

# Professor Calestous Juma



**Calestous Juma** (born [9 June 1953](#) at [Port Victoria](#), western [Kenya](#)) is an internationally-recognized authority in the application of [science](#) and [technology](#) to [sustainable development](#) worldwide. He is Professor of the Practice of International Development and Director of the Science, Technology and Globalization Project[1] at [Harvard University](#)'s [Kennedy School of Government](#)[2]. He is also Visiting Professor at the United Nations University Institute of Advanced Studies[3] in Yokohama, Japan.

In recognition of his work, Juma has been elected to the [Royal Society of London](#), the [U.S. National Academy of Sciences](#), the [Academy of Sciences for the Developing World](#) (TWAS), the [World Academy of Art and Science](#) and the [New York Academy of Sciences](#). He is a member of the [Kenya National Academy of Sciences](#).

Juma grew up on the Kenyan shores of [Lake Victoria](#) where he obtained early education. He first worked as an elementary school teacher before becoming Africa's first science and environment journalist at Kenya's [Daily Nation](#) newspaper. Juma later joined the Nairobi-based [Environment Liaison Centre International](#) (ELCI) as a founder and editor of trilingual quarterly magazine, *Ecoforum*. He later received an MSc in Science, Technology and Industrialization and a DPhil in Science and Technology Policy from the Science Policy Research Unit at the [University of Sussex](#). He has written widely on science, technology and sustainable development.

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## Leadership

In [1988](#) Professor Juma founded the African Centre for Technology Studies[4] (ACTS), [Africa](#)'s first independent policy research institution designed to advance research on technology in development. In 1989 ACTS released a path-breaking study, *Innovation and Sovereignty* that led to the adoption of the Industrial Property Act in Kenya and the creation of the Kenya Industrial Property Office.

## Policy research

His continuing original work focuses on analyzing the dynamics of evolutionary technological change and applying the results in advancing science and technology policy research; providing high-level science and technology advice; and promoting biodiversity conservation.

## **Technological innovation**

Juma has made significant contributions to understanding the dynamic role of technological innovation in economic transformation in developing countries. He developed the concept of “evolutionary technological change” to explain how socio-economic environments shape the adoption and diffusion of new technologies. This approach was elaborated in his early works such as *Long-Run Economics* (Pinter, [1987](#)) and *The Gene Hunters* (Princeton and Zed, [1989](#)) and remains central to theoretical and practical work. Juma’s contributions to science and technology policy have focused on the role of technological innovation in [sustainable development](#).

## **Biotechnology**

He has established himself as a world leader in policy research on [biotechnology](#) and directed the International Diffusion of Biotechnology Programme of the International Federation of Institutes of Advanced Studies. He continues to provide international leadership in research, training and outreach through Harvard University’s Kennedy School of Government. He is also advancing scholarship in this field as editor of the peer-reviewed *International Journal of Technology and Globalisation*[\[5\]](#) and the *International Journal of Biotechnology*.[\[6\]](#)

## **Biological diversity**

Juma has contributed to biodiversity conservation in two ways. First, he has helped to shape global conservation programmes during his tenure as the first permanent Executive Secretary of the Convention on Biological Diversity in Geneva and Montreal. Second, his research has inspired the field of [biodiplomacy](#)[\[7\]](#) that focuses on interactions between [biosciences](#) and international relations.

## **Property rights**

Juma’s research has helped to improve understanding on the role of property rights in conservation under the rubric of “[ecological jurisprudence](#)” as outlined in the volume, *In Land We Trust* (Zed, 1996). His work guided international negotiations on the United Nations Convention on Biological Diversity (CBD)[\[8\]](#) as documented in *Biodiplomacy* (ACTS, 1994). He later became Executive Secretary of the CBD where he advanced the use of scientific knowledge in conservation policy and practice.

## **Teaching**

Juma teaches graduate courses on the role of science, technology and innovation in development policy.[9] The first course focuses on the role of technological innovation in economic growth with emphasis on emerging regions of the world.[10] The second course examines the policy implications of the introduction of new biotechnology products in the global economy (covering health, agriculture, industry and environment).[11] He also teaches an executive course for senior policy makers and practitioners. The Science, Technology and Innovation Policy (STIP) program runs annually to provide high-level leaders from government, academia, industry, and civil society with an opportunity to learn how to integrate science and technology into a national development policy.[12]

## Policy advice

Juma continues to provide high-level policy advice to governments, the [United Nations](#) and other international organizations on science, technology and innovation. He chairs the Global Challenges and Biotechnology of the US National Academy of Sciences and serves as co-chair of the African High-Level Panel on Modern Biotechnology[13] of the [African Union](#)[14] (AU) and the New Partnership for Africa's Development (NEPAD).[15]

Juma led international experts in outlining ways to apply science and technology to the implementation of the [Millennium Development Goals](#) arising from the [UN Millennium Summit](#) in the year 2000. *Innovation: Applying Knowledge in Development*[16] (Earthscan, 2005), the report of the Task Force on Science, Technology and Innovation of the UN Millennium Project[17], was released in early 2005 and its recommendations have been adopted by development agencies and governments around the world. The report has become a standard reference against which governments assess their policies and programmes on the role of technological innovation in development.

In a successor study, *Going for Growth*[18], Professor Juma proposes that international development policy should be directed at building technical competence in developing countries rather than conventional relief activities. He argues that institutions of higher learning, especially universities, should have a direct role in helping to solve development challenges.[19]

## Boards and committees

Juma is member of the Kenyan President's National Economic and Social Council. He has served or serves on the boards and committees of numerous organizations including the US National Academy of Sciences, the US National Academy of Engineering,[20] the United Nations University Institute for New Technologies in Maastricht (The Netherlands), the World Resources Institute (WRI)[21] in Washington, DC, the EARTH University[22] in Costa Rica, the Dickey Center[23] at Dartmouth College, the Canadian Program in Genomics and Global Health at the University of Toronto.[24] and the Public Library of Science[25] in San Francisco. He is also a member of the editorial boards of

several leading peer-reviewed journals on science, technology and innovation. He has held numerous honorary positions including the Chancellorship of the University of Guyana.

## Honors and awards

Juma received the [1991 Pew Scholars Award](#)[\[26\]](#) in Conservation and the Environment for dedication in preserving global biodiversity; the [1992 Rweyemamu Prize](#) for broadening [Africa](#)'s knowledge base for development; the [1993 UN](#) Global 500 Roll of Honour for Environmental Achievement[\[27\]](#) for important contributions to Africa's quest for solutions to the complex issues of [biotechnology](#), [biodiversity](#) and the transfer of technology; and the [2001 Henry Shaw Medal](#) for significant contribution to [botanical](#) research, [horticulture](#), conservation or the museum community.

In 2006 he delivered the Iowa State University's 6th John Pesek Colloquium on Sustainable Agriculture[\[28\]](#) and the 2006 Hinton Lecture[\[29\]](#) of the Royal Academy of Engineering in London. In the same year he was awarded an honorary Doctor of Science degree from the University of Sussex for outstanding contributions to the promotion of science and technology for development. He also received the honor of the Elder of the Order of the Burning Spear (EBS) from President Mwai Kibaki of Kenya in recognition of "his achievements and distinguished service to the nation". He was cited as a respected "international diplomat who has assisted governments to solve diplomatic problems".

## [Selected publications

- 2007. *Freedom to Innovate: Biotechnology in Africa's Development*. Report of the High-Level African Panel on Modern Biotechnology. African Union, Addis Ababa, Ethiopia (with Ismail Serageldin) (forthcoming).
- 2006. *Lost Crops of Africa: Volume II, Vegetables*. National Academy Press, Washington, DC (Contributor to a Study of the National Research Council as committee member).[\[30\]](#)
- 2006. *Redesigning African Economies: The Role of Engineering in International Development*. 2006 Hinton Lecture, Royal Academy of Engineering, London.[\[31\]](#)
- 2006. *Reinventing African Economies: Technological Innovation and the Sustainability Transition*. 6th John Pesek Colloquium on Sustainable Agriculture, Iowa State University, Ames, Iowa, USA.[\[32\]](#)
- 2005. *Going for Growth: Science, Technology and Innovation in Africa*. The Smith Institute, London.[\[33\]](#)
- 2005. *Innovation: Applying Knowledge in Development*. United Nations Millennium Project. Earthscan Publications (with Lee Yee-Cheong).[\[34\]](#)
- 2002. *Knowledge and Diplomacy: Science Advice in the United Nations System*. National Academy Press, Washington, DC (Contributor to a Study of the National Research Council as committee member).[\[35\]](#)

- 2002. *Down to Earth: Geographical Information for Sustainable Development in Africa*. National Academy Press, Washington, DC (Contributor to a Study of the National Research Council as committee member).[\[36\]](#)
- 1996. *In Land We Trust: Environment, Private Property and Constitutional Change*. Zed Books, London and Initiatives Publishers, Nairobi (with J.B. Ojwang).
- 1995. *Economic Policy Reforms and the Environment: African Experiences*. United Nations Environment Programme, Geneva (with Hugh Monteith, Hartmut Krugmann, Tobias Angura, Herbert Acquay, Akino Anthony E., Philip Wandera and John Mugabe).
- 1994. *Coming to Life: Biotechnology in African Economic Recovery*. Acts Press Nairobi and Zed Books, London (with John Mugabe and Patricia Kameri-Mbote).
- 1994. *Bioplomacy: Genetic Resources and International Relations*. Acts Press, Nairobi (with Vicente Sánchez).
- 1993. *The Adaptive Economy: Economic Crisis and Technological Change*. Acts Press, Nairobi (with C. Torori and C.C.M. Kirima).
- 1991. *Biotechnology and Sustainable Development: Policy Options for Developing Countries*. Acts Press, Nairobi (with Norman Clark).
- 1991. *A Change in the Weather: African Perspectives on Climatic Change*. Acts Press, Nairobi (with S.H. Ominde).
- 1989. *The Gene Hunters: Biotechnology and the Scramble for Seeds*. Zed Press, London and Princeton University Press.
- 1989. *Innovation and Sovereignty: The Patent Debate in African Development*. African Centre for Technology Studies, Nairobi (with J.B. Ojwang).
- 1989. *Gaining Ground: Institutional Innovations in Land-use Management in Kenya*. Acts Press, Nairobi (with Amos Kiriro).
- 1989. *Biotechnological Diversity and Innovation: Conserving and Utilizing Genetic Resources in Kenya*. Acts Press, Nairobi.
- 1987. *Long-Run Economics: An Evolutionary Approach to Economic Growth*. Pinter Publishers, London (with Norman Clark).

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