

NEWSLETTER



Newsletter No. 6 - April 2015

IN THIS ISSUE

- **News**
- **Spotlight:**
Green Growth
- **Environmental Seminars**
- **Publications and Results**

The Centre for International Environmental Studies (CIES) was established in 2010 for the purpose of conducting research on international environmental issues. To this end, CIES promotes research that allows for a better understanding of environment-related problems as well as for the development of possible solutions. Bringing together researchers from various disciplines, CIES pursues these two goals by promoting interdisciplinary dialogue.

This newsletter focuses on the events and activities recently undertaken or soon-to-occur at CIES, and reports on new research projects and publications resulting from these activities.

News

Conference on Economics of Innovation, Diffusion, Growth and the Environment

The Centre for International Environmental Studies is co-organising a conference on the *Economics of Innovation, Diffusion, Growth and the Environment*. This gathering of leading international scholars on green growth will be hosted by the Grantham Research Institute of London School of Economics at the Royal Society of the Arts, London, UK on 16-18 September 2015. Other convening partners include ETH Zurich and EPFL Lausanne. The conference will cover a wide range of topics in the area of the economics of growth, development, technological change and the environment.

Further information on conference themes, keynote speakers and the Call for Papers can be found on the CIES website.

Workshop: Non-State Actor Zone for Climate Action

A one-day workshop on Non State Actor Zone for Climate Action, held on February 6, addressed key questions regarding the further development of the NAZCA platform. It brought together participants from climate initiatives, data platforms, supportive governments, the UNFCCC Secretariat, and observers and advocates of “bottom up” climate action. Sessions consisted of a mix of full group discussion and smaller breakouts. The workshop produced a concrete set of refined recommendations to guide the development of the NAZCA platform to Paris and beyond. The workshop was immediately preceding the February 2015 Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) session in Geneva. The workshop, co-sponsored by the Centre for International Environmental Studies is part of *Galvanizing the Groundswell of Climate Actions*, an initiative of the Stanley Foundation, the Natural Resources Defense Council, and the Blavatnik School of Government at Oxford University.

Workshop on Innovation and Green Growth, Zurich, January 15-16, 2015

ETH Zurich hosted a workshop within the Sinergia project, *Innovation, Knowledge diffusion and Green Growth*, coordinated by Prof. Tim Swanson and Dr. Joelle Noailly both of CIES. Research Assistants from CIES, including Chiara Ravetti, Jules Wurlod and Giulia Valacchi, shared results of ongoing research, together with collaborators from ETH Zurich, EPFL and the London School of Economics.

Project Grant- Impact of Innovation on Sectoral Energy intensity

CIES has been awarded competitive funding from the Swiss Federal Office of Energy (SFOE) to explore the impact of green innovation on the consumption of energy by industries across OECD countries. The project, conducted by Dr. Joelle Noailly

and Research Assistant Jules Wurlod, aims at quantifying the impact of green innovation in explaining the decline of energy-intensity across industrial sectors. A better understanding of what affects the energy intensity of production processes is of particular relevance, as recent estimates from the International Energy Agency suggest that 31% of reductions necessary to halve CO2 emissions by 2050 can be achieved through improvements in energy efficiency.

SNIS International Geneva Award 2014

The SNIS International Geneva Committee has selected Prof. Liliana Andonova's paper *Boomerangs to Partnerships? Explaining State Participation in Transnational Partnerships for Sustainability* among the three winning papers, out of a total of 18 high-level articles submitted for the award. This article examines under what conditions states engage in transnational public-private partnerships for the environment. The SNIS International Geneva Award 2014 will be distributed at an event held this spring in collaboration with UNITAR. Each winning author will receive a sum of CHF 5,000.

Access to Clean Energy research presented at International Studies Association 2015

Kathryn Chelminski, Research Assistant at CIES, presented a paper titled "The clean energy regime complex and Indonesia's geothermal energy evolution" at the Political Economy of Energy panel at the 2015 International Studies Association Conference in New Orleans, LA, 18-21 February. The paper presented initial empirical findings from her field research in Indonesia, developed during her work at CIES on the SNIS-funded project "Access to Clean Energy for the Green Economy in Developing Countries." The paper discusses the impact of global governance for clean energy on the development of geothermal energy in Indonesia, and examines the ways through which barriers to technology diffusion are addressed by multilateral and bilateral initiatives. The main findings are that a combination of finance, policy support, and technical training are necessary elements of clean energy governance in facilitating technology diffusion in Indonesia, particularly in the geothermal industry.

CIES event with the Special Rapporteur on Human Rights and the Environment

Despite many great strides in the development of human rights norms pertaining to environmental protection, still no globally recognized human right to a healthy environment exists. Is it likely, that such a right will be recognized in the foreseeable future? What are the advantages and disadvantages of such recognition and what difference would it make? Prof. Knox, the UN Independent Expert on Environment and Human Rights addressed these questions at the Geneva Dialogue lecture at the Graduate Institute on 10 March 2015. The video recording of his lecture is now available online. Prof. Knox is an expert on human rights law and international environmental law. In July 2012, the United Nations Human Rights Council appointed him to a three-year mandate as its first Independent Expert on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment. On 26 March 2015, the Human Rights Council renewed his mandate for another three years and changed his title to Special Rapporteur.

Green Growth – How is it achieved?

We asked **Liliana Andonova**, Professor of Political Science and International Relations, **Joelle Noailly**, Head of Research, and **Mare Sarr**, Senior Lecturer at the University of Cape Town and Visiting Fellow at CIES, for their insights on the subject of Green Growth and its viability.

What is green growth? How will it be achieved?

Sarr: Economists usually think of the process of development as one in which physical capital accumulation and consumption require the exploitation and depletion of natural capital (natural resources, the environment, etc.). For example, economic development since the industrial revolution has come with a remarkable increase in the concentration in greenhouse gases in the atmosphere due to mainly fossil fuels; our digital world full of smartphones and electronic devices require the mining and depletion of minerals such as coltan; our increased consumption of fish has resulted in many fisheries being depleted. These are but a few examples of how our development process caused considerable collateral damage to our environment. Green growth is a new paradigm that is based on the idea of achieving economic growth with a minimal negative impact on the environment in terms of emissions, resource use, biodiversity loss, etc. In that respect, this concept seeks to transcend the usual dichotomy between economic growth and environmental protection, and purports that growth could be sustainable and environmentally friendly.

Achieving green growth comes with many challenges. It requires massive investment in new and *greener* technologies to ensure that our energy sources, our industries, our buildings, our transport systems etc., in short our economic activities become eco-friendly. To do so, governments have a crucial role to play in providing the right framework through new regulations, incentives for rebalancing the current energy mix based on fossil fuel, research subsidies to spur innovation and the development of technologies (e.g. alternative forms of renewable energy), remove undesirable subsidies and tax undesirable emissions.

Noailly: Green growth is about finding a path of development that can balance both our shorter-term needs for economic growth with our longer-term objectives of preserving the environment.

Technological change is one of the key solutions to achieve green growth. Developing new technologies to transform our energy or transportation systems can help us to conciliate goals of both economic growth with carbon emissions reductions. This year the International Energy Agency reported that for the first time in 40 years, the growth in global carbon emissions remained flat in 2014 even though worldwide economic growth was at 3 percent. This is mainly the result of China's shift to clean energy after massive investments into solar and wind energy. Hence, innovation and the broader diffusion of clean technologies can really make a difference towards achieving greener paths of developments. Some of our current research projects at CIES investigate the factors that affect technological innovation and in particular how we can design better policies to encourage the development and diffusion of green technologies.

In September 2015, we are also co-organizing a conference in London on the theme of "Innovation, Diffusion, Growth and the Environment" together with our research partners, that will bring together academics and experts to present recent scientific progress on the economics of green growth.

How will it be shared between developed and developing countries?

Andonova: At the heart of the green growth and sustainable development discourse is the concept of Common but Differentiated Responsibilities as established in the Rio Declaration at the Rio Earth Summit in 1992. The Rio Declaration underlines the responsibility of developed countries to contribute to poverty eradication and transfer of technology in light of the financial resources they hold and the larger environmental pressures they place in terms of current and historical industrial development. Developing countries — particularly the most vulnerable — should have a special priority for development and poverty eradication, while still ensuring principles of environmental sustainability. In view of the green growth paradigm, where environmental sustainability is integrated as a crucial aspect of economic growth, the involvement of both developed and developing countries is essential. On the part of developed countries, this will require greener investments, prioritising sustainability in development aid and clean energy technology and policy diffusion to foster sustainable growth and leap-frogging in developing countries. In order to achieve green growth objectives, developing countries can contribute by prioritising green growth in their development policies and providing incentives for sustainable investments, such as through carbon taxes, renewable energy subsidies or tax credits.

Will developing countries receive benefits or bear costs from pursuing this object? Is it a constraint?

Sarr: The green growth agenda is potentially a double edged sword for developing countries that are lacking not only the financial but also the human capital necessary to undertake these costly and irreversible investments in new technologies. Even if they had such muscle, such investment would divert much-needed resources from perennial development priorities such as health, infrastructure, education, etc.

Green growth can be perceived as a rich nation's problem in the developing world. While environmental considerations cannot be ignored, developing countries however fear that the green growth paradigm may become a binding constraint to their development prospects. In this respect, it is at times regarded as a way for rich nations to kick away the ladder of prosperity they once climbed. Countries that are rich in *dirty* sources of energy such as coal are particularly wary that the pursuit of green growth may threaten the very existence of some of their key industries because of repeated calls for abandoning or banning the imports of carbon-intensive energy sources. This obviously

could have considerable consequences in terms of forgone resource rents and employment. However, through appropriate and effective technology transfer, green growth has the potential of benefitting developing countries by helping them spur more growth with less environmental damage. In fact, the diffusion of new technology may allow developing countries to harness new sources of energy in which they have a comparative advantage. For instance, solar energy could become a significant source of power generation in Africa and an engine for economic development should the technology be mastered in the future and diffused.

Ultimately given the potential opportunities and threats that lie ahead, the question of the pace of transition toward a greener economy is likely to be critical for developing countries. Ensuring that the transition is achieved in a way that negative shocks (e.g. fall of the price of commodities such as coal, oil etc.) can be absorbed smoothly will prove to be a delicate yet critical balancing act if developing countries are to come to the party.

Noailly: There are always costs involved with transforming an existing system into a new one. So yes, developing countries will have to bear some costs for using less cheap coal or for reducing emissions. Phasing out fossil fuel subsidies will trigger higher energy prices which will harm both consumers and producers. Air pollution controls will affect competitiveness and the prospects of specific sectors, potentially threatening jobs. This will require necessary adjustment policies for the sectors of the economy that are the most affected. Yet, there are also benefits for developing countries to achieving greener paths of developments. Since developing countries are the most vulnerable to climate change, reducing carbon emissions can help to prevent the damages caused by climate change, so that less economic growth is lost. Improving access to clean energy – which is an issue that we investigate in a research project financed by SNIS at CIES – can also bring local benefits to developing countries: for instance, the diffusion of clean cook stoves can generate important health benefits in terms of indoor air pollution; off-grid renewable energy such as distributed solar systems can also bring electrification to rural areas.

How will international institutions and governance contribute to its development and implementation?

Andonova: In order to overcome political and economic barriers to achieving green growth and sustainable development, there must be a paradigm shift on part of both the public and private actors since the current production and consumption models are unsustainable. International institutions and governance will make an important contribution to this process by coordinating the post-2015 development agenda and reframing economic development models to make growth sustainable, more inclusive and adaptable to local contexts. The green growth concept reformulates sustainable development by harmonizing growth with environmental sustainability, instead of framing them as contradictory objectives; technological innovation therefore will play a key role in this transformation. International institutions and governance will need to promote a set of policies and financial incentives to accelerate low-carbon technology adoption and diffuse norms that foster green growth and increasingly sustainable production and consumption. Furthermore, the current trend in global governance involving partnerships across the public and private spheres promotes shared knowledge of policies supporting sustainable development to a range of actors, which will lead to a more inclusive process that will be crucial for achieving green growth development and implementation.

Research Projects

FoodSecure

As part of the *Foodsecure* project funded by the European Commission, Dr. Derek Eaton and Research Assistant Jules Wurlod have explored international productivity patterns in agriculture, testing whether countries converge in productivity, i.e. if initially less productive countries grow faster, and whether this convergence occurs only conditionally. Using a novel dataset containing 84 countries at all levels of development, support for convergence among OECD countries but divergence in the sample at large is found. Furthermore, while agricultural research intensity seems to have a significant effect on productivity growth, the size of the effect decreases the further the country is from the technological frontier. Other factors, such as secondary education, or economic growth outside of agriculture, are found to increase agricultural productivity, while IPR protection and trade openness seem to have only a limited impact.

COSTASSESS: The Costs of Adopting Technology Restrictions in South Africa

For the project *COSTASSESS*, in joint partnership with the University of Cape Town (UCT), Professor Tim Swanson and Research Assistant Chiara Ravetti are working with Dr. Mare Sarr from UCT on designing a field experiment to test the effects of the segmentation of the dual labour market in the mining industry of South Africa. In particular, the experiment will analyse how different groups of workers respond to negative shocks – for instance a drop in the price of coal - in terms of their cooperative behavior. This experiment will be implemented as a collaborative effort with the UCT team (Daniel Munene, Dambala Gelo and Mare Sarr). This project is financed by the SNF under the Swiss-South Africa Joint Research Programme, and commenced in January 2014.

Diffusion of Clean Energy Technology for Green Economy in Developing Countries

The SNIS-funded project, *Diffusion of Clean Energy Technology for Green Economy in Developing Countries*, led by Liliana Andonova, Professor, Department of Political Science and International Relations and Co-Director of CIES and Dr. Joëlle Noailly, Head of Research at CIES, has successfully completed its midterm review. This project, in collaboration with partners from UNIBE, ETH Zurich, UNIGE, Harvard University, and UNEP, aims to provide an in-depth investigation of the barriers to diffusion of low-cost clean energy technologies to developing countries as well as to the governance mechanisms that can help to unlock diffusion and improve clean energy access. Over the last year, the project has produced a series of working papers on clean energy governance, renewable energy policy diffusion, development and access to clean energy technologies, such as energy-efficient lightbulbs and geothermal energy. Work on further publications on clean cook stove diffusion and green goods liberalisation in developing countries is currently underway.

The Human Niche Project: Looking at the Benefits from Managing Global Land Use

The aim of this project is to study the interactions between economic growth, population growth, the demand for food, technological progress, and how these affect the conversion of natural land for agricultural use. A simulation model has been developed which is able to replicate observed trajectories for population, income, technology and land use over the period from 1960 to 2100. An application of the model, which considers the issue of global food production and potential to development constraints arising from the finiteness of land reserves up to 2100, has recently been invited for presentation at seminars in the Swiss Federal Institute for Technology (ETH) Zurich and in the Institut National de la Recherche Agronomique (INRA), Paris. This work has also been selected for presentation at the annual conference of the *European Association for Environmental and Resource Economists* in Helsinki in June 2015. Current development of the model focuses on the role of uncertainty in agricultural technological progress. The model is also being used to generate evidence about different policy interventions for the management of global land use.

A symposium on Global Land Use Patterns and Food Security gathering scholars from biology, agronomy and economics was organised in Cambridge, UK, in Fall 2014. The objective of the symposium was to provide a synthesis of evidence of hazards from aggregate global land use change on agricultural productivity, and ultimately on food security. The Symposium was convened by the Graduate Institute Geneva in partnership with the Grantham Institute of LSE and also the newly established Luc Hoffmann Institute of WWF-International (Josh Tewkesbury, Director). The sponsor of the symposium was the MAVA Foundation's Program on the Sustainability of the Human Niche project. An article with the outcome of the symposium is currently in preparation.

Greenspill

The *Greenspill* project conducted by Dr. Joelle Noailly and supported by a Marie Curie Fellowship from the European Union came to an end in March 2015. This 2-year project focused on the role of multinational firms in the global diffusion of green technologies. A major achievement of the project was the construction of a global dataset linking information on multinational financial activities, production networks, and worldwide location of innovation activities. The project resulted in three working papers: two papers investigating the role of local environmental regulations in attracting multinationals' green R&D activities and a third one looking at the impact of green technologies on the energy-efficiency performance of industrial sectors. Some of the results of the project have already appeared in a special issue of the journal *Energy Policy* and have been the subject of a blog article ("The globalization of green R&D – or why General Motors is developing electric vehicles in China?") posted on the website of the Green Growth Knowledge Platform, a forum for the broader community of experts working on green growth issues. The working papers will also be presented at several conferences in the Summer and Autumn of 2015, including the conference *Our Common Future* which will bring together the scientific community prior to the COP Paris 2015 UNFCCC conference.

The Value of Air Quality in Chinese Cities: Evidence from Wages and Rents Differentials

Xuan Huang, PhD student in economics from Peking University, was awarded a research grant by the China Scholarship Council to work with Dr. Bruno Lanz on environmental policy in China. Ms. Huang is visiting CIES during the 2014-2015 academic year. In their current work they provide novel empirical evidence on the value of improving air quality in Chinese cities. The work by Huang and Lanz uses a hedonic approach which reveals how variations in air quality is reflected in wage and rents differentials. The paper has been selected for presentation at the annual conference of the *European Association for Environmental and Resource Economists* which will take place in Helsinki in June this year.

Adapting to Adaptation

Professor Marc Hufty, Development Studies, and Research Assistants Hameedullah Jamali and Morgan Scoville-Simonds presented results from the project Adapting to Adaptation (ADAPT2): Studying the influence of climate change adaptation discourses and policies on local governance processes, at the conference *Beyond 2015: Exploring the Future of Global Climate Governance* organised by the Institute for Environmental Studies (IVM), VU University Amsterdam in Amsterdam on November 20th, 2014. Two papers were presented and well received by the

attending researchers and practitioners involved in global climate governance. Together, the papers presented some of the findings of the ADAPT2 project, in particular, empirical results demonstrating the processes and actors through which climate change adaptation is defined and framed at the international, national, and local levels in, variably, highly-technical or socially-aware ways, but rarely in explicitly-political terms. The findings suggest the need for a broader debate of the adaptation problem that considers inherently-political questions of differing values, choices, and voices in climate change adaptation governance.

Governance Entrepreneurs, International Organizations and Public-Private partnerships

The project *Governance Entrepreneurs* was completed in January 2015. It has resulted in a book manuscript *Governance Entrepreneurs. International Organizations and Global Partnerships* authored by Liliana Andonova, for submission to Cambridge University Press. The project has also supported the PhD Dissertation of Manoela Assayag on the topic of “Agenda Politics: Issue Entrepreneurship and Priority-Setting in Global Governance.” Manoela is presently a Sustainability Science Fellow at the Harvard Kennedy School of Government. Defne Gonenc, who also worked on research as part of the Governance Entrepreneurs project, successfully defended her MPT on the topic of “The Role of Litigation in Norm Transformation: A Study of Human Right Approaches to Environment”.



bigstock photo

Staff

Academic Directors

Liliana B. Andonova
Professor, Political Science
Climate Change Programme

Timothy Swanson
Andre Hoffmann Chair of Environmental
Economics
Environment and Development Programme

Head of Research

Joelle Noailly
Innovation, Sustainable Growth and
Technological Change Programme

Programme Directors

Marc Hufty
Professeur Titulaire, Development Studies
Biodiversity Programme

Joelle Noailly
Innovation, Sustainable Growth and
Technological Change

Bruno Lanz
Public Economics and the Environment

Professorial Fellows

Urs Luterbacher
Emeritus Professor, Political Science

Jorge Vinuales
Visiting Professor, International Law

Research Associates

Bruno Lanz

Research Assistants

Defne Gonenc
Pedro Guimaraes Naso
Ozgun Haznedar
Chiara Ravetti
Suchita Srinivasan
Ioana Tuta
Giulia Valacchi
Jules-Daniel Wurlod
Ankai Xu

Staff Changes

Derek Eaton has resigned from his position as Executive Director at CIES to take on the position of Vice President-Research for the Global Footprint Network in Geneva. CIES is grateful for his contributions in the direction of the Centre and providing leadership in research and administration at CIES.

CIES is happy to announce **Joelle Noailly** has taken on the position of Head of Research and is now coordinating all research activities within the Centre. Joelle brings several years of experience in research and research management and has been successful in applying for significant funding for research projects conducted at the Centre. Joelle has also been given membership in the College d'Enseignement, in recognition of her contributions to the development of the graduate teaching program in resource economics.

Kristine Kjeldsen, Administrative Coordinator has resigned to pursue further studies. CIES thanks her for her contributions to the smooth running of the centre and wishes her well.

Lys Kulamadayil has joined the team as Project Assistant and is leading in the management and organization of events. Lys is a Doctoral Candidate in the Law Department at the Graduate Institute.

Several Research Assistants have successfully defended their dissertation and have moved on from CIES. We thank **Martina Bozzola, Chiara Ravetti Hameed Jamali, Morgan Scoville Simonds** and **Vanessa Boanada** for their contributions.

CIES is also happy to note that it has had its first students complete their PhDs while working as Research Assistants, who are moving on in their research careers. Chiara Ravetti has accepted a position as postdoctoral researcher at Oxford University. Martina Bozzola has received an offer to become a postdoctoral researcher at the European University Institute.

CIES welcomes **Xuan Huang** as Junior Visiting Fellow for the 2014-2015 academic year. Ms. Huang is a PhD student in economics from Peking University, and was awarded a research grant by the China Scholarship Council to work with Dr. Bruno Lanz on environmental policy in China.

CIES welcomes Dr. **Mare Sarr** from the University of Cape town as Visiting Research Fellow at the centre from January to June of 2015. He is collaborating with the centre on the SNF-funded project *CostAssess*.

Recent CIES Research Papers

CIES research papers are published in order to stimulate discussion within the environmental research community. These papers may include content that has been submitted for publication in academic journals. They have not necessarily undergone formal peer review.

Using Discrete Choice Experiments to Regulate the Provision of Water Services: Do Status Quo Choices Reflect Preferences?

Lanz B., Provins A. CIES Research Paper no. 35

Using the methodology for DCE in the regulation of water and sewerage services in England and Wales, our paper contributes to the understanding of Status quo (SQ) choices in several novel dimensions. First, we control for the perception of the SQ and the importance of attributes in day-to-day activities. Second, we use a split sample design to vary both the description of the SQ and the survey administration mode (online vs. in-person). Third, the service attributes can both improve or deteriorate, so that the SQ is not necessarily the least-cost option. Fourth, we examine SQ choices in individual choice tasks and across all tasks so as to identify the determinants of serial SQ choices. Our results suggest that *individual* SQ choices mostly reflect preferences and thus represent important information for the regulator. However, *serial* SQ choices are mainly driven by cognitive and/or contextual factors, and these responses should be analysed as part of standard validity tests.

Emissions Trading in the Presence of Price-Regulated Polluting Firms: How Costly Are Free Allowances?

Lanz B., Rausch S. CIES Research Paper no. 34

We study whether to auction or to freely distribute emissions allowances when some firms participating in emissions trading are subject to price regulation. We show that free allowances allocated to price-regulated firms effectively act as a subsidy to output, distort consumer choices, and generally induce higher output and emissions by price-regulated firms. This provides a cost-effectiveness argument for an auction-based allocation of allowances (or equivalently an emissions tax). For real-world economies such as the United States, in which about 20 percent of total carbon dioxide emissions are generated by price-regulated electricity producers, our quantitative analysis suggests that free allowances increase economy-wide welfare costs of the policy by 40-80 percent relative to an auction. Given large disparities in regional welfare impacts, we show that the inefficiencies are mainly driven by the emissions intensity of electricity producers in regions with a high degree of price regulation.

Multinational Firms and the Internationalization of Green R&D: A Review of the Evidence and Policy Implications

Noailly J., Ryfisch D. CIES Research Paper no. 33

This paper presents novel empirical evidence on the internationalization of green R&D by multinational firms (MNCs), as measured by patents data. Using data on inventors' addresses for the set of 1,200 MNCs firms patenting in green technologies over the 2004-2009 period, we find that about 17% of green patents result from MNCs R&D investments conducted outside their home countries. MNCs tend to locate their foreign

green R&D activities in other OECD markets and in China, in particular in lightings and solar technologies. The empirical analysis reveals that the probability of conducting green R&D abroad increases with the host country's stringency of environmental regulation, market size and (green) R&D intensity. Also, relatively lower wages for scientists and engineers, and stronger protection for intellectual property rights in the host country increase the likelihood for MNCs to offshore green R&D. The paper concludes by discussing the policy implications of this changing global innovation landscape.

Clean Substitutes and the Effectiveness of Carbon Footprint Labels vs. Pigovian Subsidies: Evidence from a Field Experiment.

Lanz, B., Panzone L., Swanson T., and J. Wurlod. CIES Research Paper no. 32.

We study how substitutability between clean and dirty alternatives affects the effectiveness of environmental regulation in a field experiment that controls for the choice set of respondents. We consider four product categories with clean and dirty alternatives: (i) cola products in plastic bottles vs. in aluminum cans; (ii) skimmed vs. whole milk; (iii) chicken meat vs. beef meat; and (iv) margarine vs. butter. We employ two neutrally framed treatments to quantify the willingness to substitute between clean and dirty alternatives in each product market, namely a change in relative prices and the removal of the dirty alternative, leaving respondents the option of buying one of the remaining clean alternatives or nothing. We then compare the impact of a carbon footprint label and a Pigovian subsidy to the clean alternatives. While both instruments increase the market share of the clean products, their impact is higher when clean and dirty alternatives are close substitutes. We also find evidence that motivation crowding is present and increases with substitutability. Our results highlight the importance of product markets in the design of consumer-orientated policies.

Documenting Legal Dissonance: Legal Pluralism in Papua New Guinea.

Larcom, S., Swanson, T. CIES Research Paper no. 31.

We examine the case of payback killings and similar retributive sanctions in the context of a transplant regime such as that existing in Papua New Guinea. This is a post-colonial regime with multiple overlaid legal systems, with significant negative interaction existing between the different regimes. We explain how multiple regimes can co-exist in the context of negative externalities. To explain such an outcome, we provide a simple model for considering the interaction between legal regimes within a single jurisdiction. We demonstrate that, even when the fundamental relationship between such regimes is to behave as substitutes for one another, the existence of negative externalities between the enforcement technologies can result in the withdrawal of enforcement efforts. We term this phenomenon legal dissonance – the situation in which legal regimes interact negatively in their production technologies. This model is then applied to the post-colonial state of Papua New Guinea where we use survey data to identify significant negative production externalities in the enforcement of informal law. We suggest that disorder may be the outcome of too much law.

Resistance to the regulation of Common Resources in Rural Tunisia.

Liu, X., Sarr, M., Swanson, T. CIES Research Paper no. 30.

We examine the effect of the introduction of uniform water-charging for aquifer management and provide evidence using a survey-based choice experiment of agricultural water users in rural Tunisia. Theoretically, we show that the implementation of the proposed second-best regulation would result both in efficiency gains and in distributional effects in favour of small landholders. Empirically, we find that resistance to the introduction of an effective water-charging regime is greatest amongst the largest landholders.

Running with the Red Queen: An integrated assessment of Agricultural Land Expansion and Global Biodiversity Decline.

Lanz, B., Dietz, S. and Swanson, T. CIES Research Paper no. 29

Modern agriculture relies on a small number of highly productive crops and the continued expansion of agricultural land area has led to a significant loss of biodiversity. In this paper we consider the macroeconomic consequences of a continued expansion of modern agriculture from the perspective of agricultural productivity and food production: as the genetic material supporting agriculture declines, pests and pathogens become more likely to adapt to crops and proliferate, increasing crop losses due to biological hazards. To evaluate the macroeconomic consequences of a reduction in agricultural productivity associated with the expansion of agriculture, we employ a quantitative, structurally estimated model of the global economy in which economic growth, population and food demand, agricultural innovations, and the process of land conversion are jointly determined. We show that even a small impact of global biodiversity on agricultural productivity calls for both a halt in agricultural land conversion and increased agricultural R&D in order to maintain food production associated with population and income growth.

A Household Survey of the cost of illness due to air pollution in Beijing, China.

Ravetti, C., T. Swanson, Y. Popp Jin, M. Quan, Z. Shiquiu. CIES Research Paper no. 28

This paper examines with a case study of Beijing, China, the health benefits that could be reaped from urban air quality improvements. The study implements a household survey to collect information about the yearly medical expenditures and lost days of work, to estimate the total costs of illness (COI) borne by a typical individual due to airborne diseases. The results of this survey provide a lower bound for the health costs borne by the urban population of Beijing due to air pollution. We find that the average individual COI in our sample is more than 3000 yuan per year, corresponding to almost one month of the average wage (slightly more than 500 US\$ per year). This result indicates that Beijing could benefit quite substantially from reducing air pollution in terms of health costs: if it could completely eliminate pollution, the savings in terms of COI would range in an order of magnitude of 21 million yuan per year only from hospitalized cases.

Air Pollution in Urban Beijing: The Role of Government-controlled Information.

Ravetti, C., T. Swanson, Y. Popp Jin, M. Quan, Z. Shiquiu. CIES Research Paper no. 27

This paper looks at the problem of information control behind the unsustainable levels of air pollution in Chinese cities. In particular, it focuses on a large urban area, Beijing, and it examines the role of the public information and the adaptation choices of households in response to high pollution. Our analysis is based on an empirically analysis of two air pollution indexes from different sources, one public and one foreign. We also examine agents' behaviour in response to pollution peaks in an original household survey collected in Beijing. We find that the official air pollution values are systematically distorted, creating perverse incentives for households to react to bad air quality, especially for people who rely on government-controlled sources of information.

Ancillary Benefits of GHG Abatement Policies in Developing Countries: A Literature Review.

Ravetti, C, T. Swanson, M. Quan, X. Xie, Z. Shiquiu. CIES Research Paper no. 26

In this paper we survey the literature that estimates the ancillary benefits of greenhouse gas (GHG) abatement in developing countries, and the extent to which its findings can be transferred across countries. Specifically, we focus upon the health benefits from emission reduction in developing nations. In order to evaluate the spillovers and indirect benefits that a country could reap from GHG mitigation policies, it is crucial to account for the differences that exist among nations in the valuation of such benefits. In fact, the monetary loss attached to an illness and the value of a human life may vary across cultures, economies and over time, depending on income, demographics, socio-economic and political characteristics of a country. The goal of this research is to examine the still relatively scarce literature on the developing world and its specific findings. Particular attention will be dedicated to case studies of China.

Global Population Growth, Technology and Malthusian Constraints: A Quantitative Growth Theoretic Perspective.

Lanz, B. and S. Dietz, T. Swanson. CIES Research Paper no. 25

How much further will the global population expand, can all these extra mouths be fed, and what is the role in this story of economic growth? We study the interactions between global population, technological progress, per-capita income, demand for food and agricultural land expansion from 1960 to 2100. We structurally estimate a two-sector Schumpeterian growth model with endogenous fertility and finite agricultural land reserves, in which a manufacturing sector provides a consumption good and an agricultural sector provides food to sustain contemporaneous population. The model closely replicates 1960-2010 data on world population, GDP, productivity growth and crop land area, and we employ the model to make projections from 2010 to 2100. Results suggests a slowdown of technological progress, and, because it is the main driver of a transition to a regime with low population growth, significant population growth over the whole century. Global population is slightly below 10 billion by 2050, further growing to 12 billion by 2100. As population and per capita income grow, demand for agricultural output almost doubles over the century, but the land constraint does not bind because of capital investment and technological progress. This provides a first integrative view of future population development in the context of modern growth theory.

Recent Publications by CIES Staff

Andonova et al. 2014. *Transnational Climate Governance*, Cambridge University Press, Cambridge.

Andonova, Liliana B. and Ioana A. Tuta 2014: *Transnational Networks and Paths to EU Environmental Compliance: Evidence from New Member States*. *JCMS: Journal of Common Market Studies* 52(4): pp.775–793,

Andonova, Liliana B. & Gilles Carbonnier 2014: *Business Humanitarian Partnerships: Processes of Normative Legitimation*, *Globalizations*, 11(3): pp. 349-367.

Bozzola, M. and T. Swanson. 2014. *Policy Implications of Climate Variability on Agriculture: Water Management in the Po River Basin, Italy*. *Environmental Science & Policy* 43: pp. 26–38.

Di Falco S., Adinolfi F., Bozzola M., Capitanio F. 2014. *Crop Insurance as a Strategy to Adapt to Climate Change*. *Journal of Agricultural Economics* 65 (2): pp. 485–504

RECENT EVENTS AT CIES

2015 Spring term- Seminar in Environmental and Resource Economics

CIES continues to offer a seminar course for economics PhD students from the Graduate Institute. The course familiarises students with the frontiers of research in environmental and resource economics.

Thursday, February 26

International Capital Markets, Oil Producers and the Green Paradox

Cees Withagen, VU University Amsterdam

Thursday March 5

The Economics of the Low-Carbon Transition: More fun than you might expect

Cameron Hepburn, University of Oxford

Thursday March 12

Learning by Negligence: Environmental Torts, Experimentation and the Value of Information

Timo Goeschl, University of Heidelberg

Thursday March 19

Religious belief as a costly signal of trustworthiness: theory and evidence from Haiti

Paul Seabright, Toulouse School of Economics

Thursday March 26

Dynamic Resource Management under Weak Property Rights: A Tale of Thieves and Trespassers

Sjak Smulders, Tilburg University

Thursday April 22

Food, Fuel and the Spatial Economy

M. Scott Taylor, University of Calgary

Brown Bag Seminars

The Brown Bag series is an informal lunch time event where members of the CIES community can present their preliminary research findings. All lectures take place at 12:15 in Maison de la paix. Please consult the website for exact location.

24 March 2015

Weather, Climate and Agriculture: The importance of weather and climate information for farmers and policy makers

Robert Stefanski, WMO

15 April 2015

Biosafety: Reconciling Economic, Environmental, and Technological Anxieties

Diego Silva, PhD candidate, The Graduate Institute

22 April 2015

Fossil fuel subsidy reform in a time of low oil prices: how to assess experience?

Tom Moerenhout, PhD candidate, The Graduate Institute

29 April 2015

Labour market impacts of coal price fluctuations - an experiment

Chiara Ravetti, PhD candidate, The Graduate Institute

13 May 2015

Environmental Migration, Political Marginalization and Violence

Fabien Cottier, PhD candidate, University of Geneva

21 May 2015

The Legal Design of the 2015 Climate Agreement – Linking Domestic and International Law

Dr. Birgit Lode, Institute for Advanced Sustainability Studies.

Upcoming Events

BROWN BAG LECTURES

Wednesday 29 April 2015

The Invisible Handshake in the Coal Labour Market: Cooperation

Chiara Ravetti, PhD Candidate, Economics

Wednesday 13 May 2015

Environmental Migration, Political Marginalization and Violence

Fabien Cottier, PhD Candidate, Political Science

Thursday 21 May 2015

The Legal Design of the 2015 Climate Agreement – Linking Domestic and International Law

Dr. Birgit Lode

Wednesday 27 May 2015

The value of air quality in Chinese cities: Evidence from wages and rents differentials

Xuan Huang

Junior Visiting Fellow

GENEVA DIALOGUES LECTURE

May 13, 2015

Is the Public Sector short termist towards sustainability issues?

Christian Gollier, Toulouse School of Economics

6:30 pm

Auditorium Ivan Pictet

CONFERENCE

16-18 September, 2015

Conference on Economics of Innovation, Diffusion, Growth and the Environment

Royal Society of the Arts, London

For further details see page 2.

For Further information please contact



Chemin Eugène Rigot 2, P.O. Box 136
1211 Geneva 21, Geneva
Tel. (+41) 22 908 6226
<http://graduateinstitute.ch/cies>
Email: cies@graduateinstitute.ch