

# Environment and Development Economics

Volume 21 Part 5 October 2016



# ENVIRONMENT AND DEVELOPMENT ECONOMICS

published in association with the Beijer Institute of Ecological Economics,  
Royal Swedish Academy of Sciences

**AIMS AND SCOPE** *Environment and Development Economics* aims to publish papers on the environmental problems associated with the process of economic development. It encourages submission of two categories of paper. The first comprises scientific papers. The second comprises environmental policy discussion papers. The first is carried in a section on Theory and Applications. The second is carried in a regular section, Policy Options, and an occasional more focussed Policy Forum.

The journal publishes on a wide range of topics including:

- \* the environmental impact of economy-wide policies
- \* optimal environmental regulation and incentives in a development context
- \* the valuation of environmental resources in developing countries and incentives in environmental policy
- \* the environmental effects of institutional change
- \* modelling interdependent economic and environmental processes

**SUBSCRIPTIONS** *Environment and Development Economics* (ISSN 1355-770X) is published bimonthly in February, April, June, August, October and December. Six parts form a volume. The subscription price (excluding VAT), which includes print and electronic access, and postage, of Volume 21 in 2016 is £370 (\$600 in the USA, Canada and Mexico), for institutions and £60 (\$97 in the USA, Canada and Mexico) for individuals ordering direct from the publisher and certifying that the journal is for their personal use. The electronic-only price available to institutional subscribers is £289 (US\$482 in the USA, Canada and Mexico). Single parts are £66 (US\$107 in the USA, Canada and Mexico). Prices include delivery by air where appropriate. Orders which must be accompanied by payment, may be sent to a bookseller, subscription agent or direct to the publisher: Cambridge University Press, Journals Fulfillment Department, UPH, Shaftesbury Road, Cambridge, CB2 8BS, UK: or in the USA, Canada and Mexico: Cambridge University Press, Journals Fulfillment Department, 1 Liberty Plaza, Floor 20, New York, NY 10006, USA. EU subscribers who are not registered for VAT should add VAT at their country's rate. VAT registered subscribers should provide their VAT registration number. Japanese prices for institutions are available from Kinokuniya Company Ltd, PO Box 55, Chitose, Tokyo 156, Japan. Special arrangements exist for subscribers in most low-income countries. Apply to: Journals Marketing Department, Cambridge University Press, University Printing House, Shaftesbury Road, Cambridge, CB2 8BS, UK.

Periodicals postage is paid at New York, NY, and at additional mailing offices. POSTMASTER: send address changes in the USA, Canada and Mexico to: *Environment and Development Economics*, Cambridge University Press, 1 Liberty Plaza, Floor 20, New York, NY 10006, USA.

**Copying** This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of U.S. Copyright law) subject to payment to C.C.C. of the per-copy fee of \$12.00. This consent does not extend to multiple copying for promotional or commercial purposes. Code 1355-770X/2016.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, PA 19104, USA, is authorised to supply single copies of separate articles for private use only.

Organizations authorised by the Copyright Licensing Agency may also copy material subject to the usual conditions.

For all other use, permission should be sought from Cambridge or from the American Branch of Cambridge University Press.

This journal is included in the Cambridge Journals Online service which can be found at <http://journals.cambridge.org>. For further information on other Press titles access <http://www.cambridge.org>

ISSN 1355-770X © Cambridge University Press

## CONTENTS

LUNYU XIE Automobile usage and urban rail transit expansion: evidence from a natural experiment in Beijing, China	557
JULIANO ASSUNÇÃO and FLÁVIA CHEIN Climate change and agricultural productivity in Brazil: future perspectives	581
RAINER ANDERGASSEN and LUIGI SERENO Natural disasters, mitigation investment and financial aid	603
SOUHA EL KHANJI and JOHN HUDSON Water utilization and water quality in endogenous economic growth	626
HILARY NDAMBIRI, ROY BROUWER and ERIC MUNGATANA Comparing welfare estimates across stated preference and uncertainty elicitation formats for air quality improvements in Nairobi, Kenya	649
NIK STOOP, ROMAIN HOUSSA and MARIJKE VERPOORTEN To fish or not to fish? Resource degradation and income diversification in Benin	669

# ENVIRONMENT AND DEVELOPMENT ECONOMICS

published in association with the Beijer Institute, Royal Swedish Academy of Sciences

## EDITOR

Eswaran Somanathan, *Indian Statistical Institute, Delhi*

## ASSOCIATE EDITORS

Allen Blackman, *Resources for the Future, Washington, DC*

Carlos Chávez, *Universidad de Talca*

Susana Ferreira, *University of Georgia*

George Halkos, *University of Thessaly*

Louis Hotte, *University of Ottawa*

Alemu Mekonnen, *Addis Ababa University*

Katrin Millock, *CNRS, Paris School of Economics*

Ping Qin, *Renmin University of China*

Martin Quaas, *Christian-Albrechts-University of Kiel*

Juan Robalino, *CATIE and Universidad de Costa Rica*

Elizabeth Robinson, *University of Reading*

Elisabetta Strazzera, *University of Cagliari*

Anant Sudarshan, *Energy Policy Institute at Chicago, India*

Mahmud Yesuf, *American University*

## ASSISTANT EDITOR

Dimi Xepapadeas

## EDITORIAL BOARD

Francisco Alþázar, *Tropical Agricultural and Higher Education Center, Costa Rica*, Kenneth Arrow, *Stanford University*, Edward B. Barbier, *University of Wyoming*, Lucas Bretschger, *Center of Economic Research at ETH Zurich*, Juan-Camilo Cárdenas, *Universidad de los Andes, Bogotá*, Margaret Chitiga, *University of Pretoria*, Maria Cunha e Sá, *Universidade Nova de Lisboa*, Partha Dasgupta, *Cambridge University*, Salvatore Di Falco, *University of Geneva*, Hossein Farzin, *University of California, Davis*, Carl Folke, *Beijer Institute*, Gérard Gaudet, *Université de Montréal*, Rashid Hassan, *University of Pretoria*, Jikun Huang, *Chinese Academy of Sciences*, Razack Lokina, *University of Tanzania*, Karl-Göran Mäler, *Beijer Institute*, Jane W. Kabubo-Mariara, *University of Nairobi*, Subhrendu Pattanayak, *Duke University*, Charles Perrings, *Arizona State University*, Rüdiger Pethig, *University of Siegen*, Karen Pittel, *Ifo Institute for Economic Research and University of Munich*, Eftichis Sartzetakis, *University of Macedonia*, Mordechai Shechter, *University of Haifa*, V. Kerry Smith, *Arizona State University*, Jeff Vincent, *Duke University*, Anastasios Xepapadeas, *Athens University of Economics and Business*, Jintao Xu, *Peking University*, Aart de Zeeuw, *Tilburg University and Beijer Institute*, David Zilberman, *University of California, Berkeley*.