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UCT climate scientist bags prestigious Frontiers Planet Prize

Professor Mark New, director of the University of Cape Town's African Climate and Development Initiative (ACDI), along with ACDI researchers Petra Holden, Piotr Wolski, Romaric C. Odoulami, Joyce Kimutai, Tiro Nkemelang and Kamoru A. Lawal, and collaborating researcher Alanna Rebelo from the Agricultural Research Council, has been awarded the prestigious Frontiers Planet Prize for their research on nature-based solutions (NbS) and climate change.

In 2022, the Frontiers Research Foundation launched its third initiative, an international science competition called the Frontiers Prize. The prize aims to directly fund and accelerate scientific research to stabilize the planetary ecosystem. This international science competition offers three awards for scientific breakthroughs that show the greatest potential to help keep humanity within any one of the nine boundaries, as described by the Stockholm Resilience Centre.

The prize's international champions receive funding and worldwide exposure for their research. The prize money is awarded as a grant to the winner's research institution to fund their continued research.

This year, New and his team were awarded the prize for their work on NbS outlined in the recent journal article *Nature-based solutions in mountain catchments reduce impact of anthropogenic climate change on drought streamflow*, published in Communications Earth & Environment.

"Receiving this prize is a huge surprise, and a great honour," said New. "The paper that won the prize is the cumulation of five years of research, involving a large team of researchers, and builds on many other papers, datasets, and research outputs. I'm really happy that the prize is recognising the role of local solutions, which if scaled, can have planetary-scale impacts."

The winning research aimed to explore regional scale interactions between climate change, water security and ecosystem integrity, asking, "Can NbS reduce the risks to water security from climate change and land degradation?" To investigate these questions, the team tested

whether catchment restoration through removing alien invasive trees could have ameliorated the impacts of climate change on Cape Town's 2015-2018 drought.

The research showed that restoration of catchments which are heavily invaded by woody alien plants could offset some of the anthropogenically derived drought risk. However, the team also found that human influence on drought risk was already sufficiently large that catchment restoration could not completely offset climate change impacts.

"Our paper showed the importance of integrating NbS into a broader portfolio of adaptation options for managing water resources under climate change," said Petra Holden, lead author of the paper. "I am grateful to have had the opportunity to lead this paper under New's guidance and with a team of inspiring African scientists. It means a lot to me that African-led research and southern African relevant NbS - such as invasive alien tree clearing - are being showcased in the global arena."

An element of the prize is to highlight how research may lead to immediate impact either through research innovation, stakeholder collaboration, or policy interventions. The authors highlighted these key areas of impact, specifically focusing on the importance of reliable mapping and modelling in planning for and investing in NbS.

New explained: "With reliable and well-calibrated models, we can better quantify the buffering capacity of NbS. Equally so, remote sensing coupled with high-resolution modelling can identify the most important locations for restoration. The data generated through these methods can be used in financial modelling for investment cases for restoration. The research highlighted that NbS can help offset climate impacts, but its effectiveness varies from location to location."

The authors showed that the results from this research can and should be implemented in practice, highlighting implementation examples such as:

• New remote sensing methods for high-resolution mapping of invasive alien vegetation to radically improve existing maps;
• Spatially disaggregated hydrological modelling, coupled with high-resolution vegetation information, to identify areas within catchments where restoration should be prioritised for offsetting anthropogenic climate impacts on water supply; and
• Financial modelling of investment cases for restoration, to promote private-public partnerships for long term catchment restoration and maintenance.

NbS have been widely touted as key landscape-scale interventions to restore ecosystem function, enhance ecosystem services, and buffer society from climate change impacts. But the empirical evidence on the efficacy of NbS in a changing climate across contexts is lacking. This research, with several others from the research team, filled this gap by quantifying the efficacy of catchment restoration in reducing water stress directly linked to human-caused climate change. It sets an example of what is possible with robust interdisciplinary research on NbS, specifically which more focused "NbS for water" project design should be possible, locations where NbS will be most effective, and where NbS would be less effective.

Commenting on how he will use the prize, New said: "I'm still figuring out how best to use the prize to deepen our research and scale its impact. A few ideas we have are to build a regional observation and modelling platform to support the planning and implementation of NbS in Southern Africa and to develop an EBA academy where policymakers, community

organisations, landscape custodians and others can be trained in nature-based solutions, helping to grow local green economic development."

Professor Mark New Photo: Michelle Shields

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