the recommendation  
156 “*that continuing and intensified research should be undertaken on the ecology of human*  
157 *diseases, with special references to those associated with environmental change and to the*  
158 *zoonotic diseases arising from the interactions between man and the animal”*. What is important  
159 to emphasize is that this recommendation called for the implementation of an ecology of  
160 zoonotic diseases that should integrate the problematic of environmental changes and consider  
161 human culture.

162

163 For contemporary researchers engaged in the understanding of various social, ecological,  
164 biological factors related to the emergence of diseases, the writings of Logan, Huxley,  
165 Worthington to the final report of the Unesco conference of 1968 appear to be so modern. Even  
166 so that they could have been written nowadays by any of the current international organizations  
167 involved in the One Health initiative [2]. But, one can ask why these writings of the late 19th  
168 century or the middle of the 20th century that appear so relevant have disappeared from our  
169 contemporary scientific writings (see [9])? Indeed, scientific researchers involved in the “On

170 Health” have to integrate in their discourses that a large part of the rhetoric they used is not new  
171 but deeply rooted in the colonial sciences that aimed at developing local societies, their health  
172 and the health of their livestock, and their economies by favoring their integration into the  
173 Empire market as that time and to the global market today.

174

175 **Figure 1. The colonial scientific network of environmental management in Worthington**  
176 **[56] (see also Tilley [50] , Morand & Lajaunie [33] ).**

177

178 Interestingly, the network presented above, which does not exclude any of our ‘modern’  
179 scientific disciplines, puts anthropology at the top of the chart. Something hardly taken into  
180 consideration when assessing policy of preparedness or response to zoonotic outbreak that  
181 regularly flourish on a global scale nowadays, with the fear of a new pandemic (see box 1).  
182 Anthropology, a discipline that found its origin in the colonial period itself, seems to have been  
183 banned for long from public health engagement, something that may be explained by its initial  
184 racial theories serving colonial wills. Often considered as the ‘daughter of colonialism’,  
185 anthropology has been favor the serve colonial administration. To wipe off from this view, in  
186 France, the use of the term ‘comparated sociology’ or ‘ethnology’ has replaced the term  
187 ‘anthropology” from academia for decades in the 20<sup>th</sup> century . It has then been reiterated by  
188 Claude Lévi-Strauss after the second World War II which introduced the term “Social-  
189 Anthropology’ in the country.

190

191

### **Box 1. Ongoing global crises**

192 Since the end of the 20<sup>th</sup> century we assist in an increase in the number of emerging infectious  
193 diseases [19,45] mainly related to climate change, land use change, growth of global trade and  
194 biodiversity loss. Biodiversity loss through altered landscapes due to urbanization and  
195 agricultural intensification appears to be linked to higher disease risks with emergence of novel  
196 pathogens resulting from increased interactions between wildlife, domesticated animals, and  
197 humans [18, 28, 16]. Such infectious diseases lead to an increasing number of global outbreaks  
198 with a slight but constant apparition of new pathogens worldwide. Another trend observed is  
199 the homogenization of global parasite distribution, which began around 1960 [46]. Using  
200 network analysis, a striking decrease of the modularity of the country-pathogen network is also  
201 observed [37], suggesting that outbreaks of infectious diseases are increasingly shared among  
202 an increasing number of countries. That is to say that today, an outbreak of a given infectious  
203 disease has a greater chance to spread among a larger number of countries due to globalization.

204 These above patterns strongly suggest that global changes are affecting the global  
205 epidemiological environment mostly by favoring the spread of infectious diseases among  
206 countries and by increasing the risks of pandemics [49]. An echo today with the emergence of  
207 the 2019-nCoV originating from China rapidly spreads out of the country to reach global scale.  
208

209 **Figure 2 Number of infectious diseases presenting outbreaks globally over the last 60**  
210 **years from GIDEON (Global Infectious Diseases and Epidemiology Network,**  
211 **www.gideononline.com).**

212

### 213 **c.d Results and discussion**

#### 214 **Biological and cultural diversity: a (still) missing link for a better health**

215 In the context of repeated global health crises, what does it mean today to encompass into a  
216 single approach human, animal, and environmental health as highlighted by colonial  
217 administrators and currently promoted by ‘One Health’ initiatives? While acknowledging  
218 colonial past view, one should not forget to extricate from their views and relations with local  
219 populations and to engage with new forms of exchange based on dialogue and mutual  
220 collaboration rather than domination. This way, apprehending health as ‘one’ primarily requires  
221 to renew the appreciation of knowledge possessed and implemented by local populations of  
222 their immediate environments. The latter have much to say about the current state of knowledge  
223 on biodiversity as well as the way to manage it.

224 Thanks to their local knowledge, their approach and management of territories and resources, local  
225 populations are essentials actors in meeting the challenges related to global health and  
226 environmental risks. This is all the more true as it meets the current requirements of research ethics.  
227 An extension of the 1992 International Convention on Biological Diversity signed in Rio, the  
228 Nagoya Protocol, has governed access to genetic resources (animal, human, and microbial  
229 genomes) since taking effect in 2014. This protocol emphasizes the need to involve local  
230 populations in research so that they have access to scientific knowledge, participate in building  
231 such knowledge, and share in its benefits.

232 Again, back in 2008, a World Bank report insisted on the fact that indigenous territories encompass  
233 up to 22 percent of the world’s land surface which hold about 80 percent of the global biodiversity  
234 [47] . The role of local knowledge in managing and maintaining a high level of biodiversity  
235 was already acknowledged years ago on the occasion of Convention on Biological Diversity  
236 (CBD) in 1992 in Rio. In particular, the Article 8J of this convention emphasized the  
237 preservation of local knowledge and know-how for the conservation and sustainable

238 management of biodiversity. It states to respect, preserve and maintain knowledge, innovations  
239 and practices of indigenous and local communities embodying traditional lifestyles relevant for  
240 the conservation and sustainable use of biological diversity.

241 Let's add that the rich immediate and surrounding environment local population are living in does  
242 not only provide them basics needs for their daily life, immediate resource for their medicine, and  
243 inspiration for their cultural and spiritual activities. Biodiversity directly encompasses in their own  
244 society, reflecting a particular way of living and representing the world, known as cosmology. Be  
245 the Kasua in Papua Guinea [6] who have borrowed some of their attitudes - expressive, sexual,  
246 technical, ceremonial, even ritual - from animals co-evolving in their shared forest, or the Aït  
247 Ba'amran communities in South Morocco and the Quechua populations of Peruvian Amazonia  
248 [44]who employed natural elements to transmit their culture, there is no boundary between nature  
249 and culture as projected in western dualistic ontology. For them, biodiversity is intrinsically linked  
250 with their own culture and identity. But let's be precise before continuing, our will to highlight to  
251 role of local knowledge does not mean to naively idealizing the knowledge and know-how  
252 possess by communities but considering the way they are sometimes forgotten or smothered by  
253 global measures, they rather could be sentinels for better anticipation and management of health  
254 and environmental crises, as notably shown by Ruhlmann [40] with Mongolian herders.

255  
256 Anthropologists (and social scientists in general) are well positioned to respond this need of in-  
257 depth and immersive research. As a people-centered discipline, historically, anthropology  
258 accounts for the diversity and complexity of relationships communities share with their  
259 environment. Back in 1962, this knowledge refers to what Claude Lévi-Strauss coined as called  
260 the "*science of concrete*" in his book *The Savage Mind* [24]. In the first chapter of the volume,  
261 he attempted to characterize two modes of thought, or methods toward acquiring knowledge:  
262 the "science of the concrete" or mythical thought, and the modern scientific inquiry. His  
263 demonstration stressed that both scientific and mythical thought should be understood as valid  
264 and that one does not supersede the other. They actually consist in two autonomous ways of  
265 thinking, rather than two stages of evolution as thought back in colonial period. Despite a  
266 growing demand for social scientists to tackle global problems nowadays [43], what we witness  
267 is that are call only *after* an epidemic outbreaks in emergency situations. Since Ebola outbreaks,  
268 social scientists are assigned to facilitate the implementation of measures of control and policy,  
269 help in describing local context, and make understanding of local risky practices (see box 2).

270

271

**Box. 2 Social Scientists and ebola outbreaks**

272 In recent years, anthropologists become valuable interlocutors to address the multiple social  
273 economic political and cultural intertwining in epidemic outbreaks. By involving social science  
274 researchers who were present or directly engaged in the field, the recent (and many) episodes  
275 of ebola crises across West Africa highlighted the nature of their contributions. Although recent,  
276 feedbacks have demonstrated the value of involving these researchers who used to work closely  
277 with affected-populations. A recent special issue of the journal "*Anthropology in Action*" (2017)  
278 draw up a first - but not exhaustive - inventory of interventions, in particular from researchers  
279 in the field of medical anthropology and development anthropology who turned their research  
280 into applied anthropology [53]. For the involved researchers such situation also challenged  
281 methods of conducting fieldwork. One of the main mobilization of social scientists in  
282 emergency situations, resides in their presence for the promotion of health measures by NGO  
283 or health experts, making such measures understandable and acceptable to local communities.  
284 Online network and platforms dedicated to the multiple dimensions of outbreak, notably for  
285 helping to implement accurate local interventions were launched (See [http://www.ebola-  
anthropology.net/](http://www.ebola-<br/>286 anthropology.net/) and <https://shsebola.hypotheses.org/>) .

287  
288 It is undoubtedly that one of the roles of the social scientists is to mediate between the various  
289 knowledges to enable a dialogue between scientists, decision-makers, and local populations  
290 specially during emergency situations such as epidemics outbreaks where hard measure are  
291 decided. Indeed, while health issues have invaded the public space, particularly those related to  
292 the origin of animals' diseases, they crystallizing opinions and actors involved. Various  
293 situations lead to a misunderstanding of the measures (slaughter) or issues (particularly  
294 economic) associated with the management or prevention of health crises. In the livestock  
295 sector, for example, a reversed and widespread fear movement in France between local farmers  
296 who fear that wildlife affect livestock on the one hand, and scientists or conservationists who  
297 fear that livestock affect wildlife on the other [12]. But should the social scientists be restricted  
298 to a role of health promoter, *cultural broker*, or risk communicator? Pursuing with the case of  
299 Ebola, a group of scholars [41] directly involved in field during outbreaks insist on their role in  
300 post crisis period, notably for the following of patients who experienced the social effect of the  
301 disease. For Ebola survivors, this includes to understand the physical, social and psychosocial  
302 effects of it. Inputs provide precious feedbacks on the way patients experienced measures  
303 during epidemic. Such information could indeed be crucial for a better adaptation of measure  
304 and coordination between global and local health agencies.

305 Shall we even go further in this step and include *upstream* the inputs of social sciences in the  
306 prevention of risk related to animal, human and environmental health? As for anthropologists,  
307 this question is closely related to the way they conduct their research, the type of data they  
308 collected and more crucially the approach they employed to collect them.

309

### 310 **How to access local knowledge**

311 Anthropology (or any related discipline) through its approach (field survey over time, bottom-  
312 up approach) and its methodological tools (participating and repeated observation of practices,  
313 attention to details, data collection in vernacular language, interviews or life stories) can tell  
314 much about the various perspectives on phenomena like the transmission of diseases from  
315 humans to animals and from domestic to wild animals. Instead of taking the global guidelines  
316 that guide local actions as a starting point, most social scientists have in common to engaged in  
317 bottom-up approach, using ethnographic as its sole method.

318

319 Such is the case of the anthropology of Nature promoted by Descola [8] who challenged the  
320 western dualistic view of nature and culture. Changing such perspective can help in  
321 understanding the social and cultural factors that allow pathogens to cross the interspecies  
322 barrier locally [14]. As virus and pathogens are rarely translated into local languages and also  
323 hardly make sense for local communities (cf. *undo*), anthropology of nature primarily invite to  
324 shift the focus from the pathogen itself to the construction of the human-nonhuman frontier.  
325 Investigations could then focus on how the interspecies frontier is thought to probe the extent  
326 to which it does or does not allow the passage and spread of pathogens. Following the  
327 ontological perspective Descola [8], pathogens are then be investigated through the interiority  
328 and exteriority of beings. For example: is the pathogen present (visible) inside or outside the  
329 body of animals? According to those who are affected and exposed to it, through what type of  
330 contact could transmission have taken place?

331

332 Complementarily to the anthropology of Nature, medical anthropology helps in appreciating  
333 the diversity of points of view on biological phenomena such as the transmission of diseases  
334 between humans and animals, and between domestic and wild animals. It is also well positioned  
335 perspective to engage into pluridisciplinary dialogues. As remind by Panter-Brick and  
336 Eggerman [23] , medical anthropology “*sits at the intersection of the humanities, social*  
337 *sciences, and biological sciences, seeking to transform our understanding of “what matters”*  
338 *for people in terms of health, well-being, and environment. Embracing far ranging interests, it*

339 *generates in depth knowledge about the ways people understand these issues and frame health-*  
340 *related decisions* ". Research in medical anthropology sheds light on the understanding between  
341 the biomedical representation of viruses and/or diseases and their local interpretations. It reveals  
342 various conception of diseases, different values and perceptions orienting animals'  
343 management.

344 In addition, medical anthropology invites to keep a close eye on policies and relations shared  
345 between all actors involved in field and their links. These links, as we know, are not neutral and  
346 implicated issues of knowledge and ultimately power. Something applies to any situation where  
347 different conceptions of health and disease are at stake. For example, while studying elephant  
348 TB surveillance in Lao PDR, Lainé [26] reveals several levels of incomprehension and a lack  
349 of dialogue between the local mahouts and veterinarians. There, instead of facilitating  
350 exchanges, it has only exacerbate tensions, probably already present, between the various actors  
351 involved (NGO, veterinarian, mahout and elephant owner). Finally such biosecurity device [11]  
352 has nothing but offered a new legitimacy to veterinary science over local knowledge.

353

354 Considering the importance place of domestic animals on earth [32] , the latent epidemic  
355 outbreak related to our growing dependency on livestock for food, offer human-animal studies  
356 [7]and ethnozoology [17] to become a flourishing area for medical anthropology [4] . Local  
357 ethnography conducted on human-animal relations engaged research to investigate how farmers  
358 and people daily engaged with animals vary their relationships with them in terms of distance  
359 and proximity depending on their health situation. For example, during fieldwork, researchers  
360 ask how do people perceive a risk associated with animal diseases? If so, how do they prevent  
361 these risks? Under what conditions are animals considered healthy, in their opinion? Are they  
362 under the influence of a good or bad spirit?

363

364 Drawing from ethnobiological methods, local ethnography seeks for local interpretations of  
365 animal diseases, and perceptions of associated zoonotic risks. At the same time, researchers  
366 collect local inventories of animals diseases and their treatment using ethnoveterinary and  
367 ethnobiological tools. In that direction, advocating for a better integration of ethnobiological  
368 research -including its subfields such as ethnoveterinary and ethnomedicine- into the '*One*  
369 *Health*' agenda, Marsha and Robert Quinian [22] recalls how a "one Health" perspective is  
370 actually a central part to Ethnobiology. Reciprocally, they add that "*One Health would benefit*  
371 *from ethnobiology for its natural and social perspective, consideration of deep connections*  
372 *between indigenous people and their landscapes, and its norm of rapport establishment"*

373 (Quinian [22]).

374

375 Recent development of ethnographic method could even push further the understanding of  
376 complexes socio-ecological systems. As we will show below, embracing a multispecies  
377 approach to One Health enlarges the scope of the research by including non-human as a  
378 subject/object.

379

380

### 381 **A multispecies approach to One Health**

382 While we have seen that anthropology could historically be defined as a people-centered  
383 discipline, in recent years, an “ontological turn” has offered an enlarged vision for  
384 understanding the complex entanglements of human and animals. Within the ontological turn,  
385 researches have shown that, far from being automatons or machines animals act and think in  
386 their environment, and that they have representational abilities in it. This perspective offers new  
387 methodological approaches such as multispecies ethnography [20]. It refers to an approach that  
388 aims at considering the agency of nonhuman and their multiples (social, historical, and  
389 ecological) connectivity with human while challenging the anthropocentric vision upon which  
390 ethnography historically depends. Thus, within such “desanthropocentric” perspective, animals  
391 are no more thought of as cut off from the world of human, but as an integral part of this world,  
392 and as actors capable of acting and interacting.

393

394 As a more-than-human approach, multispecies ethnography is open to perspectives from the  
395 natural as well as the social sciences. Applying such perspective to a One Health approach  
396 allows to engage into innovative results which could benefit human, animal and their shared  
397 environment. Researches conducted in such more-than-human approach no more consider  
398 animal as passive objects good to think with [25]. Rather, they are themselves actors in shaping  
399 and producing knowledge along with humans. Such paradigm, adapted to a transdisciplinary  
400 history of One Health has recently revealed how animals have shaped medical knowledge and  
401 make difference for their comprehension [56].

402

403 More crucially, what is interesting in adopting such desanthropocentric perspective is the fact  
404 that while conducting field study it invites not to choose between human or animal, but to  
405 carefully look at the network of relations they built in their shared environment. From an  
406 epistemological point of view, this reversal implies that the primacy of knowledge should no

407 longer be granted only to humans. It then gives a prominent place to interspecific interaction  
408 and dynamics, thought reciprocally. Finally, conducting a multispecies ethnography of human-  
409 animal relations allows researcher to even go further by discussing the notion of local  
410 knowledge and investigating how it could be applied to animals themselves.

411 Relying on local knowledge, it is possible to explore animal's exploitation of resource following  
412 what anthropologist Florence Brunois [5] have called ethno-ethology Practicing ethno-  
413 ethology, she writes, encourages to conduct an "*ethnography of how individuals perceive and*  
414 *conceive, in the course of their interaction with them, the behaviour of living beings and how*  
415 *they react to these behaviours*" (Brunois [5] : 34). In the field, this means accessing animals'  
416 knowledge and understanding of their immediate environment through the mediation of the  
417 people in charge of these animals, in particular how they perceive the said behaviour. This  
418 includes, for example, asking them about their knowledge of the plants consumed by animals,  
419 or following them through the forest or grazing areas to directly observe the plants or any other  
420 plant resources (root, branch, fruit, leaf, vine, bark) consumed by the animals.

421 Conducting such study implies a strong pluridisciplinary. In that direction, Krief and Brunois-  
422 Pasina [21], primatologist and anthropologist respectively, combined their approach to  
423 understand the co-evolution of great apes and humans in the Kibale region of Uganda. Their  
424 results show that animals are co-producers of shared medical knowledge with humans.

425

426 In the same direction, investigating ethnoveterinary practices on pachyderms in Laos, Lainé  
427 [27] showed that according to mahouts, elephants have a rich knowledge of the forest world,  
428 which they express by looking for specific plant specimens for food and healing. In the Tai-  
429 Lue villages in the northwest of the country, the health and care of these animal is based on  
430 local ethnoveterinary practices using local plants, to which must be added an essential element:  
431 respect for the knowledge of the elephants themselves, who are capable of self-medication. That  
432 is, if people provide them with the plants they need for a healthy diet, they are aware that  
433 elephants are able to supplement them if necessary thanks to the abundant diversity of the  
434 spaces they cross in their company. Such aspect of elephant's health management in village is  
435 considered an integral part of the system of care for these animals. There, mahouts do no pretend  
436 to control every aspect of elephant diet and care. According to them, the forest is the equivalent  
437 of a pharmacy for the elephants, they find many medicines there. Adding that when they are  
438 sick, elephants would prefer to stay alone, without seeing any humans, either their owner or the  
439 veterinarian, and that finally the forest is the place where the animal was *sabai* ("healthy"). For  
440 example, it happens to see an elephant being tired or thinned, especially after several days of

441 work in the forest. Their morphology can also vary. And everyone agrees that once the task is  
442 accomplished, when they leave their elephants at rest, free to roam in the forest, it only takes a  
443 few days for them to regain their healthy weight and shape.

444 The ethnographic survey on human-elephant daily life highlights the interdependency of  
445 elephants with local populations they work with, notably in term of health and wellbeing. The  
446 results of this research first show a concordance in the ritual treatment of humans and elephants  
447 (protection by the same household spirit, collective ceremony). Secondly, the collection of  
448 information on the diet of elephants highlights a possible convergence of plant use between  
449 human and animal health.

450 This last example not only allows a decentralization of viewpoint on the world from human to  
451 animal, nor engage research in a more dynamic and inter-relational perspective, it also recalls  
452 the necessary holistic approach for research on health and infectious diseases. By giving a  
453 primary voice to local knowledge such example illustrates how current anthropological  
454 research, by focussing on human-animal relation, reverse the order of relations established by  
455 colonial veterinarians or doctors, but keeps it holistic approach of health. Here local populations  
456 are no more under the domination of administrators, but appears as crucial mediators between  
457 various actors including animals themselves.

458

459 As we have seen, today's global economic changes induced higher demand for livestock and  
460 meat production worldwide which result in a homogenization and intensification of human-  
461 animal interactions. To counter square such trends, and to limit the loss of biological diversity,  
462 there is a need to instigate dialogue between ethnosciences, biodiversity and health by  
463 promoting cultural biodiversity [29]. At the same time, innovative solutions should be  
464 purposed, in particular by seeking to reconstruct local veterinary pharmacopoeias based on  
465 veterinary scientific knowledge, local pharmacopoeias, and also by adding a third component:  
466 the knowledge possessed by animals on their environment that are capable of self-medication.  
467 Operating such epistemological change in how 'making' science induce to rethink the way  
468 research are conducted including its ethics (see box 3).

469

470

### ***Box 3. Rethinking ethics***

471 Alongside with the 'One Health' approach, in recent years, several discourses on ethics have  
472 been produced. The rise of ethical responses to public health crises have been labeled as "One  
473 Bioethics" [51], "One Health ethics", and "Global Health ethics" [13]. Yet, till date, no  
474 consensus exist among bioethicists to what such label mean [53]. As emphasized Morand and

475 Lajaunie [34], ethical reflection in the field of biodiversity and health requires examining the  
476 relevant scientific domains (i.e. biology, ecology, evolution, human medicine, animal medicine,  
477 anthropology, and juridical science), their epistemology, and the need for scientific pluralism.  
478 The latter being essential to establish genuine interdisciplinarity and requires the values,  
479 practices, and impact of each constituent field to be evaluated.  
480 Thus, a well-established “Global Health ethics” is more essential than to build a “One  
481 Bioethics”, as proposed by the “One Health” approach, or a “Planetary health ethics”. As  
482 Verweij and Bovenkerk [53] pointed out, such “One Bioethics” or “Planetary health ethics”  
483 refer more to the domain of meta-ethics which correspond to a moral belief in “health” and  
484 “Planetary health”. The crucial point is the scientific posture adopted in the face of health crises  
485 originating from ecological crises, and its implications for studying nature (broadly  
486 conceptualized as ranging from a simple mechanism that can be easily fixed to a complex  
487 adaptive system that requires care). The recognition that crises are systemic must lead to the  
488 development of systemic actions for better earth stewardship and better common health and  
489 well-being.

490

#### 491 **e. conclusion : Towards an ecological health solidarity**

492 In today’s globalized epidemiological environment [32] characterized by the emergence and  
493 re-emergence of diseases circulating between humans and animals and the rapid biodiversity  
494 decline, social sciences research show that there is no single “one size fits all” solution to the  
495 health and environmental risks that threaten our planet. Case-based contextual studies  
496 conducted in close collaboration with local populations are needed to incorporate their  
497 understanding of the environment they know so well. Working in direct collaboration with local  
498 communities also means to challenge the question of knowledge and the dominant relations  
499 behind it. Recently a global movement of decolonization of knowledge affecting both  
500 ecological [10] and health-related issues [39] has emerged. For the whole scientific  
501 communities that is to say to engage in dialogue and take into account the plurality of points of  
502 view and different types of knowledge including their own logics and epistemologies.

503

504 More crucially, in the society of risk we are living in, where scientific knowledge is a source of  
505 uncertainty [3], humans should no longer be considered as the sole repositories of a knowledge  
506 imposed on nature. On the contrary, they must learn to collaborate with non-humans. It means  
507 to change our view on wildlife and domesticated animals and not necessary consider them as  
508 passive objects, or in the case of health as victims of pathogens or guilty of transmitting them.

509 Potentially, they are co-producer of knowledge on biodiversity. Recent development in social  
510 science methodologies allow to take the agency of animals and highlight the interdependencies  
511 of living beings on a shared territories. Such perspective sheds light on how social and  
512 ecological processes interact with each other and compose a precious ecological solidarity [30]  
513 (including including plants, animals, microbes, insects and other species) that can help and  
514 prevent from the next epidemic.

515

516

### 517 **Conflict of Interest**

518 Both the authors declare that there is no conflict of interest.

519

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524 Asia).

525

### 526 **Figures**

527 Figure 1. The colonial scientific network of environmental management in Worthington (1938)  
528 (see also Tilley 2011, Morand & Lajaunie 2017).

529

530 Figure 2 Number of infectious diseases presenting outbreaks globally over the last 60 years  
531 from GIDEON (Global Infectious Diseases and Epidemiology Network,  
532 [www.gideononline.com](http://www.gideononline.com)).

533

534

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