

## **Nobel Sustainability Trust**

### **2024 AWARD SPEECH**

20-21 November 2024

## **Laudatory Speech for Prof. Klaus Butterbach-Bahl, for Outstanding Research & Development in Agriculture**

**by Prof. Dr. Akiça Bahri**

Excellencies, dear members of the Nobel family, dear Professor Klaus Butterbach-Bahl, distinguished guests,

It is both a privilege and honor to stand before you today to celebrate a pioneer who has reshaped our views on agriculture, climate, and sustainability: Professor Klaus Butterbach-Bahl, Head of the Center for Landscape Research in Sustainable Agricultural Futures. As we honor him with the Nobel Sustainability Award in the category of Outstanding Research & Development in Agriculture, we celebrate not only his remarkable achievements but also his transformative impact.

I would like to start with this quote from Ban Ki-moon, Secretary General of the United Nations which illustrates the contribution of Prof. Butterbach-Bahl to reduce the impacts of climate change: “We are the first generation to be able to end poverty, and the last generation that can take steps to avoid the worst impacts of climate change”.

First, please allow me to share a few words about the life of professor Klaus Butterbach-Bahl. Klaus Butterbach-Bahl is a German national who trained and completed his academic journey in Germany, specializing in biology, geography, soil ecology and biogeochemistry. He has worked in Aarhus University for many years and is in charge of the Land-CRAFT research facility, where he and forty other researchers are searching for sustainable substitutes for the methods used in agriculture today. From his alma mater at Giessen University and the Technical University of Munich to his current post as a professor of landscape biogeochemistry, he has dedicated 30 full years to understanding and preserving our earth.

When Klaus Butterbach-Bahl started his studies in the mid-1990s, sustainability and the green transition were topics rarely discussed outside of specialized scientific groups. This was a number of years before the Kyoto Protocol, which really put climate change on the agenda. Planetary boundaries were discussed, but not many people took them seriously. Nowadays, we constantly experience the effects of climate change and, in order for our society to exist, we need to adapt to its effects.

Professor Butterbach-Bahl's career aims to ensure that agriculture can coexist harmoniously with the environment. His work focuses on the environmental impacts of agriculture, particularly greenhouse gas emissions. He explored drivers, modeled emissions, and developed practical mitigation strategies.

His early research into methane emissions from rice paddies showed how rice variety and management practices affect greenhouse gas emissions. Through innovative field experiments and modeling using the Landscape-DNDC framework, he provided strategies to reduce methane emissions through techniques like Alternate Wetting and Drying, enhancing sustainability in countries like the Philippines and Vietnam.

In grassland ecosystems, he examined the effects of grazing on greenhouse gas emissions in Inner Mongolia's steppes, revealing surprising insights, such as how grazing decreases nitrous oxide (N<sub>2</sub>O) emissions during spring thaw. Extending this to the Tibetan Plateau, his studies combined field measurements with microbial process analyses, providing a nuanced understanding of nitrogen cycling in grazed systems.

In sub-Saharan Africa, he led transformative research at the Mazingira Laboratory in Kenya, the region's first advanced environmental lab for livestock emissions. His work included the first measurements of methane emissions from ruminants and manure management practices in East Africa, directly influencing IPCC guidelines and national reporting. His team's identification of abandoned cattle pens as significant nitrous oxide sources highlighted a critical environmental issue.

Beyond regional studies, Prof. Butterbach-Bahl has been a leading global authority on nitrogen cycling and its climatic implications. His pioneering methodologies for quantifying difficult-to-measure processes, such as soil dinitrogen (N<sub>2</sub>) emissions, have been pivotal in understanding human impacts on nitrogen cycles. His leadership quantified European nitrogen fluxes and provided actionable strategies to reduce nitrogen pollution without compromising food security.

His pioneering research on the nitrogen cycle highlighted the environmental challenges of nitrogen overuse. His innovative tools and methodologies paved the way for sustainable nitrogen management strategies, shaping international climate policies and enabling sustainable farming practices worldwide. His work now serves as the foundation for global greenhouse gas inventories, shaping international climate policies and enabling more sustainable farming practices worldwide.

The impact of his work is profound. By promoting integrated nutrient management and resilient farming systems, he has contributed to improving global food security. His research

has provided farmers with solutions to grow more food on less land using fewer resources while protecting the environment.

Beyond his scientific achievements, he has applied research to practice, redefining fertilizer use and helping smallholder farmers balance productivity with sustainability. He has promoted techniques for precise nutrient application, minimizing waste and reducing environmental harm.

In recent years, he has driven climate-smart agriculture, showing how integrating cover crops, crop rotation, and advanced irrigation techniques can reduce emissions and enhance resilience. His use of data science and precision agriculture tools has set new standards for sustainable farming.

As a scientific leader, he has fostered international collaboration, bringing together scientists, policymakers, and practitioners from over 50 countries to address climate change challenges. His innovative approaches to nitrogen management, mitigation of greenhouse gas emissions, and promotion of climate-smart agriculture serve as a model for addressing global challenges while preserving the planet.

While his research achievements are unparalleled, Prof. Butterbach-Bahl's legacy extends far beyond the laboratory. As a mentor and educator, he has inspired several young scientists, many of whom are now leading sustainability efforts in their own right. His interdisciplinary approach and commitment to capacity building have ensured that the next generation is well-equipped to tackle the complex challenges ahead and to implement sustainable agriculture in diverse contexts.

The hallmark of his work is bridging the global and local, helping farmers adopt low-emission practices and advising governments on sustainable land use policies. His work exemplifies the profound impact of science on society.

Ladies and gentlemen, today we honor a man whose work has not only advanced our understanding of agriculture and climate but has also given us the tools to build a more sustainable and equitable world. His contributions remind us that science is not just about discovery—it is about making a difference. His work exemplifies the deep synergy between science and real-world application which is the essence of the Nobel Sustainability Award: innovation with a conscience, science with a purpose.

Prof. Klaus Butterbach-Bahl's contributions have also given us the tools to transform our understanding of agriculture into a force for good—a source of sustenance, resilience, and

harmony with our planet. He has shown us that sustainability and productivity can coexist, and that through innovation and collaboration, we can meet the challenges of our time.

Ladies and gentlemen, please join me in extending our heartfelt congratulations to Professor Klaus Butterbach-Bahl, our 2024 Nobel Sustainability Award recipient in the category of outstanding research & development in the field of agriculture, who I hope will inspire new breakthrough developments in agricultural science to help humanity become more resilient.

Thank you.

Prof. Akiça Bahri

Former Minister of Agriculture, Water Resources and Fisheries of Tunisia