ONE HEALTH ATLAS

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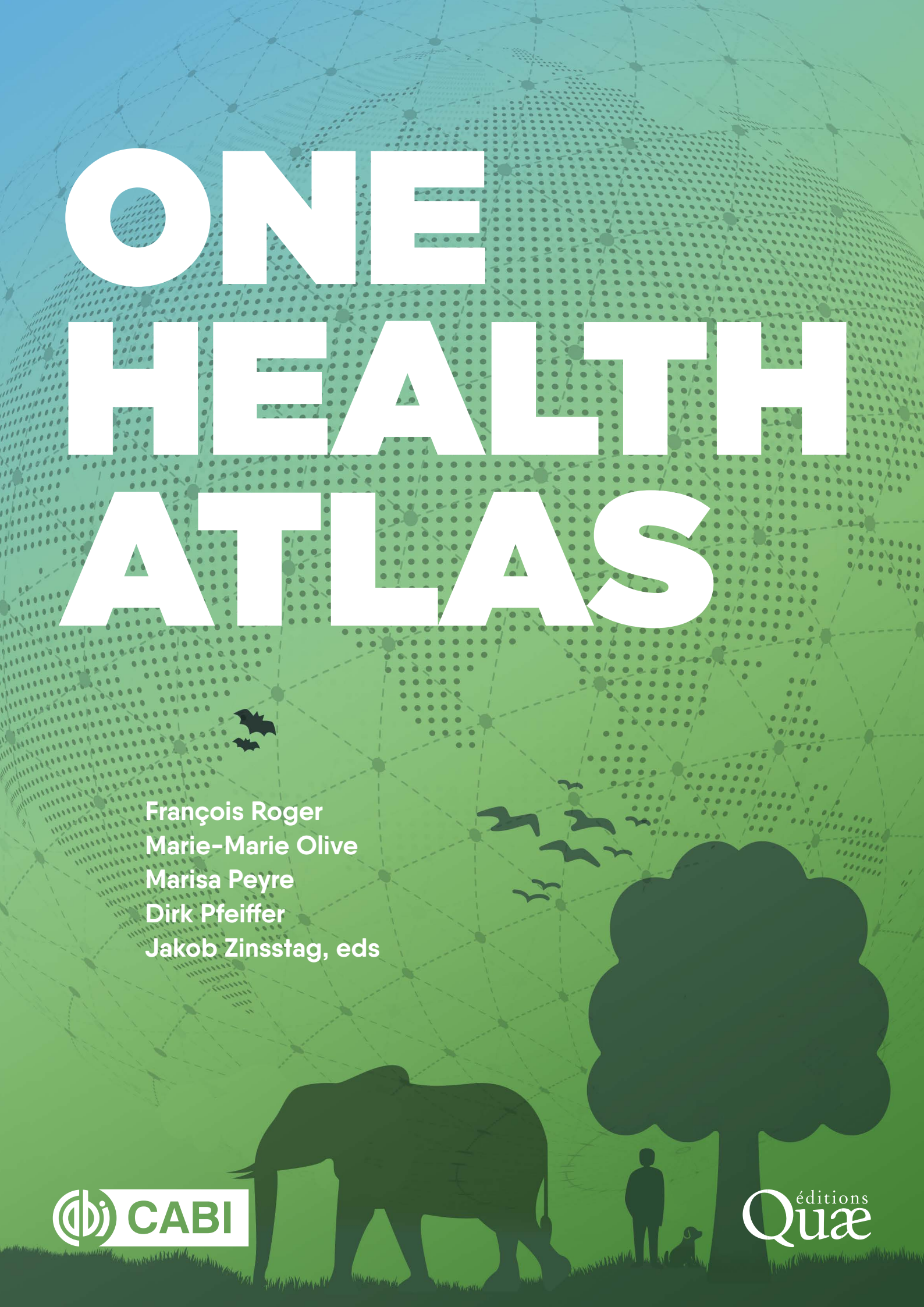

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Epistemology of One Health: bridging disciplines and integrating knowledge

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Complex health problems require collaboration between different scientific disciplines. But deep divergences in the way these disciplines conceive and value knowledge (their epistemology) hinder such collaboration. Projects combining disciplines are often split into work packages and thus remain siloed (Figure 1).

An often-cited obstacle is the opposition between qualitative and quantitative approaches to research (Figure 2). Qualitative research entails subjective interpretation of data collected within a specific context, while quantitative approaches require representative samples to generalize results at the population level. However, necessary dialogue is impeded by myriad practices, judgement biases and epistemologies. Social sciences often (although not exclusively) rely on a constructivist, inductive and interpretative approach. Biomedical research establishes experimental facts to test hypotheses within controlled conditions to decontextualize knowledge, but it also gains knowledge from epidemiological studies. Meanwhile, modelling calls for mathematical translations of reality to create the object of analysis. As a result, this highly diverse landscape is one with wide divergences, exacerbated by technical jargon that further hampers collaborations.

The epistemology of One Health acknowledges that each discipline sheds unique and valuable light on a complex reality and promotes the dialogue between viewpoints. One Health is based on the theory of complex systems, which recognizes multiple perspectives on real-world problems and the need to act and decide even when there is uncertainty. This need for various perspectives extends beyond scientifically validated knowledge and harnesses the full range of human knowledge (e.g. experiential and traditional knowledge), as well as other ways to relate to the world and our problems (e.g. the arts, philosophy, spirituality). This approach, called transdisciplinary research, entails the broad participation of stakeholders and negotiation between divergent values, engaging political and intercultural dialogue (Figure 1). One Health is thus built on strong communication, translation and mediation activities (Figures 3 and 4). For example, One Health practitioners must often bridge and balance anthropocentric and biocentric ethics, where collaborations sometimes hinge on how terms—such as "nature" and "environment"—translate our worldviews. From a systems thinking standpoint, they must also continuously go back and forth between holism and reductionism. Indeed, the need to see the "big picture" does not eliminate the need to identify detailed mechanisms.

References

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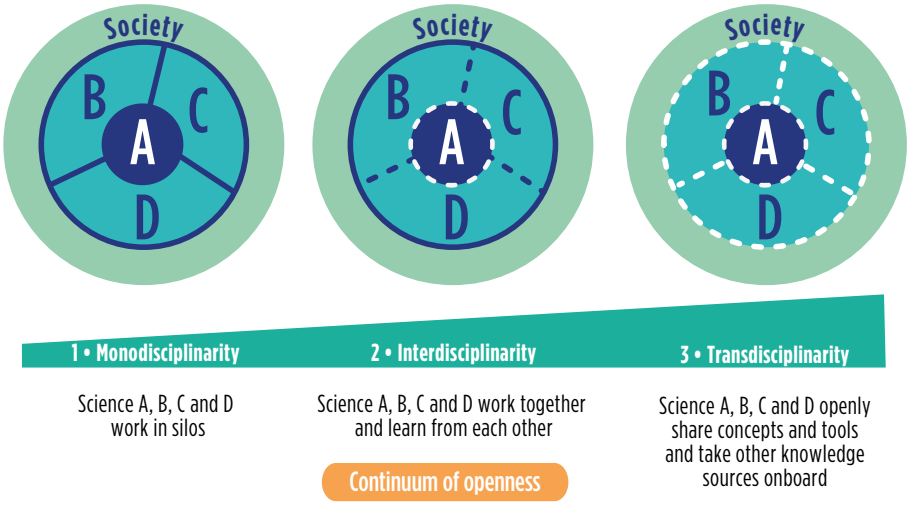

Figure 1. Mono-, Inter- and Trans-disciplinarity represent distinct forms of work along a continuum of openness to a variety of knowledge forms. Importantly, all three forms are needed, in an iterative and adaptive way throughout the solving of complex health problems.

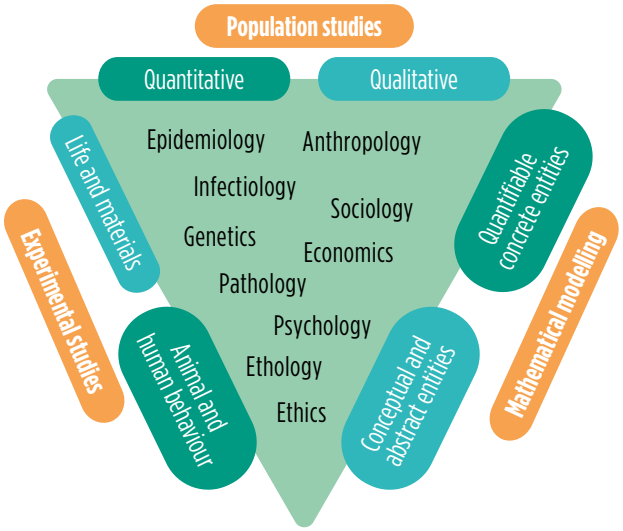

Figure 2. Beyond the opposition between quantitative and qualitative methods, there are many scientific practices. This triangle proposes a framework to reflect on that diversity. Each side sets dichotomies within a main research modality met in One Health research: experimental studies, population studies, mathematical modelling. Disciplines at the centre may in fact have recourse to several of these types of practices.

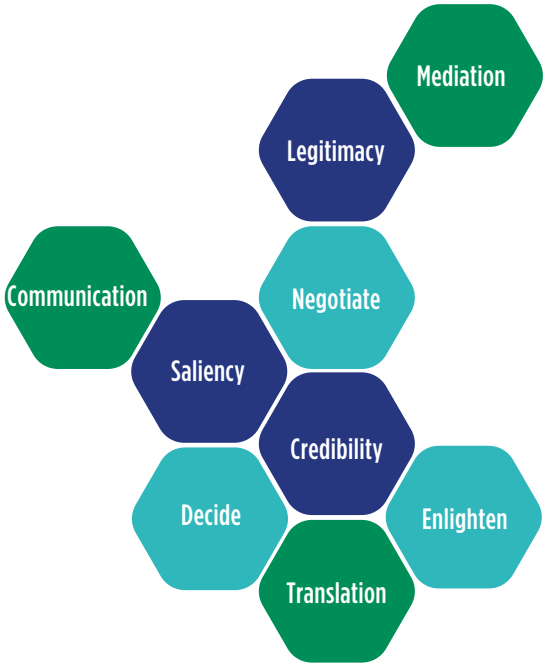

Figure 3. Knowledge in transdisciplinary research may be valued based on three criteria (dark blue hexagons). Hexagons in the figure are arranged to connect criteria to their goals (verbs in light blue hexagons) and to the needed practices (green hexagons) (adapted from Cash *et al.* 2003).

Figure 4. Knowledge sharing is facilitated by objects that are meaningful to all collaborators and that all can manipulate. These so-called "boundary objects" are key to One Health implementation and may be of many different types (e.g. models, species, games, art). Since One Health aims to manage health, health management concepts may themselves act as boundary objects. Source: AI-produced illustration (DALL-E).