

Changing the way we conduct research: Advocating for sustainability science

February 26 2021, by Valérie Verdier, Olivier Dangles, Philippe Charvis and Philippe Cury



In Gabon, sampling of bats in the framework of the EBOSURSY project. The objective is to promote the improvement of early detection systems in wild animals to prevent Ebola and other emerging diseases. Credit: Pierre Becquart/IRD, [CC BY](#)

To stay in step with their times, make their voices heard and play a decisive role in shaping major future directions, researchers must move toward a "sustainability science."

Countless articles published by scientists since the outbreak of the COVID-19 epidemic have reached the same conclusion: there was a risk of a global pandemic; scientific communities repeatedly sounded the alarm; governments were not sufficiently prepared, even though we have already experienced serious health and ecological crises and will have to face other, more violent ones.

These events are the result of our excesses and reflect economic and political reasoning that reaches far beyond the realm of our laboratories. Yet, doesn't this situation also call for scientific communities to rethink the way they build knowledge and propose concrete solutions to respond to global challenges?

As philosopher Edgar Morin said in a recent interview, in this time of health crisis, shouldn't we also have the courage to "see the greatness of contemporary science along with its shortcomings?"

Moving beyond disciplinary interests

Science is now being called upon to find solutions. A multitude of voices are making themselves heard, offering opposing viewpoints at times. But we have to work quickly, provide guidance for public policies and solve problems. While these requirements are legitimate, it is time for us to prepare ourselves better in order to avoid future crises.

Contemporary research remains fragmented and focused on individual disciplines, and it falls very short when it comes to the relationship between the results proposed and the problems to be solved. Putting out the "COVID-19 fire" with research on treatments and vaccines is crucial

in order to save lives... but let us not forget that the rest of the planet is burning! We must find new ways to work together if we want to stand a chance of solving environmental crises.

Against this backdrop, the recent advent of "sustainability science" is a sign of a radical change in the construction of new knowledge systems. A defining feature of this approach is that research problems are anchored in addressing real-world problems, rather than in the sole dynamics of the scientific disciplines involved.

The aim is to promote interdisciplinary knowledge, built jointly by scientists and stakeholders in society, in an effort to move beyond disciplinary interests. This approach is still marginal, especially in France, but is essential to gaining a better understanding of the complexity of the modern world and finding more comprehensive solutions to the economic, social and environmental challenges facing our societies.

Developing cooperative projects

Based on the UN's sustainable development goals (SDG) established by the United Nations in 2015, new research frameworks may be invented in an effort to foster dialog between experts from different scientific disciplines and create collective knowledge.

This is what international panels of experts ([IPCC](#), [GSDR](#), [IPBES](#)) are already trying to do by providing a multi-disciplinary scientific consensus without which we would not be able to understand and take action concerning the future evolutions of our planet.

However, to tackle the issues at stake, there is an urgent need to strengthen joint efforts to build knowledge by incorporating the full range of scientific expertise more effectively, in close cooperation with

policy-makers and civil society. To this end, the management of emerging diseases is perhaps one of the most compelling illustrations of the benefits of sustainability science.

Responding to the Ebola crisis required a [coordinated effort](#), geared toward a [common goal](#)—ecologists specialized in the dynamics of reservoir animal populations, sociologists and economists who study the vicious circles of poverty, [anthropologists](#) specialized in the construction of representations of disease and, of course, infectious disease specialists and doctors cooperating with public health institutes and the communities affected.

In France, although some laboratories are organized with a [multidisciplinary approach](#), thematic silos and competition between disciplines are still too pervasive. It is not enough to bring together researchers with different kinds of expertise—they must work toward a common goal, demonstrate curiosity about other disciplines and consider the epistemology of interfaces in order to rethink the way questions are developed and the synergy between different kinds of knowledge.

As such, there is an urgent need to develop new, ambitious and publicly-funded joint scientific projects that bring together international expertise and work toward a common goal (following in the steps of [CERN](#), the [Human Genome Project](#), and the [Sea Around Us](#) in marine ecology). These projects focused on developing solutions are complementary with disruptive research, drawing on scientists' curiosity and creativity.

Concrete actions

The COVID-19 crisis has led us to think about concrete ways to promote sustainability science. It appears necessary to strengthen the role of partnership-based, participatory, community research and special attention must be paid to the ethics of the partnership, especially in the

Global South, by respecting all of its forms, such as traditional knowledge.

Participatory research with local stakeholders is not a new idea, but it must be promoted in order to build local capacities to better prepare for and combat future crises, especially in the most disadvantaged areas of the world. The growing involvement of society stakeholders can also help bridge the gap between researchers and citizens and help bring them together to work toward a shared goal.

One recent example is the "Silent Cities" project to assess the impact of lockdown measures on biodiversity (birds, amphibians and insects) by monitoring the modification of soundscapes.

Promoting sustainability science also calls for a rethink of the indicators used by the assessment authorities for higher education and research. High quality level requirements for the science that is produced must be maintained and combined with practices that are in step with global challenges.

Scientists must be allowed to build on the activities they have developed in direct interaction with society, as is the case in many countries—in the United States notably with the land grant universities involved in improving quality of life in their region, hours dedicated to "community" activities in South America, and joint university curriculum development with local stakeholders in certain African centers of excellence ([AGRISAN](#), for example).

Finally, it is crucial to apply the principles of [sustainability science](#) to our own research institutions, for example by creating places where knowledge can be built jointly by scientific communities and stakeholder organizations (innovation labs) and establishing measures to reduce the energy consumption of our research practices. There is also

an urgent need to consider our responsibility to train future generations to conduct research focused on taking up major challenges, and to make them more aware of a science that is fundamentally open to others.

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