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# Comments on 'The future of transdisciplinarity: How do we relearn to be human in new ways?'

The deep and insightful reflections on transdisciplinary science by Dr Ramphele, Professor Vogel and Professor Reddy motivated me to share a few thoughts from my somewhat outside-of-Africa perspective. I was trained in Physical Oceanography in Kiel Germany and spent more than a decade in the USA at MIT and Columbia University researching the ocean's role in the climate system and looking at climate variability and change more generically. Given the challenge of observing, modelling and understanding the vast ocean and climate system of our planet, it was quite obvious that no single university or even one country could claim to make significant progress by themselves. Thus, even as an early career scientist, international cooperation became the norm. International teams would take advantage of the World Climate Research Programme to plan and execute large-scale decade-long research missions. Knowledge was generated together and shared at international meetings. These programmes successfully managed to work across competing and sometimes hostile governments. On the other hand, as reflected on by Dr Ramphele, those with access to high-end technology had a stronger voice and many parts of the world simply could not engage. Unfortunately, Africa, South America and Central Asia were weakly represented. Today, there are more attempts to make international climate and ocean sciences more equitable, but there is still a long way to go. For example, Rodrigues argues correctly for:

*... the need to integrate a multitude of different perspectives to achieve progress on the most difficult problems facing the planet. We need people with different backgrounds, training and experiences to help make progress; we need to integrate the knowledge in the Global South with that in the wealthiest countries; and we need to bring together our compassionate, creative, human side with scientific analysis.<sup>1</sup>*

Cultural diversity and the many different realities of scientists around the world are a challenging divide to bridge. Similar challenges exist when working in interdisciplinary or transdisciplinary teams. In my own experience leading an interdisciplinary network in Kiel focusing on the Future Ocean, we first had to agree on a common language, common communication culture and acceptable way to review proposals and ideas. Our programme encompassed seven out of eight faculties and covered natural and social sciences. During the more than 10-year period of the programme, we often contemplated the idea of founding a new faculty on (ocean) sustainability. Is it really so 'new' to work in inter- or transdisciplinary settings at our academic institutions?

A key might lie in the academic contract between universities and society. Often the advancement of fundamental knowledge is at the centre and academic freedom a core value. In such a setting there is little incentive to work in very diverse interdisciplinary settings. Scientists work with their (often also evolving) peer groups of like-minded people and manage to solve ever more complex problems. The sheer volume of expert knowledge needed to advance to the next level makes it less likely to remain an academic specialist. As a consequence, over the last two centuries the number of disciplines for which we have faculties has gradually increased. Most current university presidents would argue that faculties are organised around disciplines. In such a system, the competition for internal resources provides few incentives to work across faculty lines.

However, the situation can change if universities are asked to find solutions to address specific challenges facing their societies. Medical faculties are often combined with university hospitals where research on the fundamental understanding and provision of health services go hand in hand. An instructive historical example played out at the beginning of the 20th century when devastating famines and rapid population growth challenged societal cohesion and economic progress for most European nations. Their leading 'knowledge institutions' were called upon by the respective governments to use science and innovation to increase resilient food production. Many universities responded by establishing a new faculty of Agricultural Sciences, bringing existing expertise together. Even today these faculties are known for their interdisciplinary approach combining biology, ecology, animal medicine, chemistry, engineering and economic science. Collectively they helped to transition the ineffective and vulnerable small-scale farms to modern high-performance agriculture and food production industries. Very often progress was made by combining perspectives of practical knowledge with fundamental systems understanding and engineering – a stakeholder-driven transdisciplinary approach.

How to best address our current climate, biodiversity and sustainability crisis? Do we hear a call to arms for university systems to urgently provide solutions? And how many university presidents have established a transdisciplinary sustainability faculty? Most universities choose to compete in highly disciplinary rankings, need economic success and are seemingly less involved in global problem solving. In 2015, the world leaders, however, established the 2030 Agenda for Sustainable Development. Despite 17 Sustainable Development Goals, they provide a coherent, integrated and wholistic frame putting human dignity and prosperity at the centre. How are our knowledge systems responding? For example, *Times Higher Education* releases annual Impact Rankings<sup>2</sup> to assess universities against their pledges to implement SDGs. None of the richest universities leads the rankings, and unfortunately few African universities can be found in the top 100.

I will end with a reflection on the breathtaking advances in science over the last 100 years. The rapid growth in knowledge and technology has led to spectacular increases in energy and food availability, health services, mobility, urbanisation and global trade. However, many of those technologies have very significant side effects and often provide only short-term gains. For example, most of our energy production produces climate changing CO<sub>2</sub> emissions. Waste is produced at staggering levels and pollutes the environment, for example with long-lived plastics or toxic aerosols. The rapid development is fueled by an economic system that incentivises short-term



growth and benefits, while ignoring long-term negative side effects. This is in stark contrast to value systems of indigenous cultures, which have established rules and procedures that have allowed them to be successful over many generations. How can we relearn to put long-term human prosperity and equity in the centre? Do we critically review technological advances? And how can we best assemble the global, multifaceted knowledge needed to get humanity back on a sustainable development trajectory? Working across disciplines, cultures and societies might hold the key to co-design our future. This is particularly urgent for Africa, as it is projected to become the only continent with dramatic population

growth in the next 50 years. It is my wish that transdisciplinary African solutions can be found once again to address the upcoming challenges.

## References

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