

The background of the entire page is a stylized illustration. The upper portion features a large, light-colored silhouette of the African continent. Inside the continent's outline, a bright white sun with radiating lines is positioned in the upper left. Below the continent, a landscape scene is depicted with a body of water in shades of blue and green, a dark green landmass with two acacia-like trees, and a yellow-orange mountain range in the distance. The overall color palette is soft and pastel, with shades of pink, blue, green, and yellow.

# EARTH, OCEANS AND SKIES

Insights from selected, outstanding  
African women scientists



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# Foreword

Why study stars? Why count and name the fish in the ocean? How about insects? What lurks within the fascinating geology of Africa? What messages do trees rings hide? Can we save our infants, cure incurable diseases, understand our genes, secure the health of our animals? Can we find cures in our traditional knowledge and biodiversity? Can the humble sweet potato nourish Africa? How about humankind's fascination with light? How do we nurture talent and create more scientific leaders?

Insights into these and many more fascinating questions, articulated by selected outstanding African women scientists, lend this book its rather unusual title, *Earth, Oceans and Skies*. This name is befitting of a publication written within a globally transformative period, a time when the world has been forced to rethink its present and to reimagine its future.

Compelling factors include the slow progress in the achievement

of the Sustainable Development Goals, adopted by the United Nations in 2015. Moreover, while the coronavirus disease (COVID-19) pandemic has further impeded progress towards the Sustainable Development Goals, it has made their realization even more necessary and urgent. Thus, the declaration by the United Nations General Assembly of a decade of action and delivery for sustainable development (2020–2030), aimed at accelerating attainment of the Goals.

Produced as part of the Economic Commission for Africa (ECA) project to champion the decade of action and delivery, *Earth, Oceans and Skies* metaphorically unifies two issues: science and gender, as a mighty, transformative force in every aspect of our existence. It is a book with multiple goals, the first being to pivot growing efforts to mainstream science, technology and innovation into socioeconomic development in Africa. Second, this publication aims to recognize and celebrate the

often onerous efforts by numerous women in forging pathways and overcoming gender biases in many fields. It also aims to motivate and empower young girls and future leaders, who are currently observing from the sidelines of structural gender imbalances. Ultimately, the perceptions in this book will enable more women to enter and thrive in the world of science, as a way of achieving the continent's overall ambition of achieving gender equality and empowering women and girls.

The scientists featured in *Earth, Oceans and Skies* are exemplars who have been selected through an informal, yet rigorous process. Presented as condensed autobiographies, the stories in *Earth, Oceans and Skies* create a mosaic of individual journeys interwoven with the historical, political and social economic contexts that influence the science, technology and innovation endeavour in Africa.

Their narratives oblige us to shift our gaze, to look beneath the statistics, global narratives, policy-making rhetoric and dominant discourses. We discern diverse motivations into science: giftedness, natural curiosities and inquisitive minds; empathy for human suffering; an innate instinct to nurture, to serve, to solve, to save; the stimulation of herding sheep in the scenic vistas of Lesotho, with its tall mountains and narrow valleys; growing up in a beautiful Algerian village and its rocky mountains; a childhood in rural Ethiopia that led to early awareness of the disconnect between agricultural labour and yield; legendary water problems in the Sahel; a disconcerting visit to a gynaecologist at a tender age; a book gift; serendipity; motivating parents and nurturing communities; defiance and rebellion against culture; and negative beliefs on women and science.

The scientists take us with them along their scientific journeys, which are intricately intertwined with personal, family, national and global scenarios, as well as moments of triumph and frustration. They confide in us how they have thrived by seizing opportunities, remaining focused, refusing to be bowed, believing in themselves and their missions, daring to dream, to ask the big questions, venturing beyond their comfort zones into uncharted waters, taking risks, remaining grounded and because of mentorship and numerous helping hands. Many are now paying forward that debt, by nurturing other scientists, women included.

The testimonies of success, motivation, dedication and distinction in *Earth, Oceans and Skies* will inspire women and girls to pursue careers in science, technology and innovation, or any other dreams that they might have. These stories also provide intuitions for mechanisms and frameworks to identify, nurture and retain scientific talent – female and male.

Beyond what statistics show, the scientific accomplishments presented in this publication provide alternative perspectives and indicators of the contribution by Africa to the global knowledge hub. They reveal rising institutional strengths, capacities, output and impact across scientific and developmental fields.

Thus, *Earth, Oceans and Skies* demonstrates a return on investment in science, technology and innovation in general, and in women scientists specifically. This book leaves us with no doubt that women are capable of excellence in science and as scientific and institutional leaders. From the lab to the field, across the continent, the globe and indeed the universe, African women are shining strongly.

On the flip side, *Earth, Oceans and Skies* decries a dearth of support and appreciation of science and scientists in Africa. A key message in this publication is that investing in and recognizing scientists in Africa should become a non-negotiable commitment. We are strongly reminded of changing global scenarios and priorities, especially due to the COVID-19 pandemic, which are obliging international science funders and development partners to refocus their support inwards, to the disadvantage of Africa. Moreover, the old adage holds: charity begins at home, and the onus for more homegrown investments for science, technology and innovation has never been more real. Indeed, reducing over-reliance of African researchers on external funding will be the ultimate trump card for science in Africa.

Commendably, as demonstrated in this publication, several African countries have made progress, for example by establishing research funding agencies. But such pooled resources need to be boosted to accommodate investment-intensive initiatives, for example vaccine development. Further, while the emphasis by local and international funders on applied research with societal impact is justified, a balance is necessary. Investments in basic sciences, as the foundation for strategies, technologies and solutions, must not be compromised. This will also enable the continent's scientists to follow their intellectual curiosities, to participate in the excitement of scientific discovery and augment their contribution to the global scientific hub. The prestige and legitimacy of African scientists will be enhanced within the international scientific communities and, in turn, their ability to access the global reward system, which includes resources, knowledge and recognition.

“ *It is our hope that Earth, Oceans and Skies will invigorate Africa and the rest of the world, to do more to harness the potential of women in science.*

Moreover, allocations must be made for strategic interventions in institutional, technical and human capacity, for example scientific infrastructure and equipment, and training and rewarding of scientists. Combined, these shifts will enable us to harness the massive brainpower of Africa; to turn a vicious cycle of intellectual wastage into a prosperous one where talent is harnessed, lives are saved and economies are built.

*Earth, Oceans and Skies* also throws down the gauntlet to scientists to communicate, lobby and create awareness for improved research uptake, knowledge-based policy and decision making. Scientists need to become role models and champions, lending their voices and actions to bring about a revolution in science teaching and training; to close the innovation chasm between research and markets; and to demystify science among the public, to build popular support.

This publication offers valuable insights on thought leadership: the bravery, boldness, audacity and determination needed to bring forth big ideas. It also emphasizes the need for women scientists to become part of the movement of change, to embrace their right and responsibility to think and theorize from their distinctive geographical and sociocultural perspective.

It is my hope that *Earth, Oceans and Skies* will invigorate Africa and the rest of the world to do more to harness the potential of women in science, to consolidate gains, undertake proper tracking and monitoring, and accord them, alongside their male counterparts, their due recognition in the scientific universe.

At ECA, *Earth, Oceans and Skies* is just the beginning. We acknowledge that many other commendable women have not been included in this edition but are nonetheless noteworthy and deserving of celebration in their countries, communities and cohorts. Therefore, it is vital for us to continue this publication, in some form or another, to recognize and celebrate more women from across the continent who are frontrunners in development, in harnessing talent and in nurturing leadership.

Moreover, in 2022, ECA aims to enhance the capacity of member States to positively reimagine gender dimensions in their economic and digital transformation as a significant result area. This could include introducing and revising policies and programmes to reduce the gender digital divide, building on previous progress. With concerted efforts, we can break the cultural and institutional barriers that women and girls continue to face in science, technology, engineering and mathematics education and training.



**Ameenah Gurib-Fakim**  
Former President of Mauritius

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