

The overall objective of the EFD Initiative is to support poverty alleviation and sustainable development through increased use of environmental economics in the policy making process. EFD is a capacity building program in environmental economics, focusing on research, policy advice and education in Central America, Chile, China, Ethiopia, Kenya, South Africa, Sweden, Tanzania and the USA.

REPORT 2014/2015



Mountain view from Cuajiniquil de la Cruz, Guanacaste, Costa Rica.



Mulan Wind Farm in Henan, China.



EfD South Africa is involved in a research project in Kenya investigating the effectiveness of compensation strategies for discouraging the killing of lions by Maasai people.



Part of Great Migration at Serengeti National Park, Tanzania.



Mount Longonot, Rift Valley, Kenya.



Rural homes in Debre Berhan, Amhara region, Ethiopia.



Punta de Choros Island, where EfD Chile researchers have studied the value of natural resources.

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EfD in Central America

Our vision is a green economy with sustainable economic growth founded on efficient management of ecosystems, natural resources and climate change impacts.

2014 was an eventful year for EfD. The year started with a program evaluation. The distinguished international evaluation team concluded that EfD showed an impressive rate of return from investing in human capital, including a considerable level of research output for the level of investment, good research quality, and evidence of impact on public policies and sustainable development. In all cases, the EfD centers have contributed to domestic academic capacity by enhancing the environmental-economics research and teaching capacities available, according to the evaluation team. Not surprisingly, the evaluation recommended that Sida and other donors keep investing in the program.

As you will read in this report, the productivity of the EfD centers is consistently high. In 2014 alone, 86 articles by researchers at the nine EfD centers were published in peer-reviewed international journals. More are in the pipeline; there were 22 publications in the EfD Discussion Paper Series for 2014 and several papers for the 2015 series were in progress at the end of the year. The Research Fund is thus very active and, for 2015, the Research Committee cleared 10 new projects for funding, to be added to the 15 projects that are ongoing since the 2014 and 2013 cycles.

We hope you enjoy reading about EfD's achievements in 2014 and plans for 2015.



Gunnar Köhlin
Director, EfD

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Organization

Research Top Outcomes

Highlights of Peer-Reviewed Publications

Applied, policy relevant research is a core activity of the EfD Initiative. Research is a critical input in a long-term strategy to reduce environmental degradation, eradicate poverty and ensure sustainable use of natural resources. A major challenge in developing countries is, however, the lack of comprehensive research on environmental resource management and poverty alleviation to inform national strategic plans and policies. Policy makers, farmers, donors, and others need research-based information, not only to design policies but also to evaluate their effectiveness in reaching their objectives.

With the aim of addressing these challenges, EfD has created a network of domestic and international researchers who engage in high-quality, policy-relevant applied research in the respective countries. This is achieved through the EfD research cycle, which begins with identifying relevant research problems through interaction with various stakeholders in the respective countries, evaluating research

Local people on the coast of Quajiniquil de la Cruz, Guanacaste, Costa Rica.



proposals by different subject specialists and the EfD research committee, and publishing the research results in peer-reviewed international journals. EfD-funded research concludes with communicating the research findings through research and policy briefs to relevant stakeholders and policy makers who will ultimately formulate and implement policies.



Stove replacement program of the Chilean government.

Central America

EfD in Central America, the Research Program in Economics and Environment for Development (Programa IDEA) at the Tropical Agricultural Research and Higher Education Center (CATIE), published two papers in peer-reviewed journals in 2014, with another three articles accepted for publication in 2015. CATIE's publications include findings about how visitors and communities interact with protected natural areas, including studies of ecotourism, entrance fees and donations in national parks, and the impacts of protected areas on local wages. For example, while the number of protected nature areas around the world has significantly increased, there is still debate about the effects of this kind of resource management on the well-being of local households. Our research findings show that parks' effects on wages are positive, on average, but the size of the effect varies. Wages close to parks are higher for local workers living near tourist entrances. However, there is no strong evidence of positive effects on wages for workers living close to parks but far away from tourist entrances. Additionally, we provide some of the first evidence that tourism eco-certification programs can generate private benefits for local business operators in developing countries. Our research suggests that these programs are apt to attract business operators and have the potential to improve environmental quality.

Chile

EfD in Chile, the Research Nucleus in Environmental and Natural Resource Economics (NENRE) at the University of Concepción,



Hang Yin, PhD Candidate at the University Gothenburg, conducting a survey on the public's opinion of the traffic congestion charge in Beijing.

published seven peer-reviewed papers in 2014, five in international journals and two in national journals. A top research outcome is the paper "Using Stated Preference Methods to Design Cost-Effective Subsidy Programs to Induce Technology Adoption: An Application to a Stove Program in Southern Chile," published in the *Journal of Environmental Management*. This paper deals with air pollution problems in urban areas due to the use of wood as an energy source by households. This is one of the most difficult and important environmental problems in Chile. Our paper uses surveys of willingness to pay and simulations to give valuable insights into one of the most promising policy tools, i.e., subsidy programs for technology adoption of cleaner and more efficient stoves.

China

EfD in China, the Environmental Economics Program in China (EEPC) at the National School of Development, Peking University, published twelve papers in international peer-reviewed journals and one paper in a national journal in 2014. A special issue of *Environment and Development Economics* on China's environmental policy was jointly edited by Jintao Xu and Peter Berck, both EfD senior fellows. Out of six papers published in the special issue, four are authored by EEPC researchers, and focus on rural natural resources and urban transportation management. The special issue provides exposure to EEPC's academic activities; its focus on China's environmental challenges and policy processes will have a significant impact on practices worldwide.

Ethiopia

EfD in Ethiopia, the Environment and Climate Research Center (ECRC), formerly known as the Environmental Economics Policy Forum for Ethiopia, at the Ethiopian Development Research Institute (EDRI), published ten peer-reviewed articles in 2014. The major research themes included energy, climate change and adoption of new technology. Climate change is a particularly important challenge for Africa, and Dr. Alemu Mekonnen published an article entitled "Economic Costs of Climate Change and Climate Finance with a Focus on Africa" in the *Journal of African Economies*. This article

discussed adaptation (adjustments to a changing climate), mitigation (measures to reduce greenhouse gas emissions) and climate finance (financing to address climate change). The article is a critical examination of different frameworks, methodologies and empirical issues in the estimation of the economic costs of climate change. It also discusses issues of management and distribution of climate finance, and notes that recent estimates of adaptation costs for Africa are in the range of US\$ 20-30 billion per year over the next 15 years, while current adaptation funding is much less.

Kenya

EfD Kenya at the School of Economics, University of Nairobi, published seven peer-reviewed articles in 2014, focusing on crop productivity, food security, water treatment, strategic alliances in smallhold farming, and gender differences in the adoption of sustainable agricultural practices. The paper "Understanding the Adoption of a Portfolio of Sustainable Intensification Practices in Eastern and Southern Africa," published in *Land Use Policy*, explores smallholder farmers' decisions to adopt multiple sustainable intensification practices in Eastern and Southern Africa. One finding is that,

Josephine Gatua and Maimuna Kabatesi explaining fieldwork procedures to enumerators for the "Urban water use in Kenya" project.



for maize production, some practices are used together (complements), while farmers can choose between some other practices (substitutes). Another finding is that adoption of these practices is influenced by membership in groups, quality of agricultural extension (training) services, reliance on government support during crop failure, incidence of pests and diseases, access to credit, security of land tenure, education, and market access. Another study finds gender differences in the pattern of adoption of some sustainable intensification practices. Compared to male plot managers, female managers are less likely to adopt minimum tillage and animal manure in crop production. On another topic, a study on risk perception and water treatment in Kenyan towns recommends a system where households pay the connection fee in installments, through a prepaid water scheme or through a subsidy scheme.

South Africa

Researchers at EfD in South Africa, the Environmental-Economics Policy Research Unit (EPRU), University of Cape Town, published thirteen articles in peer-reviewed journals during 2014, with another couple of articles accepted for publication in 2015. For example, Martine Visser and Kerri Brick used a game about private contributions to the public good to show how participants in international climate change negotiations try to allocate the costs of climate change agreements in ways that suit their own needs. In addition, Dambala Gelo and Martin

Koch examined a common property forestry program in Ethiopia that includes Joint Forestry Management and improved non-timber forest product marketing. They found that the program affects household



EPRU researcher Dambala Gelo working with local residents at a common property forestry site.



Research fellow Stephen Kirama at Serengeti National Park during his study of optimal pricing for entrance to parks.

access to agricultural land, and tends to reduce livestock holdings. Further, Anthony Leiman and Carola Kirchner showed that fishing / processing technologies drive profitability, employment capacity and resource security in the Namibian hake fishery. They found that state attempts to coerce firms away from factory trawling are likely to reduce taxable incomes and foreign exchange generated.

Tanzania

EfD Tanzania at the Department of Economics, University of Dar es Salaam, in 2014 published eight peer-reviewed articles in journals as a result of the studies carried out by the center research fellows and the international research associates. The themes of these publications were based on forestry, marine, agriculture and poverty analysis. In forestry, the study on “Insiders, Outsiders, and the Role of Local Enforcement in Forest Management: An Example from Tanzania” (published in *Ecological Economics*) showed that, in low-income countries, both nearby local villagers (“insiders”) and non-locals (“outsiders”) extract products from protected forests, even though their actions are illegal. The study shows that, to reduce this illegal activity, forest managers typically offer livelihood projects to local communities (“carrots”) as well as carrying out enforcement actions (“sticks”). However, with limited budgets, neither approach can deter all extraction. The analysis suggests that, depending on the relative ecological damage caused by each group, budget-constrained forest managers may reduce total forest degradation by legalizing “insider” extraction in return for local villagers’ involvement in enforcement activities against outsiders. Other studies document similar issues with marine protected areas. These are an increasingly popular tool for protecting marine stocks and biodiversity, but they pose high costs for small-scale fisherfolk in poor countries; therefore, management of marine protected areas will require changing the incentives to fish through a combination of carrots and sticks.

Projects fully funded by EfD focused on the following themes

Central America's two research projects focused on climate change and policy design.

China had two projects in forestry and bioenergy.

Ethiopia focused on climate change and agriculture.

Kenya had two broad projects: one on natural resources covered both water conservation and forestry, and the other looked at agriculture and climate change.

South Africa's two projects both focused on climate change but from different perspectives; one focused on gender dimensions and the other on behavioral change.

Tanzania had one project on agriculture and climate change and one project on poverty reduction and environmental sustainability.

In addition, in 2014, EfD Chile actively pursued six projects examining water and marine resources. These were funded by, among others, the European Commission and the International Development Research Center (IDRC), based in Canada. Resources for the Future (RFF), EfD Central America and EfD China jointly examined the impact of policy design and energy use on driving restrictions. RFF also researched forestry and climate change and conservation. These projects are funded through Formas COMMONS, the Tinker Foundation and Rainforest Alliance, and the Moore Foundation.

Projects 2014

The 2014 EfD budget allocated SEK (Swedish crowns) 2.8 million to the EfD research fund. This fund supported 12 individual and 3 collaborative research projects across the centers.

EfD researchers conducted projects using funding from both the EfD Research Fund and other donors. Building on the recommendations of the 2014 program evaluation, EfD continues to actively seek funding partnerships. One notable success in 2014 was a grant of about US\$ 700,000 from the International Development Research Center (IDRC) to EfD Ethiopia to study "Adaptation to Increase Resilience to Climate Change in Ethiopian Agriculture: Empowering Farmers to Adopt the Right Water Management Technologies for their Farms." IDRC is also a funder of EfD Central America's research in water resource management.

EfD Research Projects by Theme 2014

Most of the research projects in 2014 dealt with three of the six major EfD research themes: forestry and energy (considered together because wood fuels are used for cooking and heating), climate change, and agriculture. As shown in the table "EfD Research Projects by Theme 2014," research was also conducted on the other three themes: fisheries, parks and wildlife, and policy design.

Collaborative research

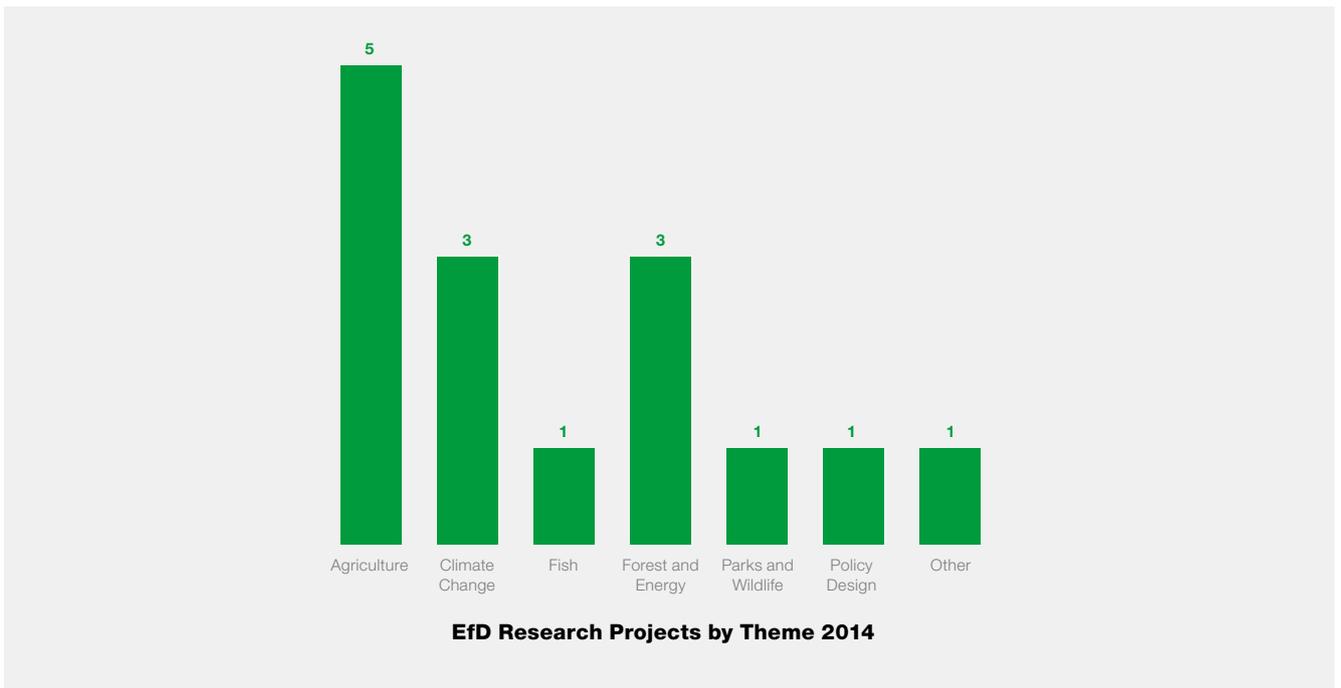
ESAforD – working to advance ecosystem accounting

Ecosystems offer valuable benefits that people depend on for both survival and quality of life. These include timber, fish, drinking water, air and water quality, and tourism and recreation. However, the benefits and economic value derived from ecosystems are often not measured and are thus frequently overlooked in development decisions. As ecosystems deteriorate worldwide, so does their importance in supporting human well-being and sustainable economic growth. Ecosystem accounting is a way to address this failure by integrating ecosystem services and natural capital into the System of National Accounts.

EfD Centers are key implementing partners in the new Ecosystem Service Accounting for Development program (ESAforD). The program is a collaboration between the Swedish Environmental Protection Agency, the EfD centers in China, Chile, Costa Rica, Ethiopia, Kenya, South Africa, Sweden and Tanzania, and the Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership. It is funded by the Swedish International Development Cooperation Agency (Sida).

Jessica Alvsilver is an environmental economist with the Swedish EPA and the coordinator of ESAforD. She presented the program at the WAVES Policy and Technical Expert Committee's third annual

For more information on each project, please see the section for each center in this report, and www.efdinitiative.org.



meeting in Washington, D.C. in late October 2014. Alvsilver also attended the EfD annual meeting in Dar es Salaam October 23-26, 2014, which included a workshop focusing on WAVES.

The program's objective is to develop a methodology to create ecosystem accounts and help standardize international guidelines. What makes the program unique is the multi-country collaboration; it can also have an impact on policy in the individual countries. By the end of four years, a study will be published to share results with the scientific community and to contribute to better policy making.

Recently recruited post-doctorate researchers in economics will work full time carrying out the research with the environmental economists at each center. The Swedish EPA plans to share the results with international groups such as the European Union, the Organization for Economic Co-operation and Development (OECD) and the Convention on Biological Diversity (CBD).



Grain and green in rural area of Gulling, Guangxi.

Publications

A key indicator of EfD success is the output of publications. “Notable progression is evident in terms of the quantity and quality of outputs from the programs,” according to the evaluation team. 2014 has been another productive year for the whole network, with a total of 82 articles in international peer-reviewed journals.

This is a record number of peer-reviewed publications. This is not only an increase due to the inclusion of three new centers (RFF Resources for the Future in the USA, the Environmental Economics Unit at the University of Gothenburg, Sweden and NENRE in Chile) the original six centers have themselves produced more peer-reviewed publications than in any previous year, while retaining their high quality. Furthermore, several centers had publications accepted by peer-reviewed journals in 2014 to be published in 2015. In addition, 22 working papers in the RFF/EfD Discussion Paper Series and 19 book chapters have been produced.

The EfD/RFF Book Series, edited by Professor Thomas Sterner of

University of Gothenburg, added two additional titles in 2014, one on forest tenure reform and one on biodiversity conservation: Forest Tenure Reform in Asia and Africa: Local Control for Improved Livelihoods, Forest Management, and Carbon Sequestration, edited by Randall Bluffstone and Elizabeth J.Z. Robinson; and Biodiversity Conservation in Latin America and the Caribbean: Prioritizing Policies, edited by Allen Blackman, Rebecca Epanchin-Niell, Juha Siikamäki and Daniel Velez-Lopez.

The Discussion Paper series, produced in collaboration with RFF, is a very important part of the research, communication and publication strategy of EfD. In all, in 2014, 22 papers were published in the series. It is expected that almost all of the research articles produced as EfD discussion papers will be subject to an intensive peer review process and be published in international journals, which will improve the network's record of high-quality, policy-relevant research publication. The Discussion Paper series is edited by Professor Peter Berck of the University of California, Berkeley, together with the EfD Research Coordinator, Dr Yonas Alem.

Local control for better forests

Forest Tenure Reform in Asia and Africa: Local Control for Improved Livelihoods, Forest Management, and Carbon Sequestration (Taylor & Francis/Routledge and RFF) was published in 2014 as part of the EfD Book Series. Edited by international research associates Randy Bluffstone and Elizabeth Robinson, it includes chapters by researchers in EfD centers in China, Ethiopia, Kenya, Sweden and Tanzania. The researchers document the competing needs for forest resources in the global economy and find that local control works better than top-down regulation for sustainable management. The EfD Book Series is edited by Thomas Sterner and Gunnar Köhlin. Chapter contributions are listed by EfD center.

China

Xu, Jintao and William F. Hyde. 'Collective Forest Reform in China: An Overview'.

China, Kenya and Tanzania

Robinson, Elizabeth J.Z., Randall A. Bluffstone, Jintao Xu and Wilfred Nyangena. 'Conclusion: Directions for Research and Implications for Policy.'

Ethiopia

Gelo, Dambala and Tekie Alemu. 'Impact of Forest Management Decentralization on Rural Livelihoods: Evidence from Ethiopia'.

Mebratu, Tirhas and Berhanu Gebremedhin. 'Local Forest Management Institutions and Their Role in Conserving Woody Species and Biodiversity: A Case Study in Tigray, Northern Ethiopia'.

Mekonnen, Alemu and Randall A. Bluffstone. 'Forest Tenure Reform in Ethiopia'.

Kenya

Guthiga, Paul, Wilfred Nyangena, Ogada Maurice Juma, and Geophrey Sikei. 'Local Community Participation under Reformed Forest Management in Kenya: Lessons and Policy Implications'.

Slunge, Daniel, Anders Ekbohm, Fernando Loayza, Paul Guthiga, Wilfred Nyangena. 'Can Strategic Environmental and Social Assessment of REDD+ Improve Forest Governance?'

Tanzania

Albers, Heidi J. 'Extending Local Forest Management to Include REDD+: Section Context and Overview'.

Bluffstone, Randall, Elizabeth J.Z. Robinson, and Mark Purdon. 'Introduction to Local Forest Reform: Theory and Experience'.

Kahyarara, Godius. 'Some Background on Tanzania Forest Policy, Institutions and the Forest Land Tenure System'.

Purdon, Mark. 'Understanding Local Forest Tenure Reforms: Section Context and Overview'.

Purdon, Mark, Razack B. Lokina and Mohamed Bukonya. 'Forest Sector Reforms in Tanzania and Uganda'.

Robinson, Elizabeth J.Z., Heidi J. Albers, Charles Meshack and Razack B Lokina. 'Will REDD+ be Successful in Tanzania? Practical Issues of REDD+ Implementation'.

PUBLICATIONS

Lessons Learned from Eight Centers

In 2014, Dr Thomas Sterner was invited by the journal Environment and Development Economics to reflect on lessons learned by EfD. The result was an article co-authored by researchers from eight EfD centers. A key finding is that successful outcomes depend on relationships with policy makers, community involvement in livelihood strategies, and interdisciplinary knowledge.

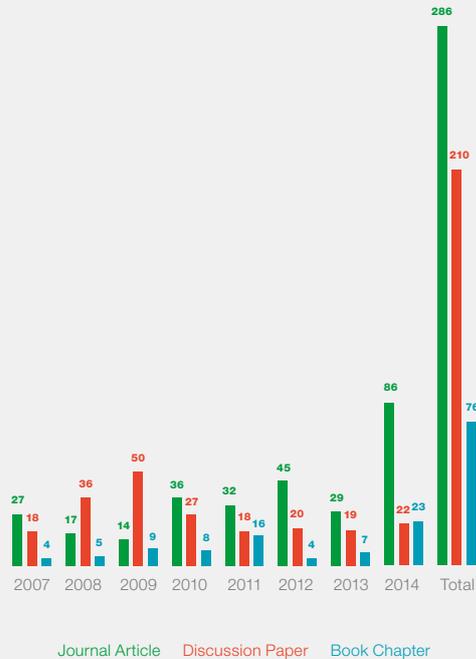
Thomas Sterner, Yonas Alem, Francisco Alpizar, Cyndi Spindell Berck, Carlos Chávez, Johane Dikgang, Stephen Kirama, Gunnar Köhlin, Jane Kabubo-Mariara, Alemu Mekonnen and Jintao Xu. 2014. "The Environment for Development Initiative: Lessons Learned in Research, Academic Capacity Building and Policy Intervention to Manage Resources for Sustainable Growth." Environment and Development Economics 19:3: 367-391.



The Wilderness of Serengeti National Park, Tanzania.

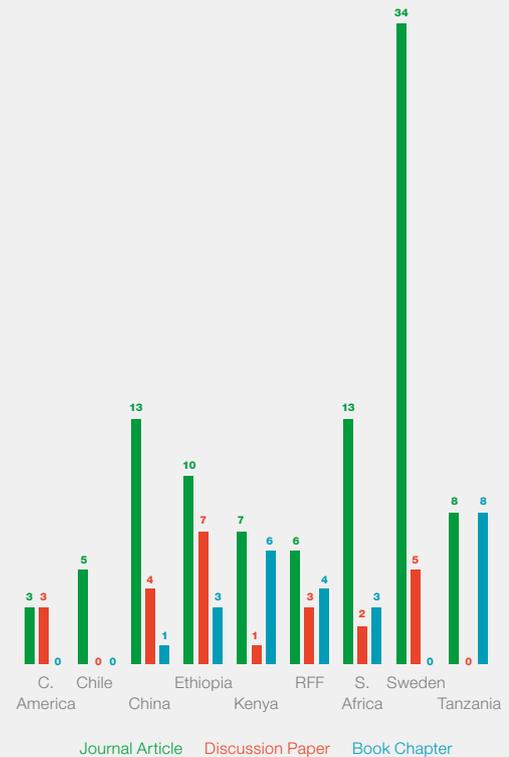
Research output by publication type 2007-2014

The increasing number of publications produced by the EfD centers in 2014 is an important indicator of the success of the centers in undertaking rigorous research.



Research output by center and publication type, 2014

Total: 86 Journal Articles, 22 Discussion Papers and 23 Book Chapters



The EfD Initiative is built on the premise that introducing relevant applied research into policy making processes will result in better policies and consequently poverty reduction and more sustainable development. Experience highlights that a close dialogue between researchers and policy makers over an extended period is of utmost importance for policy impact. Below are seven stories of environmental economics put to use around the world in 2014-15. All EfD stories can be found at www.efdinitiative.org/stories.

Africa

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Farmers are willing to pay for irrigation water. Page 12

KENYA

Subsidies delivered through the water tariff are not reaching the poor. Page 14

SOUTH AFRICA

Mixed strategy farming is best in face of climate change. Page 16

TANZANIA

Research on energy use for poverty reduction reaches grassroots. Page 18

China

Pollution tax will save lives and spur green growth. Page 20

Latin America

CENTRAL AMERICA

Rural people must deal with threats to drinking water. Page 22

CHILE

Behavior change will improve air and public health. Page 24

Farmers are willing to pay for irrigation water

How can charging money for something that was free be a good idea for poor farmers? It turns out that pricing irrigation water will help improve Ethiopian farmers' efficiency in water use, increase agricultural and food production, and make the population less vulnerable to climate change. One unique contribution of environmental economists is that they collect data from the field and then calculate what natural resources are really worth.

EfD researchers asked farmers directly about their willingness to pay and their preferences regarding irrigation services. Then they estimated the value of irrigation water in order to develop efficient prices.

Agricultural production is very important in Ethiopia, where more than 80 per cent of the population is involved in farming. Today, farmers can use irrigation canals for free to water their agricultural land. But not all Ethiopian farmers have access to irrigation services, and water availability is limited. At the same time, there is a need to increase agricultural production and productivity to secure a sufficient food supply. With climate change, it is expected that the food supply problem will worsen as increased temperature and variation in rainfall negatively impact agricultural yield.

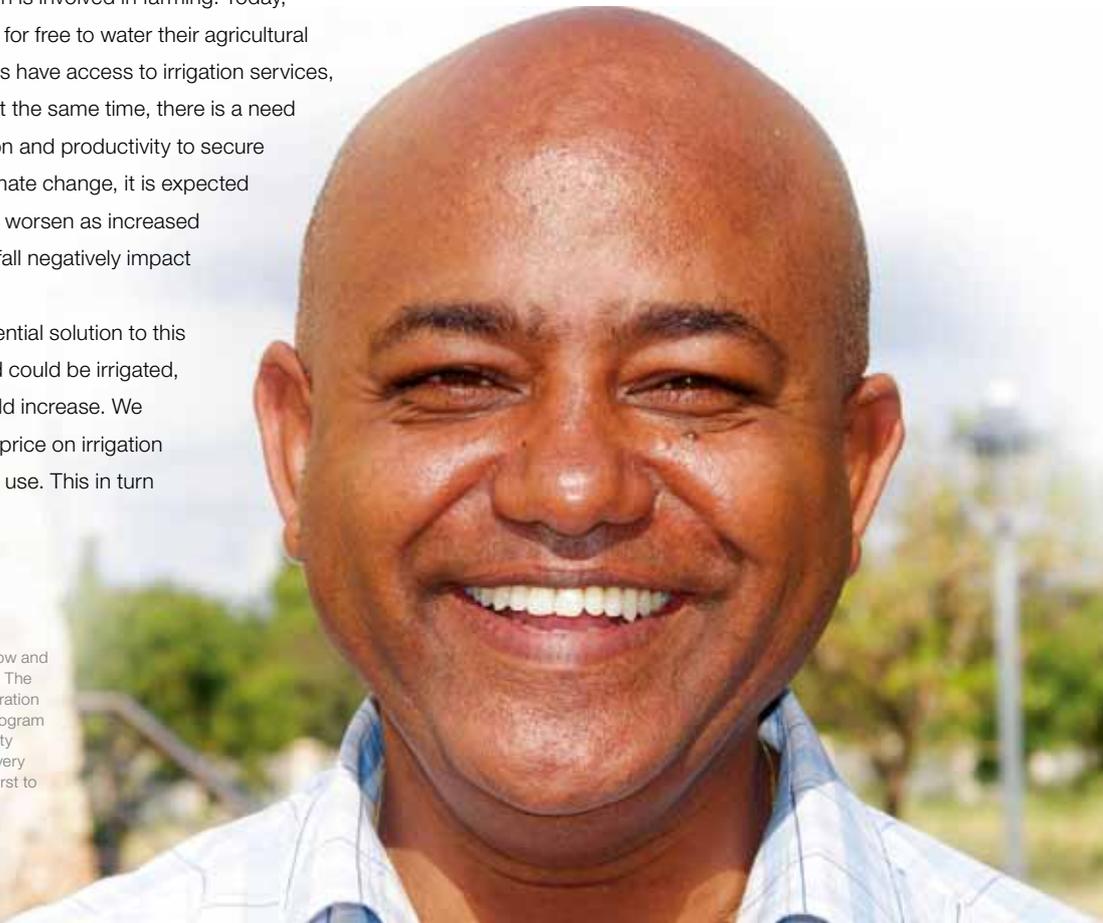
'Irrigation is an important potential solution to this problem. If more agricultural land could be irrigated, production and productivity would increase. We believe that the introduction of a price on irrigation water will help efficiency in water use. This in turn

means that the same amount of water can irrigate larger land areas. Then, agricultural output will increase', says Dr Alemu Mekonnen, outgoing EfD Center Director in Ethiopia and Associate Professor at the Department of Economics, Addis Ababa University.

The Ministry of Water, Irrigation and Energy asked EfD Ethiopia to conduct a study to come up with an estimate of the value or price of irrigation water. The Ministry also asked the EfD researchers to study the management of irrigation schemes in different regions of the country.

'We found that a large majority of farmers are willing to pay a considerable amount of money for irrigation water. This means that the government has support for this kind of proposal. There are other studies that show that quite a number of Ethiopian farmers are aware of climate change. They have noticed changes in rainfall patterns and increasing temperature. It seems they really see the importance of water', says Mekonnen.

Dr Alemu Mekonnen, Senior Research Fellow and outgoing Center Director of EfD in Ethiopia. The Swedish International Development Cooperation Agency (Sida) is supporting the doctoral program in environmental economics at the University of Gothenburg. Alemu Mekonnen was the very first student admitted to the program and first to complete a doctoral degree, in May 1998.





The estimated price of irrigation water to farmers reflects the cost of maintaining the irrigation canals. It does not cover all investment costs the government has had for establishing irrigation systems.

One possible approach to scientifically determine the price is to use the estimated cost of irrigation water supply and distribute this cost across all households. But environmental economics methods also reflect the farmers' preferences related to irrigation water, as well as their willingness to pay for different options.

'As environmental economists, we go out to the field with questionnaires and ask farmers directly how much they are willing to pay to irrigate a particular area of land. We also identify important characteristics related to irrigation and estimate how much farmers are willing to pay for the different characteristics, as well as analyze factors affecting farmers' willingness to pay', says Mekonnen.

For example, the environmental economists wanted to see how interested farmers are in the number of crop seasons. With rain fed agriculture, there is only one rainy season in the area and farmers can have only one yield per year. But with irrigation, they can produce two or even three times a year. The importance that farmers attach to frequency of watering in a crop season was also studied by the EfD researchers. They wanted to know if farmers are willing to pay more if they are able to water their land more frequently in one single season.

'Our hope is that our estimates can be used by the Ministry as inputs for further work by them. For example, the Ministry may introduce a price for irrigation water, in which case it can use the results from our study to set the price', says Mekonnen.

The results of the study were presented at a workshop organized

jointly by EfD Ethiopia and the Ministry of Water, Irrigation and Energy. It was opened by the State Minister, H.E. Engineer Wondemu Teklie. In addition, the minister attended the workshop and awarded EfD Ethiopia a certificate in recognition of its contribution to the research on 'economic valuation of irrigation water' and 'institutional sustainability of the irrigation sector in Ethiopia'. The research was acknowledged as a pioneer contribution toward the water sector's efforts to become research-based.

The workshop was held in May 2014.

Researchers involved

Abebe Dame, Zenebe Gebreegzabher, Fitsum Hagos, Alemu Mekonnen



Subsidies delivered through the water tariff are not reaching the poor

Like many water utilities across the globe, Nairobi City Water and Sewer Company implements an increasing block tariff. Recent research conducted by EfD Kenya, however, finds that the increasing block tariff implemented in Nairobi does not effectively target subsidies to low-income households. Estimates suggest that non-poor households receive over 80 per cent of the subsidies.

The failure of targeting subsidies to poor households is due to the fact that all customers are subsidized at current prices and the poorest households in Nairobi do not have a connection to the piped water and sanitation network.

‘Policy makers need to balance multiple objectives when setting water tariffs, including cost recovery, economic efficiency, equity, and fairness. Our work suggests that the increasing block tariff is not an effective means of targeting subsidies to the poor’, says Dr Richard Mulwa, a Senior Research Fellow at EfD Kenya, and senior lecturer at the Center for Advanced Studies in Environmental Law and Policy, University of Nairobi.

‘Our key policy message is that policy makers should use the water tariff to pursue financial and economic objectives and use other policy instruments such as means-testing to deliver subsidies to the poor’, adds Dr Mulwa.

Policy makers find the increasing block tariff appealing because of the perception that it can be used to ensure that low-income households have access to a certain quantity of water at a price determined to be affordable, while achieving cost recovery objectives by charging



An enumerator and a NCWSC marketing associate during the household survey.

higher volumetric prices for water use in excess of the lifeline block.

According to Global Water Intelligence's 2013 global survey of water tariffs, the increasing block tariff is the most commonly used water tariff across the globe. Indeed, over 70 per cent of the water utilities in developing countries surveyed implemented an increasing block tariff. The increasing block tariff often includes a 'lifeline block' where customers are provided a certain quantity of water, typically between 6 and 20 cubic meters per month, at a highly subsidized volumetric price. In Nairobi, the lifeline block is 10 cubic meters (m³) per month. The tariff in Nairobi includes three other usage blocks (11-30 m³/mo., 31-60 m³/mo., and >60 m³/mo.) with the volumetric price for water use increasing from one block to the next.

However, the increasing block tariff typically fails to meet the objectives of targeting subsidies to low-income households for several reasons, explains Dr Mulwa. First, utilities in developing countries often sell water below the full cost of providing service, resulting in all customers, not just those whose water use falls in the lifeline block, receiving a subsidy. Second, the lifeline block is based on the assumption that low-income households use less water than high-income households. This may not be true when low-income households have larger household sizes than higher income households or when low-income households are more likely to share a water connection. Finally, the poorest households in developing countries often do not have a private piped water connection. As a result, they cannot benefit from subsidies delivered through the water tariff.

'This is precisely what we find in Nairobi. We see a low correlation between household income and water use among households with a private piped connection. The poorest households in Nairobi also live in informal settlements and very few of them have a piped water connection. This, combined with the fact that the tariff does not cover the full cost of providing service, results in poor subsidy targeting', says Richard Mulwa.

The research was conducted by EfD Kenya in collaboration with



Dr Richard Mulwa, Senior Research Fellow, EfD Kenya

Nairobi City Water and Sewer Company, working with its Monitoring and Evaluation Manager, Mr Mbutu Mwaura. The findings were presented to the Ministry of Environment, Water, and Natural Resources; Athi Water Services Board; and the Water Services Regulatory Board at a Water Policy Day organized by Environment for Development in Kenya in collaboration with the Kenya Institute for Public Policy Research and Analysis (KIPPRA) on October 27, 2014.

Researchers involved

David Fuente, Moses Ikiara, Jane Mariara, Richard Mulwa, Mbutu Mwaura, and Dale Whittington

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Global Water Intelligence (GWI). 2013. Global Water Tariff Survey.

Whittington, D., C. Nauges, D. Fuente and X. Wu. 2015. A diagnostic tool for estimating the incidence of subsidies delivered by water utilities in low- and medium-income countries, with illustrative simulations. Utilities Policy (in press).

A wide-angle photograph of the Ngethu water treatment works. The facility features several large, circular concrete tanks with blue metal walkways and railings. The tanks are situated in a lush, green landscape with trees and hills in the background under a clear sky.

Ngethu water treatment works,
Nairobi's main water treatment facility.

Mixed strategy farming is best in face of climate change

The South African node of the EfD network, the Environmental Economics Policy Research Unit at the University of Cape Town, is working toward influencing South African policy in four key areas: climate change, biodiversity conservation, marine fisheries, and energy. One of the recent studies identified mixed farming as a crucial strategy to adapt to climate change, particularly for small farmers.

‘Policy must be informed by the best possible information available. The Environmental Economics Policy Research Unit (EPRU) isn’t just trying to provide this to government, but to guide decision makers as they develop policy’, explains past EPRU director Prof Tony Leiman.

The team, based at the University of Cape Town (UCT), School of Economics, works closely with industry bodies in these areas, but also collaborates with researchers at other key South African institutions, and with universities in Kenya, Tanzania, Mozambique and Namibia.

A recent study by EPRU shows that South Africa’s agricultural policy should support a mix of crop and livestock farming amongst subsistence farmers in order to make them more resilient to the impact of climate change. This is in contrast with government’s existing approach, which supports small farmers to diversify only their crops

in order to adapt to changes in climate.

‘The study reflects the experience of 1121 subsistence farmers in all nine provinces across South Africa,’ explains EPRU’s Dr Byela Tibesigwa. ‘These are farmers whose main output is used directly in the home, and where they have few, if any, inputs which they buy. Only a minor proportion of the farms’ produce is sold.’

These kinds of small farmers are particularly vulnerable to shifts in climate because they depend on rain-fed agriculture and have limited ways to adapt to changing farming conditions.

‘We looked at how crop-only, livestock-only, or a mix of crop and livestock farming could be impacted by rising temperatures and changes in rainfall between now and 2080’, says lead researcher on the study, Dr Byela Tibesigwa. ‘We were particularly concerned with how this could affect household income, as well as diet.’

The take-home message for policy makers is that they should try to encourage a greater mix of crop and livestock farming for these small scale operators, rather than focusing on greater diversity in crops only.

These findings were presented at the African Climate Conference: Advancing African Climate Science Research & Knowledge to Inform Adaptation Decision-Making in Africa, in Arusha, Tanzania. Tibesigwa conducted the research along with EPRU’s Prof Martine Visser and Dr Jane Turpie.

Supporting fisheries policy as government flounders

Environmental resource scientists offer government valuable support



Subsistence farmers in the Eastern Cape, South Africa, tend to have mixed farming strategies.



in terms of guiding evidence-based policy for managing marine resources. This is particularly true at a time when the national fisheries department has lost key scientific personnel, and when there have been lengthy delays in the re-allocation of long-term fishing rights.

Leiman explains that EPRU researchers regularly engage with the fisheries department on these matters, hoping that their findings will filter through to decision makers.

EPRU members were amongst the academics, fishing communities and industry that government officials consulted with earlier this year, when they began redrafting the Marine Living Resources Act of 1998. Leiman says this is currently a 'flawed document'.

'Unfortunately, much still remains to be done, and the current management of inshore fisheries, in particular the conversion of small-scale private rights to communal ones, has been a source of serious controversy', says Leiman.

Leiman and his team are amongst the scientists, computer modelling experts, social geographers and environmental economists who are working together with academics from UCT, Rhodes University and the University of the Western Cape to help guide government policy making.

EPRU has assisted Statistics South Africa (StatsSA), the national statistics service, in developing consistent accounting techniques for measuring and monitoring fishery activities in the national accounts (measures such as GDP, through which government keeps track of all economic outputs) using the United Nations accounting conventions.

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'Fisheries management here is based on an ongoing computer modelling process using catch and research data to update the estimates of fish stocks year on year,' explains Leiman. 'We have tried to make the link between the model and the national accounting process.'

The EPRU was recently involved in producing the unpublished report for the country's chief marine body, Marine and Coastal Management, in which they gave a critical review of the design, compilation and interpretation of satellite accounts for the country's fisheries.

Leiman also has a paper due out soon, in which he argues that over-estimating Namibia's fisheries stocks leads to allocation of fishing quotas that are too high to be sustainable. This, he says, can compromise the long-term profitability of the private sector fishing industry by encouraging an over-investment in its fleet and related infrastructure.



South African fisheries face reductions in the total allowable catch following ongoing stock declines.

News

- Mixed strategy farming helps beat climate change, news article published in *Farmer's Weekly*, October 21, 2014. (<http://www.farmersweekly.co.za/article.aspx?id=65945&h=Mixed-strategy-farming-helps-beat-climate-change->)
- Researchers involved: Anthony Black, Anthony Leiman, Byela Tibesigwa, Jane Turpie, and Martine Visser

Research on energy use for poverty reduction reaches grassroots



Dr Stephen Kirama, EFD Research Fellow in Tanzania, with a head of household respondent during the research work conducted in the Southern Highlands of Tanzania on small hydropower plants.

To make hydroelectric power work better in rural communities, Efd Tanzania researchers decided to have in-depth contact with the grassroots through community-based and civil society organizations. Findings from a study on management of the hydropower plants in the southern highlands region show that rural electrification has proven to boost farmers' earnings. Electric power increases the processing and value addition of agricultural products, which helps farmers fetch premium market prices.

Research findings by Dr Stephen Kirama, Efd Research Fellow in Tanzania, show an increase of the processing and value addition to agricultural products such as sunflower, timber and coffee due to the extension of electricity services in rural areas.

'Besides increases in production and revenue, communities in these areas are highly motivated for further energy usage to alleviate

poverty', Dr Kirama told the Tanzanian Daily News on August 14, 2014.

Small hydropower projects are going on in many villages. These projects provide modern, low-cost energy services to households and business enterprises. Electric power is also supplied to schools, hospitals, health centers and public offices.

'Efd Tanzania in 2014 took quite an interesting turn in its policy interactions in research and consultancy activities', says center coordinator Dr Razack Lokina. 'When we focus our policy interactions mostly on government agencies and large organizations, active and fruitful contact with the grassroots is not realized. So, for 2014, the policy interaction has added close working collaborations with community-based organizations and civil society organizations in addition to non-governmental organizations', says Dr Lokina.

Efd Tanzania applied this new approach to several energy-related issues, including small hydropower to deliver rural electricity, as this has a significant impact on growth and development.

For instance, in the Southern Highlands of Tanzania, Dr Stephen Kirama and Mr Salvatory Macha interviewed local hydropower operators and users in collaboration with ACRA-CCS, an Italian non-

governmental organization working in Tanzania since 2006. ACRA-CCS is an independent organization working to remove poverty through sustainable, innovative and shared solutions. It supports a micro-hydropower supply system that is owned and operated by LUMAMA, a community-based organization in the southern highlands, its acronym formed as a combination of three village names: Lupande, Mawengi and Madunda.

The research involved seven small hydropower plants managed by different community-based organizations. One finding of the research was to advise the small hydro producers, which are now working independently, to form a network. In addition, for the sustainability of the small hydropower plants, the best agricultural practices as well as environmental protection measures are vital, both upstream and downstream. In this regard, the major recommendation is strengthening tree planting campaigns, and conducting awareness seminars to ensure environmental sustainability of water catchments.

'For the first time in the history of EFD Tanzania, the research findings of key studies were disseminated to the level of the civil society organizations as well as the community-based organizations that are closely working with the grassroots', says Dr Kirama.

'There has also been a significant policy impact when the above research was disseminated to the grassroots', adds Dr Lokina. 'The reception when the research findings were publicized was immense'.

The new approach has also been applied to research studies on renewable energy and the oil and natural gas sector. One of them is

a baseline survey and capacity needs assessment for strengthening the role of civil society organizations in delivering sustainable energy solutions in Tanzania, conducted by Dr Aloyce Hepelwa and Dr Stephen Kirama in collaboration with the World Wildlife Fund (WWF) Country Office in Tanzania. Another is an evidence-based research and policy review of the oil and natural gas sector in Tanzania. The purpose is to identify gaps, challenges and opportunities relevant to civil society organizations and key areas for civil society organization intervention. The research findings have been published widely in local newspapers. Currently the findings are being used to prepare policy briefs for more dissemination.

In addition to the media attention, several members of the center have been invited by other non-governmental organizations dealing with energy issues to work on collaborative research work in the energy sector. For example, the Iringa Medium Hydropower Plant, located at Mwenga Coffee Estate, currently generating more than 15.5 GW of electricity and with 14 project villages, has requested the center's assistance in research work, in particular, finding some interested master's and PhD candidates to conduct research on the sustainability of the project.

'It is evident that the involvement of organizations at the community level is crucial in making the research findings important, reaching the people, and enhancing very positively the concept of environment for development, especially at the grassroots. It also makes the center visible to more stakeholders', says Dr Lokina.



Researchers involved

Aloyce Hepelwa, Stephen Kirama, Razack Lokina, Salvatory Macha, John Mduma, Adolf Mkenda, Wilhelm Ngasamiaku, and Onesmo Selejo.

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Focus group discussion during the research work conducted in the Southern highlands of Tanzania on small hydropower plants.



Pollution tax will save lives and spur green growth



APEC Blue vs. Beijing Smog. Two new concepts – ‘APEC Blue’ and ‘Beijing Smog’ – were coined in Chinese social media in November 2014 when Beijing hosted the APEC (Asia-Pacific Economic Cooperation) summit. To improve the air quality during the summit, the government closed factories, mandated days off from work and imposed restrictions on car traffic. Subsequently the sky turned an unusual blue (for Beijing), but at an enormous cost. Photo: Jun Yang/EfD China

Half a million premature deaths a year due to air pollution. More carbon emissions than any other country. Excessive energy use per unit of GDP. China suffers many problems due to monopoly and price regulation in the energy sector, according to a policy research report from EfD China. In response, marketization reform, deregulation and pollution taxes, including carbon taxes, are highly recommended by the researchers.

Policy research by EfD China researchers reveals that monopoly and price regulation of the Chinese energy sector lead to serious consequences such as lethal cancer and respiratory diseases, the world's highest dependence on dirty energy sources, a shortage of energy supply, and global warming.

The studies by Prof Jintao Xu, Dr Min Wang and Dr Zhuo Huang, EfD China/Environmental Economics Program in China (EEPC), Peking University, were conducted between July 2013 and March 2014 and cover the last 30 years. The findings are published in a report that was presented to representatives from industry, government and the media at a workshop organized by Prof Xu on April 16, 2014. When published online in July 2014, the report was cited by many newspapers. At the end of July, the EfD researchers were invited to present their findings as keynote speakers at the China Energy

Forum 2014, where industry and high-ranking officials gathered.

‘The Chinese energy sector mainly consists of coal, oil, gas, and electricity producers’, says Dr Min Wang. ‘Private firms are not allowed to enter the oil, gas and electricity sectors. The electricity grids sector is monopolized by two state-owned enterprises. In the oil sector, four state-owned enterprises have exclusive rights to explore and extract oil resources. Three of these four companies, plus three or four other state-owned enterprises, have the exclusive right to import oil. Private firms can refine oil, but they have to buy it from the state enterprises, and also compete with state-owned refiners’.

The first problem identified by the EfD researchers is shortage of energy supply. The administrative monopoly in the energy sector is an inheritance from the planned economy. Due to the monopoly of the state-owned energy enterprises, the state has to regulate and depress energy prices for two reasons: to balance the welfare of consumers against the profits of those state-owned enterprises, and to spur economic growth. As a consequence, energy prices are heavily depressed. Such a price distortion induces excessive demand as well as inadequate supply of the energy products, leading to the persistent energy shortage in the last three decades (except during the short periods of economic recession in 1998-2002 and 2013-2014). In one region, many producers simply stopped producing electricity in 2011, using excuses like ‘our generator has to be repaired’.

The second problem is high dependence on dirty energy

sources. 70 percent of China's total energy consumption comes from coal. While carbon trading has been implemented in some regions, there is still no carbon tax in China. Despite the damages that coal and oil cause to society, they are still cheap to use because this cost to society is not incorporated in the energy price. This in turn induces people to use too much energy. The EfD research findings show that the amount of energy used per unit of GDP is almost four times higher in China than in many European countries. Clean energy sources such as solar and hydropower account for only 9 percent of Chinese energy consumption, while gas accounts for 5 percent and nuclear for 1 percent.

The third problem is the resulting air pollution. China is the world's biggest emitter of many air pollutants, such as carbon dioxide and sulfur dioxide. In addition to global warming, the burning of coal and oil also leads to emissions of unhealthy, fine particles, for example, the particulate matter known as PM2.5, which has a diameter of 2.5 micrometers or less. According to the most conservative figures from China's Ministry of Health, as many as 300 000 to 500 000 people die every year in China due to cancer and respiratory diseases caused by air pollution.

'We highly recommend that the government implement a uniform tax on coal and oil consumption. The next step is a tax on emissions that targets big firms such as electricity and steel producers', says Dr Min Wang.

'In theory, a market allowing trade in carbon permits is equivalent to a tax', continues Dr Wang. 'However, in reality, especially in developing countries, a pollution tax is a much better choice than a permit trading system because the former can provide revenue incentives for the local government to seriously implement the policy'.

Industry, government and the media participated in the first workshop held to present the report in April 2014. Among the ten people invited to a discussion in front of the audience were the research director of a state-owned grid company and a government representative in charge of the energy sector.



Field trip to a coal mine. Three researchers from EfD China, Jintao Xu, Ping Qin and Min Wang, visited a coal mine in the north of Anhui province, together with Zhongmin Wang, from Resources for the Future, and Chu Wei, research colleague from Renmin University of China. The researchers wanted to understand how the coal industry continued operating when the economy was in a recession, and also to see how the coal mine uses coal to produce electricity and how they recycle the coal waste.

'Ideology is the most difficult part', adds Dr Wang. Many interest groups want to keep the existing system and use excuses such as 'energy is national security' or a 'national strategy' to defend their monopoly power. 'The views from researchers and industry are totally different from those of the government. For example, the academic and industry people talk more about how the market is efficient and the solution is to let the market work. The people from government talk about how the market is chaos and the entry of private firms would lower the quality of energy products and hurt the welfare of the people. We show with policy research findings that, if China is to achieve energy supply security, it is necessary to deregulate the energy sector and introduce a marketization reform', he concludes.

Researchers involved

Zhuo Huang, Jintao Xu and Min Wang

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Rural people must deal with threats to drinking water

Luis Felipe, President of the community based organization for water provision in Cuajiniquil de la Cruz, Guanacaste, Costa Rica.



Household chores, Cuajiniquil de la Cruz, Guanacaste, Costa Rica.

People in Central America's rural areas will face a 20 percent decline of drinking water availability by 2050, estimates show. Efd researchers are now collecting information from 8 000 households in Nicaragua, Guatemala and Costa Rica. The primary aim is to map capabilities and obstacles for communities to adapt, and to provide community leaders tools and skills to respond to drier scenarios. Efd findings also support governmental adaptation policies.

'In the end, it is not the governments who adapt. It is the people. In their communities, in their houses, they need to adapt and solve the water scarcity problems that they will face in the coming decades.



Róger Madrigal, Senior Research Fellow, Efd Central America, CATIE

This is why we want to focus primarily on building local capacities to adapt drinking water systems to the predicted drier scenarios', says Róger Madrigal, senior Research Fellow at Efd Central America. He is principal investigator of the research project 'Water for human consumption, communities and climate change: expected impacts and adaptation in Central America'.

Throughout Central America, there are 24 000 community-based drinking water organizations. These organizations are the most important providers of drinking water in the rural areas of the region. In most cases, they self-organize to provide drinking water and have little if any relationship with the government. Most of these organizations have financial and managerial problems that affect their capacity to deliver safe water regularly.

'Besides all these problems, rural people now also face the threat of climate change. It is the local community leaders that are ultimately responsible for taking decisions to adapt to drier scenarios', explains Dr Madrigal. 'As researchers, we are therefore committed to building capacity at the local level. We organize participatory meetings, workshops and small capacity building courses to raise awareness, provide information and share knowledge in an accessible way'.

The Efd researchers focus on 200 communities including 8 000 households, situated in the driest areas of Nicaragua, Guatemala and Costa Rica. The project, funded by the International Development Research Centre (IDRC) based in Canada, started in 2013 and

Benito Guadamuz, President of the community based organization for water provision in Piedra Verde, Guanacaste, Costa Rica.



aims to provide input to design adaption strategies at the governmental and community level. It also provides information to governmental bodies, international donors and NGOs about the needs of local people.

The initial estimations from the project's climate modeling component show that drinking water availability might decrease 20 percent by 2050. To map communities' and households' capacity to adapt and respond to drier scenarios, the researchers are collecting information about many different social, economic and organizational indicators. They identify factors that can facilitate or restrict implementation of future adaptation measures, such as infrastructure improvements, new wells and water metering.

Their findings so far show that many communities lack sufficient technical knowledge and management skills, and struggle with financial and organizational problems to effectively implement these critical investments. Further, in many cases, financial and technical support from governments and other external actors are necessary conditions to implement adaptation strategies.

'Most communities and households need to adapt their drinking water systems to cope with drier scenarios. But most of them also need external assistance. Governments need research based information about how to best support them, for example, by financing infrastructure investments and developing human capabilities', says Róger Madrigal.

Finally, findings reveal that, when a community has a reliable piped water system, it is much less costly to adapt to water scarcity at the community level than at the individual household level. Estimates from Nicaragua and Guatemala show that, in a community with an unreliable water system, a household's cost for buying water from additional sources, such as bottled water or drinking water from trucks, is 15 US dollars per month. In communities with highly reliable pipe systems, households spend only two dollars per month in additional sources to fulfill their drinking water needs.

Researchers involved

Róger Madrigal, Francisco Alpízar, Paul Ferraro, Pablo Imbach, Eugenia León, Chelsia Moraes

In English, the project is called Water for human consumption, communities and climate change: expected impacts and adaptation in Central America. See also efdnitiative.org/central-america/projects/l/ac3-project-water-human-consumption-communities-and-climate-change-expected/2910

In Spanish, it is called Proyecto Agua, Comunidades y Cambio Climático, and abbreviated AC3. See also aguaycomunidades.org

Behavior change will improve air and public health



Participants in the stove replacement study look at different stoves to decide which one to buy.

Air pollution caused by wood-burning in homes for cooking and heating purposes is one of the most important environmental problems in Chile, affecting thousands of families and causing early mortality. Efd Chile researchers study families' and producers' economic behavior, and advise the government to incorporate effective economic incentives to design better pollution control policies.

Incomplete combustion of wood creates pollution from particulate matter. This has a huge impact on health, creating respiratory and cardiovascular problems. In winter months, more than 25 cities in southern Chile have concentrations of particulate matter that are double or triple the national and international health standards.

The government develops major pollution control plans, including measures to reduce the use of wood and to promote the replacement of old stoves by providing subsidies to buy cleaner and more efficient stoves. Efd Chile, or the Research Nucleus on Environmental and Natural Resource Economics (NENRE), hosted by the University of Concepción, Chile, has been involved in this process by contributing to the design of a subsidy system that can be scaled up to all families in the most cost-effective manner.

'We have conducted theoretical and empirical research, applied surveys and even implemented a pilot program with real subsidies

given to families to replace their old stoves. We have provided advice to the Ministry of Environment about how to correctly demonstrate the benefits of pollution control plans and how to incorporate social issues and participation of different stakeholders in the policy implementation process', says Dr Hugo Salgado, Efd Chile Research Fellow and Associate Professor at the University of Talca, Chile.

Efd Chile researchers have found that families are willing to spend more money for cleaner technology and improved air quality, but not enough to trigger real change. Families need a partial subsidy to take action and use drier wood and cleaner stoves. The findings also show that companies respond to the incentive of subsidies. Sellers of equipment quickly computed which model of stoves would result in the greatest profit, and offered a discount to families to buy this model. The researchers' advice to policy makers is to set rules in terms of the maximum amount of pollution of stoves that can be sold in local markets. Recently, such a new regulation that set standards for wood stoves has been implemented.

'We also need education campaigns such that families understand the importance of using dry wood and how to operate their stoves to minimize the effects on air pollution. Some simple changes of behavior can have a big impact on air quality', says Dr Salgado.

The Ministry of Environment has calculated that benefits can be up to five times the cost of implementing the measures proposed in pollution control plans. Besides public health effects, families can benefit from saving money on wood expenses when they use better technology and higher quality wood. Researchers at Efd Chile are currently advising the ministry about how to correctly value different benefits, for example, the effects on agriculture productivity, infrastructure, buildings and visual values, and how to incorporate these in the socioeconomic analysis of new regulations.

'One of the most important benefits is avoiding the future cost of doing nothing today. As cities grow, the demand for energy increases and the air pollution problem gets worse. Currently, cities have started to prohibit the use of wood on critical days. However, this restriction more seriously affects low-income families that do not have alternative sources of clean energy for heating their houses. To find an alternative to the wood-burning prohibition, and in that way protect poor families, we need to start acting today to reduce pollution problems by developing clean and affordable technology and fuels', says Hugo Salgado.

EfD Chile/NENRE researchers have been able to publish a number of scientific papers that contribute to the literature on the design and implementation of air pollution control programs. And, they now have a better understanding of one of the most important environmental problems in Chile, caused by the behavior of thousands of families.

'Sandra Briceño was the first student who worked on this subject in our program. We are proud that she is now the chief of the Environmental Economics Department at the Ministry of Environment, in charge of the design of these pollution control programs', says Hugo Salgado.

Researchers involved

Carlos Chávez, Walter Gómez, Hugo Salgado and Felipe Vásquez.

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Elasticidad precio-demanda de equipos que combustionan leña en las comunas de Temuco y Padre Las Casas. Ejecutado para Conama Región de la Araucanía (2010)

Diseño, implementación y evaluación de un programa piloto de recambio de actuales tecnologías residenciales de combustión a leña por tecnologías mejoradas, en las comunas de Temuco y Padre las Casas. Ejecutado para el Ministerio de Medio Ambiente (2010-2011)

Medición de calefactores a leña del estudio incentivos para el recambio voluntario de equipos de combustión de leña en Temuco y Padre Las Casas. Ejecutado para el Ministerio de Medio Ambiente (2011-2012)

Identificación, diseño y evaluación de factibilidad de implementación de instrumentos económicos para promover el recambio masivo de artefactos a leña. Ejecutado para el Ministerio de Medio Ambiente (2012-2013).

Hugo Salgado

'Air pollution is a problem where environmental economics analysis can have a huge impact', says Hugo Salgado, EfD Chile Research Fellow and Professor at University of Talca, Chile.



Academic Capacity Building



Graduates of CATIE's MSc Program in Economics, Development, and Climate Change (EDCC).

Domestic academic capacity is a prerequisite for efficient management of natural resources and the environment. Linking research and policy interaction with graduate academic programs is one of the unique features of EfD. EfD's academic capacity building component is designed to increase the synergies between existing academic programs in the academic host institutions and EfD's research and policy interaction. By encouraging policy relevant research in academic programs, EfD supports the development of capacity that can make a real difference as students assume office in government organizations. EfD thus increases the number and quality of trained environmental economists in developing countries by supporting undergraduate and postgraduate studies in environmental economics and by building the capacity of local public universities through teaching support, research grants, books and other support.

EfD research fellows mainly teach environmental economics, natural resource economics and environmental valuation courses. All centers are involved in PhD programs and there is also a close collaboration between these programs and the specialization courses given at the Environmental Economics Unit, University of Gothenburg. While the actual courses are the responsibility of the academic institutions, EfD provides support through thesis grants, and also links coursework with experience to ensure that the academic programs are grounded in research and policy work.

Top Outcomes

Congratulations to five new PhDs! In China, Jie Li completed a thesis on "Evaluating the Impacts of Environmentally Friendly Agricultural Technologies on Chemical Fertilizer Pollution: An Economics Approach," while Shuai Chen wrote a thesis on the "Impacts of Climate Change on Crop Yields in China: Marginal Effects, Economic Impacts and Prediction," supervised by Jintao Xu. In South Africa, Kerri Brick completed her work on "Behavioral Economic Applications to Climate Change Mitigation and Adaptation: Public Good Games and Risk Experiments," while Coretha Komba wrote her thesis on "The Economics of Climate Change Vulnerability, Adaptation and Mitigation in Tanzania." Studying at EfD Tanzania, Madina Guloba completed her doctoral work on "Gender and Household Welfare: Analysis of Responses to Climate Variability and Change in Uganda." In addition, Master of Science theses were completed by 27 students.

Central America

Our educational support to academic institutions is conducted mainly through the different courses taught at CATIE by EEfD scholars, as well as by tutoring students on their dissertations. EEfD strongly supports CATIE's MSc Program in Economics, Development, and Climate Change (EDCC), offering high-quality courses updated with recent research results and methodologies. In addition, the supervision of MSc and PhD students is a priority, and many of these students become deeply involved in our research projects. Our objective is to increase the local capacity of people at academic institutions to conduct and critically evaluate research in environmental and natural resource economics and policy.





Professor James Murphy teaching a class to graduate students on experiments for environmental and natural resource economics.



Jintao Xu and new graduates at EFD: Shuai Chen (PhD), Dadong Ge (MSc) and Zhumei Huang (MSc) in front of EFD China office in June 2014. Well done, guys!



Dr Haileelassie Medhin discussing research that builds on his thesis work on farmers' adaptation strategies.

Chile

This year's most interesting capacity building activity was a course on "Experimental Economics for Environmental and Resource Economics," taught by Dr James Murphy, Department of Economics at the University of Alaska-Anchorage. This course, offered in January 2014 to postgraduate students in economics, was attended by about 20 participants. It is also remarkable that eight students finished our master's program in Environmental and Resource Economics this year. Each of the students was involved in a paper, together with a center researcher, and they submitted their results to a peer-reviewed journal. In addition, a new PhD program in Management of Aquatic Resources was introduced in 2014. The first five students are engaged in coursework before beginning their thesis research.

China

In 2014, EEPF graduated two PhD students and three master's students. One of the two PhD students (his dissertation paper has been accepted in the prestigious Journal of Environmental Economics and Management), was offered a Post Doc position at Tsinghua University, to work with China's top environmental engineering program. This opportunity was created due to the graduate's capacity in econometric analyses, which will contribute to the program's ongoing project on energy and climate change. Another PhD graduate will be working at Beijing Forestry University as a visiting assistant professor. With her arrival, BFU expects a stronger program in applied economics.

Ethiopia

One of the objectives of EEPF is to increase the number of trained environmental economists. EEPF has very close academic links with the Department of Economics of Addis Ababa University. The Forum supports the seminar series at AAU and most of our research fellows are actively involved in teaching and thesis supervision in the graduate program. EEPF also provides MSc thesis grants to those doing their thesis work in the area of resource and environmental economics.



MSc Student Oscar Santis conducting a field experiment in Arauco, Chile.

ACADEMIC CAPACITY BUILDING



Freshmen economists in the University of Nairobi on orientation day. Each year, hundreds of these students go on to take courses in environmental economics.



PhD candidate Reviva Hassan and Post-doc Kerri Brick have been working on issues of climate and technology change.



From right: John Mduma, Aloyce Hepelwa and Wilhelm Ngasamiaku, EFD center research fellows in a seminar, Dar es Salaam, Tanzania.

Kenya

EfD Kenya fellows teach both undergraduate and graduate courses in environmental economics at the School of Economics, University of Nairobi. Besides teaching, the fellows are involved in supervision of MSc and PhD thesis research in various EfD thematic areas. Master of Arts courses in Environmental Law and Environmental Policy are taught by EfD fellows at the Center for Advanced Studies in Environmental Law and Policy (CASELAP) of the University of Nairobi. This capacity building produces trained people for further research and policy analysis and thus has implications for sustainable development and poverty reduction.

South Africa

Being in a teaching institution, our fellows' primary task is the training of academic economists. However, we also introduce economic concepts to civil servants, engineers, and students in other faculties via lectures and courses outside the School of Economics. These include external sessions in Project Appraisal/Cost-Benefit Analysis and fisheries economics, as well as public lectures at the university's "Summer School" outreach program and a block of the African Climate Development Initiative (ACDI) master's program. EPRU fellows contributed chapters to a new book on the local economy. We provide dedicated graduate courses in environmental and resource economics, and all senior fellows actively supervise postgraduate dissertations. Two of our fellows obtained PhDs this year.

Tanzania

Samwel Lwiza, the winner of Gunnar Köhlin's Best MSc Thesis Award in 2014, was supervised by Dr Razack Lokina, EfD Tanzania coordinator and senior research fellow. In 2014, the Department of Economics at the University of Dar es Salaam launched a new program of Master of Arts in Applied Economics (MAAE) specializing in Environmental Economics. This is an evening program targeting working professionals. This course will be taught mostly by the EfD research fellows. The objective of the MAAE program is to equip graduate students with high level knowledge, analytical skills and techniques for understanding economic data, conducting economic research and designing policies.



Delegates at the EfD Policy Day 2014, Tanzania.



Researchers and support staff at the EfD Annual Meeting 2014, Dar es Salaam.

The EfD Annual Meeting 2014 in Tanzania

The 8th EfD Annual Meeting was held in Dar es Salaam, Tanzania from October 23 to 26, 2014 at Ledger Plaza Bahari Beach Hotel. Plenary and parallel sessions were held to present and discuss research during four days. EfD representatives and partner organizations strengthened the network by connecting with key contacts, generating debate and building on research skills.

The meeting brought together 76 attendees from all corners of the world. The plenary session speakers presented innovative approaches and thought-provoking papers, which helped environmental economists across the borders.

Professor Thomas Sterner of the University of Gothenburg, one of

Four key note speakers were invited:

Anne-Sophie Crépin (Beijer Institute of Ecological Economics Research and Stockholm Resilience Centre) spoke on “Regime Shifts, Planetary Boundaries and Behavior.”

Ola Olsson (University of Gothenburg) spoke on “The Political Economy of Natural Resource Exploitation.”

Subhrendu Pattanayak (Duke University) spoke on “Fueling Environment for Development: Lessons from Energy Studies in Rural Asia.”

Dale Whittington (University of North Carolina) spoke on “Understanding Citizens’ Reactions to Economists’ Water Policy Proposals.”

the leading researchers for the Intergovernmental Panel on Climate Change (IPCC), gave two plenary presentations, one on “Progress in Policies for Resilience and Development in the Anthropocene” and another entitled “Beyond IPCC – Future Paths for Climate Research.”

Jessica Alvsilver of Naturvårdsverket (the Swedish EPA) spoke on Wealth Accounting and the Value of Ecosystem Services (WAVES) and the new Ecosystem Service Accounting for Development program. Learn more on page 7 of this report or on www.efdinitiative.org/news/archive/ecosystems-focus-research-collaboration-8-efd-countries.

Susanne Brooks of the Environmental Defense Fund spoke about “Working toward Smarter Environmental Policy – EDF’s Strategies for Using Research to Counter Political Resistance to Change.” For the full program and participants list, please see the EfD web-page: efdinitiative.org/annual-meeting-2014.

Samwel Lwiza winner of Gunnar Köhlin’s Best MSc Thesis Award 2014

The EfD Research Committee decided to award the newly created Gunnar Köhlin’s Best MSc Thesis Award in acknowledgment of Samwel Lwiza’s MSc thesis entitled “Technical Efficiency in Agriculture and Its Implications for Forest Conservation in Tanzania: A Case Study from Kilosa District.” Lwiza’s findings indicate that farmers in the Kilosa District can improve their farming technical efficiency by about 35 percent, which in turn reduces pressure on further land clearing and forest extraction. Lwiza is a graduate of the Department of Economics of the University of Dar es Salaam and a supervisee of Dr Razack Lokina, the Director of EfD Tanzania. Lwiza received the prize at the closing day of the Annual Meeting.

EfD Policy Day 2014 in Tanzania

The EfD Policy Day 2014, held on October 22 in Dar es Salaam, Tanzania, inaugurated the 8th EfD Annual Meeting. The conference brought together environmental economics researchers, policy makers and private sector representatives to discuss opportunities, challenges and risks in view of the current and future exploration and expropriation of natural gas in Tanzania.

The objectives were to increase knowledge sharing and dialogue between policy makers, practitioners and researchers, while presenting EfD research on selected themes and discussing their policy relevance in a Tanzanian context. Another important objective was to inform the EfD research agenda by presenting policy makers' views on research needs, actions and challenges.

The Minister of State in the Vice President's Office for Environment, Binillith Satano Mahenge, gave the opening speech. The main theme of the day was entitled "From Gold Rush to Gas Gust: Tanzania in Search of a Better Way of Using Natural Gas for Sustainable Human Development" and the panel discussion focused on "Political Economy of Natural Resource Exploitation." (presentation by keynote speaker Professor Ola Olsson, University of Gothenburg); "Propelling Green Industrialization through Natural Gas in Tanzania: The Policy Link." (presentation by Professor Ammon Mbelle, University of Dar es Salaam); "Methane Leakage from Natural Gas: What Do We Need to Know and How Can We Act?" (presentation by Jonathan Camuzeaux, Environmental Defense Fund)

"Evidence-Based Research and Policy Review on the Oil and Natural Gas Sector in Tanzania" was presented by Dr Aloyce Hepelwa and Dr Stephen Kirama, University of Dar es Salaam, while a presentation on "Managing Natural Resources for Sustainable Growth and Human Development in Tanzania" The Case of Extractive Industry was given by Dr Razack Lokina, Director of EfD Tanzania. Finally, there were panel discussions on key actions to attain sustainable opportunities and challenges for sustainable natural gas use with national and local benefits for post 2015. Among the speakers were also Gunnar Köhlin, EfD Director, and María van Berlekom, Head of the Development Cooperation Division, Swedish Embassy, Tanzania.

Please see www.efdinitiative.org/news/archive/efd-policy-day-2014-tanzania for the full Policy Day program and related press releases on the topics.

At the end of the Policy Day, a special research-policy interaction session was organized for EfD center representatives. The objective was to improve strategic planning and implementation of policy interaction activities during 2015. EfD researchers focused on knowledge and experience sharing between centers. They discussed key areas where centers want to inform the policy sphere, lessons from past years and how to strategically focus future EfD centers' policy interaction activities.



EfD in Central America

The Economics and Environment for Development Research Program (EEfD, known as Programa IDEA in Spanish) at the Tropical Agricultural Research and Higher Education Center (CATIE), is a compulsory reference for high-quality scientific and policy relevant research in Central America, and more broadly, in Latin America. We have been able to consolidate a dynamic research team, successful in terms of publications, research funding, and international collaboration.

2014 was the second year of implementation of the important research projects “Water for Human Consumption, Communities and Climate Change: Expected Impacts and Adaptation in Central America (AC3)” and “Ecosystem-based Adaptation for Smallholder Subsistence and Coffee Farming Communities in Central America (CASCADE).” During 2014, the project AC3 collected fieldwork data in Costa Rica and Nicaragua. This year, fieldwork will continue in Guatemala, together with the application of behavioral experiments looking at the role of information in shaping adaptation decisions and incentives to promote water-efficient technology in Costa Rica. In 2014, the project CASCADE accomplished fieldwork data collection in three countries (Costa Rica, Honduras and Guatemala). During 2015, the working groups will focus on data analysis and writing the related publications. Publications will be both scientific and technical. Lots of effort will be placed on technical publications for training of agriculture extension officials who train farmers in each of the countries.

We have worked in close connection with several government agencies providing advice and critical analysis of policies and programs. This year, our research turned into action when the Costa Rican Park System (SINAC) for the first time allocated service concessions for non-essential activities within the protected wilderness areas in Costa Rica. Back in 2009, our researchers collaborated with The Nature Conservancy to create a price-based structure to determine the costs of maintaining and managing the sale of goods and services associated with Chirripó National Park visitors. This year, a consortium composed of community-based organizations assumes a state contract for environmental conservation and community outreach, ensuring that the economic benefits remain in the area.

Our capacity building efforts focused on the training of students in CATIE’s Master’s Program in Economics, Development, and Climate Change (EDCC). Nevertheless, our dedication to capacity building goes beyond CATIE’s walls, as there is high demand for our staff to teach at other academic institutions, such as the University of Costa Rica. Additionally, we collaborate with other partner programs, such as the Latin American and Caribbean Environmental Economics Program (LACEEP) in their efforts to build capacity for people from academic and non-academic organizations.

In closing, we must thank our fellow researchers, our support staff, our extensive network of local and international collaborators and our funding partners for their commitment to high-quality research, for their inspiration and for believing that top applied research can make a change for a better, more sustainable world. Thank you all.

Francisco Alpízar
Director

María A. Naranjo
Deputy Director



Francisco Alpízar, Director of EfD Central America, Programa IDEA hosted by CATIE.



María A. Naranjo, Deputy Director of EfD Central America, Programa IDEA.

For a complete list of EfD researchers and staff, please visit the “People” section on each center’s page on the EfD website.

RESEARCH-POLICY INTERACTION

EfD Central America study implemented in Chirripó National Park in Costa Rica

In 2009, EEfD researchers Francisco Alpízar, María Angelica Naranjo and Alberto Vargas worked with The Nature Conservancy in Costa Rica estimating a cost-base structure for the allocation of service concessions and non-essential activities within the protected wilderness areas. The objective of the consultancy was to create a price-based structure to determine the costs of maintaining and managing the sale of goods and services associated with Chirripó National Park visitors. This would substantially increase the quality of services provided to tourists and relieve the park officials of engaging in duties outside of their occupation, as well as provide open spaces to involve local groups, in keeping with the Costa Rican Law of Biodiversity. In July 2014, the consortium Aguas Eternas began to man-

age services in Crestones Ranger Station, located in the park. This consortium is composed of three community-based organizations, and it is the first time a community has assumed a state contract for environmental conservation and community outreach. This arrangement ensures that the economic benefits remain in the area.

Rural communities are facing a drier future due to climate change. EfD researchers are helping local communities make plans to manage drinking water resources. Learn more on page 22 of this report.

WORKSHOPS, POLICY SEMINARS AND IN-SERVICE TRAINING

EfD researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops.

Coffee plantation under the shade of timber trees in Guatemala.



5th Latin American Meeting on Community Water Management

The project “Water for Human Consumption, Communities and Climate Change: Expected Impacts and Adaptation in Central America” organized the 5th Latin American Meeting on Community Water Management. The gathering attracted more than 400 participants from 15 countries of the region. International and national speakers shared presentations with the Costa Rican and Latin American public to strengthen the water sector and community water management. The President of the Republic of Costa Rica, Luis Guillermo Solís, attended the opening ceremony.

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. EfD researchers are interviewed by news media and write their own opinion articles. EfD Centers strive to keep track of media coverage. At least 190 interviews and reports about EfD were published in news media 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.



Working sessions among participants from the 5th Latin American Meeting on Community Water Management.

Economic Valuation of Environmental Damage

Published October 19, 2014 in La Nación Costa Rica: Opinion article by Francisco Alpizar on Costa Rican Government's inability to economically evaluate the damage associated with environmental degradation. www.nacion.com/opinion/foros/Valoracion-economica-danos-ambientales_0_1444055597.html

DONORS

List of donors	Funding by donor during 2014
1) LACEEP (IDRC and BID)	19%
2) CASCADA (CI)	21%
3) Water and climate change project (IDRC)	1%
4) AC3 (IDRC)	19%
5) Other via Efd	13%
Sida/Efd funding as share of total center budget (incl. univ. salaries)	28%

PUBLICATIONS

Peer reviewed

Alpizar, F. 2014. "It Took Thousands of Turtles." *Environment and Development Economics* 19(3): 322-324.

Blackman, Allen, María Angelica Naranjo, Juan Robalino, Francisco Alpizar and Jorge Rivera. 2014. "Does Tourism Eco-Certification Pay? Costa Rica's Blue Flag Program." *World Development* 58: 41-52.

Robalino, Juan and Villalobos-Fiatt, Laura. Accepted in 2014 for publication in 2015. "Protected Areas and Economic Welfare: An Impact Evaluation of National Parks on Local Workers' Wages in Costa Rica." *Environment and Development Economics*.

Robalino, J., Jimenez, J., Chacón A. Accepted in 2014 for publication in 2015. "The Effect of Hydro-Meteorological Emergencies on Internal Migration." *World Development*, 16: 438-448.

Publications with associates

Alpizar, Francisco, Peter Martinsson and Anna Nordén. Accepted in 2014 for publication in 2015. "Do Entrance Fees Crowd Out Donations for Public Goods? Evidence from a Protected Area in Costa Rica." *Environment and Development Economics*.

Efd Discussion Papers

Alpizar, Francisco, Peter Martinsson and Anna Nordén. 2014. "Do entrance fees crowd out donations for public goods? Evidence from a protected area in Costa Rica." Efd Discussion Paper 14-10. Washington, DC: RFF/Efd.

Robalino, J., C. Sandoval, L. Villalobos and F. Alpizar. "Local Effects of Payments for Environmental Services on Poverty." Efd Discussion Paper 14-12. Washington, DC: RFF/Efd.

Policy Briefs

Naranjo, M., Alpizar, F. and Vargas, A. 2014. "Concessions in Wild Protected Areas: Cost estimates for non-essential services in Chirripó National Park, Costa Rica." Efd Policy Brief.

2014 PROJECTS

Experiments to Test a Bargaining Game for Reducing Pollution
Theme: Policy Design
PI: Milagro Saborío

Exploring the Role of Index Insurance on Farmers' Adaptation to Climate Change Strategies: A Field Experiment with Costa Rican Coffee Farmers
Theme: Climate Change, PI: María A. Naranjo and Francisco Alpizar

NEW RESEARCH PROJECTS IN 2015

Improving Energy Efficiency in Costa Rican Households: the Effect of Pecuniary and Non-Pecuniary Incentives in Shaping the Timing of Consumption
Theme: Climate Change and Policy Design, PI: Róger Madrigal and Francisco Alpizar

Combining State-of-the-Art Science with Practitioner's Wisdom in the Design of PES Schemes: Lessons from the Costa Rican Experience.
Theme: Forestry and Climate Change, PI: Francisco Alpizar

Individual Incentives to Cooperate within Community-Based Resource Management Institutions: Sea Turtles in Costa Rica and Nicaragua
Theme: Parks and Wildlife, PI: Róger Madrigal

ACADEMIC CAPACITY BUILDING

A complete list of courses is available at efdinitiative.org/central-america/academic-program.

MSC THESES COMPLETED

Karla Lorena Mendez. 2014. "Adaptation Measures Implemented by Committees of Water for Domestic Consumption in Areas with a History of Drought in Guatemala." Supervised by Róger Madrigal.

Nestor Javier Gómez Sagui. 2014. "Economic Analysis of the Adaptation of Households to Drought and its Relation to the Distribution System for Communal Water in the Dry Corridor of Guatemala." Supervised by Róger Madrigal.

Eduardo Francisco Pacay Tot. 2014. "Generation of Municipal Disaster Risk Indices in Honduras." Supervised by Juan Robalino.

Three PhD students had work in progress as of the end of 2014.

EfD in Chile



Carlos Chávez, Director of EfD Chile/NENRE, hosted by University of Concepción

The Research Nucleus on Environmental and Natural Resource Economics (NENRE) is supported by the Millennium Social Sciences Initiative, Ministry of Economics, Promotion and Tourism, Government of Chile. We aim to produce high-quality scientific knowledge to shape sound policies to protect the environment and achieve sustainable use of natural resources. We contribute to graduate education through teaching undergraduate Chilean students pursuing a bachelor's degree in economics, and Latin American students pursuing a master's degree (the Master's Program in Natural Resource and Environmental Economics). We also develop specific activities to strengthen the links between the Nucleus researchers and agents involved in the design of environmental and natural resource management policies at the regional, national and international levels, and we promote the formation of national and international scientific collaboration networks.

During 2014, Nucleus researchers were able to produce new scientific papers in environmental regulation, fisheries management and the economic analysis of forestry and conservation of terrestrial ecosystems, among other topics. In addition, Nucleus researchers developed an extensive international research network and conducted several activities working closely with policy makers in the areas of environmental and natural resource economics. Among our

main achievements and results, we have published seven articles in peer-reviewed journals; taught more than 200 undergraduate and more than 20 graduate students; promoted the joint advising of master's students by researchers of the Nucleus in theses related to our research areas, with the goal of promoting collaborative research and joint publications between the Nucleus researchers and master's students; and supported four scholarships to help master's students conduct or finish their degrees. Also, in cooperation with several universities around the world, we organized and hosted the Third Workshop on Environmental and Natural Resource Economics in Chile with the active participation of national and international researchers, policy makers from the Ministry of the Environment, the Undersecretary of Fisheries, the Fisheries Research Institute, and NGOs. Nucleus researchers also have actively participated in the technical discussion of a public policy for exploitation of lithium in Chile and collaborated in the design of the regional development strategy. To increase awareness of environmental issues, our researchers have given talks at public schools during science week in the "1000 Scientists in 1000 Classrooms" program allowing primary and secondary students to become aware of the environmental and natural resource problems faced by our society, and to learn about economics research and the need for sustainable management of the environment and natural resources. We have also given talks in public libraries to increase the awareness of environmental issues by the local community.

There are several relevant commitments for the near future. We plan to expand our field of work to new topics and to strengthen our participation in national and international networks in the areas of interest of the Nucleus. We will continue training master's students and sharing our activities with the external community and policy makers.

Carlos Chávez
Director



Media coverage for the stove replacement pilot project of the Center and the Ministry of Environment.

RESEARCH-POLICY INTERACTION

A remarkable policy interaction activity of our center in 2014 was the participation of our Center Director, Carlos Chávez, in the “National Commission on Lithium.” The commission was organized by the Chilean Government with the task of proposing a public policy for the exploitation of lithium in Chile. The Commission was presented to the public by the President of the Republic of Chile, Ms. Michelle Bachelet, in a ceremony in which she informed the public of the members of the commission, its objectives, and the tasks that the commission should accomplish. The activity took place in the Palacio de la Moneda, which is the house of government. This is a central topic for energy and environmental economics for the future of Chile, and we are very proud that one of our researchers was a member of this Commission. The group worked for several months and delivered its final report to the Government in January, 2015; <http://www.efdinitiative.org/news/archive/chilean-national-commission-lithium-submitted-final-report>. More information: <http://comision.minmineria.cl/>.

Wood-burning stoves for cooking and heating create serious respiratory and cardiovascular problems. EfD Chile is advising policy makers to set rules for the maximum amount of pollution from stoves and to provide subsidies for cleaner-burning stoves. Learn more on page 24 of this report.

Workshops, policy seminars and in-service training

EfD researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops

Impact Evaluation for Natural Resource and Environmental Programs

On March 20, 2014, our center organized a short course on Impact Evaluation for Natural Resource and Environmental Programs designed for policy makers in Chile. The aim was to explain concepts of the impact evaluation methodology. This new approach uses statistical methods to measure the real impact of different policies. The workshop was attended by policy makers from the Ministry for

Dr Jorge Dresdner teaching a class on the econometrics of impact evaluation for policy makers.



the Environment, the Undersecretary of Fisheries and Aquaculture, the Fisheries Research Institute, and the Regional Fisheries Management Office.

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. EfD researchers are interviewed by news media and write their own opinion articles. EfD Centers strive to keep track of media coverage. At least 190 interviews and reports about EfD were published in news media 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.

Artesanales Esperan con Especial Incertidumbre un Fallo Adverso” (Small Scale Fishermen Await with Uncertainty an Adverse Decision)

Published on January 26, 2014, in Diario El Sur, Concepción, Chile. Miguel Ángel Quiroga was interviewed on legal reform of the fishery regulation. www.elsur.cl/imprensa/2014/01/26/full/9/.



Chile's President, Ms. Michelle Bachelet, introducing the “National Commission on Lithium,” with the participation of EfD Chile director Carlos Chávez.

PUBLICATIONS

Peer reviewed

Carrasco, M., F. Vásquez, S. Valenzuela and F. Perez. 2014. "Estimación Conjunta de la Disposición a Pagar y de la Tasa de Descuento Inter-Temporal Para la Protección de la Biodiversidad en la Reserva Marina de Choros-Damas." Cuadernos de Economía 33(63): 589-611.

Gómez, W., H. Salgado, F. Vásquez and C. Chávez. 2014. "Using Stated Preference Methods to Design Cost-Effective Subsidy Programs to Induce Technology Adoption: An Application to a Stove Program in Southern Chile." Journal of Environmental Management 132: 346-357.

Quezada, F. and J. Dresdner. 2014. "The Behavior of Hake Prices in Chile: Is the World Market Leading?" Latin American Journal of Aquatic Research 42 (5): 1087-1098.

Rosas, J. C., J. Dresdner, C. Chávez and M. Quiroga. 2014. "Effect of Social Networks on the Economic Performance of Turfs: The Case of the Artisanal Fishermen Organizations in Southern Chile." Ocean and Coastal Management 88:43-52.

Santis, O. and C. Chávez. 2014. "Extracción de Recursos Naturales en un Contexto de Abundancia: Un Análisis Experimental sobre Infracciones a Cuotas en Áreas de Manejo y Explotación de Recursos Bentónicos en el Centro-Sur de Chile." Estudios de Economía 41(1): 89-123.

Tiller, R., R. Richards, H. Salgado, H. Strand, E. Moe and J. Ellis. 2014. "Assessing Stakeholder Adaptive Capacity to Salmon Aquaculture in Norway." Consilience: The Journal of Sustainable Development 11 (1): 62-96.

2014 RESEARCH PROJECTS

Field Experiments on Cooperative Management of Local Common Resources
Theme: Fisheries and Experiments (ongoing in 2015) PI: Carlos Chávez International Cooperation: Dr James Murphy, University of Alaska-Anchorage and Dr John Stranlund, University of Massachusetts-Amherst

¿Quién Debe Pagar los Costos de Fiscalización de la Política Ambiental y del Manejo de Recursos Naturales? (Who Should Pay for the Enforcement Costs of Environmental and Natural Resource Management?) (ongoing in 2015) Theme: Fisheries and Policy Design, PI: Carlos Chávez. International Cooperation: Dr John Stranlund, University of Massachusetts-Amherst

CINTERA: A Cross-disciplinary Integrated Eco-systemic Eutrophication Research and Management Approach (with Applications to Norway, Chile and Turkey) (ongoing in 2015) Theme: Climate Change, Fisheries, and Policy Design, PI: Hugo Salgado

Welfare and Economic Evaluation of Climatic Change Impacts on Water Resources at River Basin Scale (IDRC, Canada) (ongoing in 2015) Theme: Water and Climate Change, PI: Felipe Vasquez

Ocean Food-Web Patrol – Climate Effects: Reducing Targeted Uncertainties With an Interactive Network. European Commission FP7, 2013 –2017 (ongoing in 2015). Theme: Climate Change, Fisheries, and Policy Design, PI: Hugo Salgado

Undersecretary of Fisheries, Proyecto 2013-3-DAS-2. Evaluación Socio-Económica

de la Aplicación de Medidas de Administración Sobre la Pesquería Mixta de Pequeños Pelágicos de la Zona Centro Sur." Departamento de Economía, Universidad de Concepción. Theme: Fisheries, PI: Jorge Dresdner
Co-investigators: Carlos Chávez, Miguel Quiroga, Hugo Salgado

NEW RESEARCH PROJECTS IN 2015

FONDEF, CA13110061, Programa IDEA, II Concurso De Ciencia Aplicada Medidor de Impacto y Derrames de Proyectos Regionales en Chile. Theme: Policy Design
Co-principal investigator: Jorge Dresdner

ACADEMIC CAPACITY BUILDING

A complete list of courses is available at efdinitiative.org/chile/academic-program

MSc theses completed

Miguel Jara. 2014. "Trade-off between Benefits, Distribution and Employment in Fisheries: An Application to the Artisanal Fishery in Common Sardine and Anchovy in the Bío-Bío Region." Supervised by Jorge Dresdner and Walter Gómez.

Valentín Vergara. 2014. "Determinants of the Choice of Mayors in the Years 2004 and 2008." Supervised by Claudio Parés.

Ilsy Hernández. 2014. "Impact of Forest Certification on the Growth of Exports in Chile." Supervised by Miguel Quiroga.

Ignacia Benítez. 2014. "Economic and Environmental Interactions between Salmon Aquaculture and Artisanal Fisheries: An Application of Reloncaví Estuary." Supervised by Hugo Salgado.

Monserrat Miller. 2014. "Who Should Pay the Administration Costs of a CIT System? An Application Based on Numerical Simulation." Supervised by Carlos Chávez and Hugo Salgado.

Vanessa Cadena. 2014. "Analysis of the Determinants of the Performance of the Countries in the Management of Marine Resources." Supervised by Miguel Quiroga.

Marcela Maibee. 2014. "Survival Analysis of the Effect of ISA Virus in Exports of Atlantic Salmon in Chile." Supervised by Hugo Salgado.

Carol Luengo. 2014. "Is the Information on Fines Relevant?" Supervised by Carlos Chávez.

Five PhD students had work in progress as of the end of 2014.

DONORS AND PARTNERS

List of donors	Funding by donor during 2014
Ministry of Economics and Tourism	88%
Ministry of Environment	7%
University of Concepcion	5%

EfD in China

Economic analyses in China point to the fact that environmental protection policies, such as pollution control, have been undercut by the heated pursuit of economic growth at the local level. At the same time, economic opportunity has been limited by the expansion of government-sponsored ecological programs that do not necessarily achieve the desired goal of sustainable development. The Chinese government, in its newly promulgated guideline, “The Twelfth Five-Year Plan (2011-2015),” has addressed its strong determination to emphasize clean, green technology and sustainable development. Currently, China is already ranked No.1 in clean energy investment globally, and is poised to take the lead in the Green Race while maintaining stable economic growth rate.

The Environmental Economics Program in China (EEPC) focuses on applied policy research. In particular, it attempts to identify needed areas of improvement in climate and environmental policy and to address these policy needs by conducting social and economic assessments of ongoing public programs. Most of EEPC’s work is focused on forest policy, with attention in recent years to reforming the state forest sector and collective tenure system. These two themes have been a top priority on the agenda of the central government and have merged into the broader national agenda of establishing a new economy in the countryside. EEPC’s other research arenas include energy regime reform, water pricing policies, carbon sequestration monitoring, air pollution control and urban transportation, and environmental performance of industrial enterprises.

Research by EEPC has provided academia and government agencies with comprehensive information about the baseline situation in both state and collective forest sectors. It is widely acknowledged that the lack of appropriate mechanisms and incentives in the state forest sector underpins severe poverty in forested areas and unsatisfactory performance of forest resource conservation. Forest tenure reform policies have been launched in more than 20 provinces in China. Policy recommendations made by EEPC researchers have been influential during the reform process.

In 2014, EEPC published a research report on the energy regime reform in China. The report emphasizes economic insights into the

history, status quo, challenges of and solutions to energy issues in China. EEPC also hosted a high-level roundtable discussion on the topic with representatives from government agencies, industry and academia.

During 2014, EEPC researchers published eleven peer-reviewed publications in international journals. The main research themes of these publications are forest sector reform, environmental regulations, transportation management, energy, climate change and behavioral studies in household decision making.

As for capacity building, EEPC has devoted efforts to graduate and undergraduate courses on environmental and natural resource economics at Peking University and Renmin University of China, and has collaborated with international universities and institutions such as Resources for the Future, the University of California, Berkeley, and the University of Gothenburg. By 2014, EEPC had trained seven people who went on to become faculty members, including five professors at two of the leading universities in China: three at Peking University and two at Renmin University of China. These faculty members are now conducting research and training the next generation of environmental economists in China.

Jintao XU
Director

Ping Qin
Deputy Director



Jintao Xu, Director of EfD China/EEPC, hosted by Peking University



Ping Qin, Deputy Director of EfD China/EEPC



RESEARCH POLICY INTERACTION

A project to reshape China's forest sector for green growth started in 2013, when China's State Forest Administration (SFA) convened a workshop for senior government officials and academics for a discussion of the green growth agenda in China and its impacts on the forest sector. Three major themes were identified in order for the forest sector to make a significant contribution to the nation's transition toward a greener economy: forest as an energy substitute for coal and oil; forest as a growing supplier of construction materials instead of iron, steel, and cement; and forest as an important food and nutrient source. To help achieve these goals, EEPC was commissioned in 2014 to conduct fact-finding surveys on the availability and economic feasibility of wood-based fuel and energy, as well as the environmental impacts of wood-based housing construction. Their preliminary findings are included in SFA's annual report to the minister, "Report on Forest Transition for a Green Economy," in which the concept of "green timber substitution," promoted by EEPC researchers, has been used as an overarching theme. A bigger program of reshaping the forest sector for greater contributions to the national agenda is underway and EEPC has been invited back as a member of the SFA team to look at practical steps for development of forest-based bio-fuels in 2015.

China releases more carbon emissions than any other country and uses excessive energy per unit of GDP. At a roundtable discussion on energy reform hosted by EfD China in April 2014, researchers recommended carbon taxes and reforms in the energy market. Learn more on page 20 of this report.

Workshops, policy seminars and in-service training

EfD researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops

China Energy Reform Roundtable

Upon the completion of the China Energy Reform Research Report, and in celebration of the 20th anniversary of the National School of Development, Peking University and EfD China hosted the China Energy Reform Roundtable on April 16, 2014. Experts and scholars from government, industry and academia gathered to discuss energy issues such as proposed market reforms and more efficient use of energy for growth.

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. EfD researchers are interviewed by news media and write their own opinion articles. EfD Centers strive to keep track of media coverage. At least 190 interviews and reports about EfD were published in news media in 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.

Market-oriented reform is the key solution for energy security

Published in Sina Finance, China, on July 29, 2014. This piece covered Dr Min Wang's report on China's (Beijing's) 2014 International Energy Reform.

Dr Min Wang, EfD China fellow, presents the energy reform report at the roundtable on April 16, 2014.



PUBLICATIONS

Peer reviewed

Jiang, Xuemei, Gong Peichen, Bostedt Göran and Jintao Xu. 2014. "Impacts of Policy Measures on the Development of State-Owned Forests in Northeast China: Theoretical Results and Empirical Evidence." *Environment and Development Economics* 19(1): 74-91.

Li, Li, Jianhua Xu, Jianxin Hu and Jiarui Han. 2014. "Reducing Nitrous Oxide Emissions to Mitigate Climate Change and Protect The Ozone Layer." *Environmental Science and Technology* 48 (9): 5290-5297.

Qin, Ping, Xiaojun Yang and Jintao Xu. 2014. "Chinese Farmers' Preference for Relative Income and its Determinants – A Case Study in Yunnan Province." *Chinese Rural Economy* 358:76-87. (In Chinese)

Qin, Ping, Xinye Zheng and Lanlan Wang. 2014. "Travel Mode Choice and Impact of Fuel Tax in Beijing." *Environment and Development Economics* 19(1): 92-110.

Wang, Lanlan, Jintao Xu and Ping Qin. 2014. "Will A Driving Restriction Policy Reduce Car Trips? A Case Study of Beijing, China." *Transportation Research Part A: Policy and Practice* 67: 279-290

Yang, Xiaojun and Jintao Xu. 2014. "Program Sustainability and the Determinants of Farmers' Self-Predicted Post-Program Land Use Decisions: Evidence from the Sloping Land Conversion Program (SLCP) in China." *Environment and Development Economics* 19(1): 30-47.

Yi, Yanping, Xingdong Feng and Zhuo Huang. 2014. "Estimation of Extreme Value-At-Risk: An EVT Approach for Quantile GARCH Model." *Economics Letters* 124 (3): 378-381.

Zheng, Xinye, Chu Wei, Ping Qin, Jin Guo, Yihua Yu, Feng Song and Zhanming Chen. 2014. "Characteristics of Residential Energy Consumption in China: Findings from a Household Survey." *Energy Policy* 75: 126-135.

Publications with associates

Huntington, Hillard, Saud M. Al-Fattah, Zhuo Huang, Michael Gucwa and Ali Nouri Dariani. 2014. "Oil Price Drivers and Movements: The Challenge for Future Research." *Alternative Investment Analyst Review* 2 (4): 11-28.

Xu, Jintao and Peter Berck. 2014. "China's Environmental Policy: An Introduction." *Environment and Development Economics* 19(1): 1-7.

Yang, Jun, Ying Liu, Ping Qin and Antung Anthony Liu. 2014. "A Review of Beijing's Vehicle Lottery: Short-term Effects on Vehicle Growth, Congestion, and Fuel Consumption." *Energy Policy* 75: 157-166.

Yi, Yuanyuan, Gunnar Köhlin and Jintao Xu. 2014. "Property Rights, Tenure Security and Forest Investment Incentives: Evidence from China's Collective Forest Tenure Reform." *Environment and Development Economics* 19(1): 48-73.

EfD Discussion Papers

Chen, Shuai, Xiaoguang Chen and Jintao Xu. 2014. "The Economic Impact of Weather Variability on China's Rice Sector." *EfD Discussion Paper Series* 14-13-REV.

Chen, Shuai, Xiaoguang Chen and Jintao Xu. 2014. "Impacts of Climate Change on Agriculture: Evidence from China." *EfD Discussion Paper Series* 14-07.

He, Haoran and Yefeng Chen. 2014. "Auction Mechanisms for Allocating Subsidies for Carbon Emissions Reduction: An Experimental Investigation." *EfD Discussion Paper Series* DP 14-06.

Yang, Jun, Ying Liu, Ping Qin and Antung Anthony Liu. 2014. "A Review of Beijing's Vehicle Lottery: Short-term Effects on Vehicle Growth, Congestion, and Fuel Consumption." *EfD Discussion Paper Series* DP 14-01.

Research Briefs

Wang, Min, Jintao Xu and Zhuo Huang. 2014. "The Energy Regime Reform." A Research Brief submitted to the State Council of China.

Xie, Lunyu. 2014. "Diverting Commuters from Driving Autos through Urban Rail Expansion: The Case of Beijing, China." *EfD Research Brief* DRB 12-17.

Yang, Jun, Ping Qin, Antung Anthony Liu and Ying Liu. 2014. "Beijing's Vehicle Lottery: Short-term Effects on Vehicle Growth, Congestion, and Fuel Consumption." *EfD Research Brief* DRB 14-01

Reports

Qin, Ping, Pengcheng Hu, Lunyu Xie and Jianhua Xu. 2014. "Will Automobiles Contribute Heavily to the Fog and Haze?" Beijing: National Academy of Development and Strategy, Renmin University of China. (In Chinese.)

Dong, Y., Zhuo Huang, D. Hu, X. Hou, X. Li, H. Ma, S. Shen, M. Wang, J. Xu. 2014. "Research Report on China's Energy Regime Reform." Beijing: National School of Development, Peking University. (In Chinese.)

2014 RESEARCH PROJECTS

Assessment of Collective Forest Tenure Reform. Theme: Forestry, PI: Jintao Xu

The Value of Automobile Travel Time and its Congestion Policy Implication. Theme: Policy Design, PI: Ping Qin, Hang Yin and Fredrik Carlsson

The Social Cost of the Vehicle License Plate Lottery Policy in Beijing. Theme: Policy Design (ongoing in 2015), PI: Ping Qin

Study on Governmental Environmental Policy-Making Process and Behavior in China. Theme: Policy Design (ongoing in 2015), PI: Jianhua Xu

Public Perception and Behavior in Response to Air Pollution (ongoing in 2015). Theme: Policy Design, PI: Jianhua Xu

One-Child Policy and Preference (ongoing in 2015). Theme: Behavioral Experiments, PI: Fredrik Carlsson, Xiaojun Yang

Measuring the Costs of Driving Restriction Programs in Developing Countries. Theme: Policy Design, PI: Allen Blackman, Francisco Alpizar, Fredrik Carlsson and Ping Qin

NEW RESEARCH PROJECTS IN 2015

Spatio-Temporal Changes in Multiple-Cropping Index in China and its Social and Economic Factors. Theme: Agriculture, PI: Haipeng Zhang

ACADEMIC CAPACITY BUILDING

A complete list of courses is available at efdinitiative.org/china/academic-program

MSc Theses completed

Dadong Ge. 2014. "Forest Tenure and Farmers' Management Choices: a Theoretical Framework." Supervised by Jintao Xu.

Zhumei Huang. 2014. "Forest Tenure Reform and Its Impact on Forest Growth." Supervised by Jintao Xu.

Kejun Zhu. 2014. "Public Perception and Behavior toward Air Pollution in Beijing." Supervised by Jianhua Xu.

PhD Theses completed

Jie Li. 2014. "Evaluating the Impacts of Environmentally Friendly Agricultural Technologies on Chemical Fertilizer Pollution: An Economics Approach." Supervised by Jintao Xu.

Shuai Chen. 2014. "Impacts of Climate Change on Crop Yields in China: Marginal Effects, Economic Impacts and Prediction." Supervised by Jintao Xu.

An additional 80 PhD students had work in progress as of the end of 2014.

DONORS AND PARTNERS

List of donors Funding by donor during 2014

State Forestry Administration, China	10%
Rights and Resources Initiatives	15%
Peking University In-kind	45%
Sida/EfD funding as share of total center budget (incl. univ. salaries)	30%

EfD fellows and students at Shuai Chen's dissertation defense in June, 2014.



EfD in Ethiopia

The primary objective of the Environmental Economics Policy Forum for Ethiopia (EEPFE), based at the Ethiopian Development Research Institute (EDRI), is to support sustainable development and poverty reduction in Ethiopia through increased use of environmental economics in policy making processes. It attempts to achieve this through research, policy interaction and training/capacity building.

Building on prior accomplishments, 2014 was another year of important achievements for EEPFE. The main research projects implemented during the year using Sida funds include climate adaptation and finance in rural Ethiopia and impact evaluation of the sustainable land management project in Ethiopia. During this year, the Forum also finalized a World Bank funded project on improved cook stoves, forests and REDD+ (a UN program that provides payments for avoiding deforestation and forest degradation, as well as reforestation). The Forum also started a new project, funded by the International Development Research Center, to study adaptation to increase resilience to climate change in Ethiopian agriculture.

As before, researchers of the Forum participated in a number of seminars, workshops and conferences in and outside Ethiopia. Some of these seminars and workshops were organized or co-organized by the Forum. In particular, it is worth pointing out four workshops. These were on irrigation water valuation and institutional sustainability of the irrigation sector in Ethiopia; sustainable land and water management in Ethiopia; adaptation to increase resilience to climate change in Ethiopia; and improved cook stoves and REDD+ in rural Ethiopia.

The Forum's researchers participated in the World Congress of En-

EEPFE staff. From left: Abebe Damte, Zelealem Ghebremedhin, Rahel Deribe, Dawit Mulatu, Alemu Mekonnen and Hailemariam Teklewold.



vironmental and Resource Economists, held in Istanbul, Turkey, and the Fourth Conference on Climate and Development Africa. They also presented papers at the annual international conference on the Ethiopian economy organized by the Ethiopian Economics Association and at an Intergovernmental Panel on Climate Change (IPCC) outreach event to launch the Fifth Assessment Report of IPCC.

In 2015 and beyond, we plan to continue research, policy interaction and communication as well as capacity building, building on the achievements in the past. We also plan to obtain more funding to expand our research.

To this effect, we launched a new incarnation of the EfD center on February 23, 2015. The Environment and Climate Research Center (ECRC) will engage in undertaking policy oriented research at the Ethiopian Development Research Institute (EDRI) in support of Ethiopia's Climate Resilient Green Economy (CRGE) strategy.

The center was established in partnership between EfD, the EDRI, and the Global Green Growth Institute (GGGI). The center is established as a knowledge hub for the Climate Resilient Green Economy strategy that aims for Ethiopia to attain middle-income country status by 2025 with a low-carbon strategy. A major focus for the new center will be to carry out impact evaluations of CRGE programs. EfD Fellow and EDRI researcher Haileselassie Medhin has coordinated the establishment of the center and will be its first director.

Alemu Mekonnen Zenebe Gebreegzabher and Tadele Ferede
Outgoing Director Deputy Directors



Alemu Mekonnen, outgoing director of EfD Ethiopia/EEPFE, hosted by the Ethiopian Development Research Institute.



Alemu Mekonnen giving an explanation to the media on adaptation to increase resilience to climate change in Ethiopian agriculture. In 2014, EfD Ethiopia secured a three-year research grant to study "Adaptation to Increase Resilience to Climate Change in Ethiopian

RESEARCH POLICY INTERACTION

Improved irrigation could lift as many as six million Ethiopian households out of food insecurity. Increasing the extent and efficiency of irrigation in Ethiopia holds significant potential to improve agricultural productivity, alleviate poverty, and reduce vulnerability to climate volatility. In pursuit of these goals, EfD Ethiopia joined the Ministry of Water, Irrigation and Energy in organizing a workshop on "Irrigation water pricing and institutional sustainability in the irrigation sector." This workshop was held on May 2, 2014 in Addis Ababa and included government, nonprofit and private sector stakeholders. One topic was centered on concerns about inefficient water use practices and a lack of incentives to conserve water, despite national investments in irrigation infrastructure over the last two decades. EfD researchers proposed mechanisms to correct these inefficiencies through irrigation water pricing. Another topic was the need for institutional improvements. Although many donor, public, and nongovernmental organizations work in the irrigation sector, coordinated collaboration is still lacking between them. The research results showed a need for a sustainable, harmonized, and well-functioning institutional set up of the irrigation sector in Ethiopia.

Farmers in Ethiopia are willing to pay for irrigation water, shows EfD research. Learn more on page 12 of this report.

Workshops, policy seminars and in-service training

EfD researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops

Is it the Climate or the Weather?

In April 2014, EfD Ethiopia research associate Mintewab Bezabih, now working at the London School of Economics, gave a presentation at Addis Ababa University on the impacts of weather and climate change on farmers' earnings in the Amhara region of Ethiopia. The findings show that temperature effects do not increase at a steady rate but instead jump sharply as temperature gets higher. However, this effect is found only when the weather measures

Agriculture: Empowering Farmers to Adopt the Right Water Management Technologies for their Farms." The results of these field experiments will be ready to inform agricultural policy in 2016.

are combined with the extreme ends of the distribution of climate measures. Contrary to expectations for rain-fed agriculture, the study found that rainfall generally plays a less important role than temperature.

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. EfD researchers are interviewed by news media and write their own opinion articles. EfD Centers strive to keep track of media coverage. At least 190 interviews and reports about EfD were published in news media 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.

Mintewab Bezabih, EfD Ethiopia research associate.



PUBLICATIONS

Peer reviewed

Bayray, Alemayehu, Fikre Gashe, Zenebe Gebreegziabher, Abebe Tegegne and Tsigabu Bezabih. 2014. "Risk Factors of Osteoporosis Among Adults in Ethiopia, The Case of Tigray Region: A Case Control Study." *Journal of Public Health and Epidemiology* 6:2: 92-100.

Gebreegziabher, Zenebe, Linus Naik, Rethabile Melamu and Bedru Babulo Balana. 2014. "Prospects and Challenges for Urban Application of Biogas Installations in Sub-Saharan Africa." *Biomass and Bioenergy*, 70:130-140.

Kassie, Menale, HaileMariam Teklewold, Moti Jaleta, Paswel Marennya and Olaf Erenstein. 2014. "Understanding the Adoption of a Portfolio of Sustainable Intensification Practices in Eastern and Southern Africa." *Land Use Policy* 42: 400-411.

Mekonnen, Alemu. 2014. "Economic Costs of Climate Change and Climate Finance with a Focus on Africa." *Journal of African Economies* 23:2: ii50-ii82.

Teshome, Akalu, Jan de Graaff, Coen Ritsema and Menale Kassie. Accepted in 2014 for publication in 2015. "Farmers' Perceptions About The Influence Of Land Quality, Land Fragmentation and Tenure Systems On Sustainable Land Management in the North Western Ethiopian Highlands." *Land Degradation and Development*.

Publications with associates

Alem, Yonas. Accepted in 2014 for publication in 2015. "Poverty Persistence and Intra-Household Heterogeneity in Occupations: Evidence from Urban Ethiopia." *Oxford Development Studies* 43 (1).

Bezu, Sosina, Girma T. Kassie, Bekele Shiferaw and Jacob Ricker-Gilbert. 2014. "Impact of Improved Maize Adoption on Welfare of Farm Households in Malawi: A Panel Data Analysis." *World Development* 59: 120-131.

Bezu, Sosina and Stein Holden. 2014. "Demand for Second-Stage Land Certification in Ethiopia: Evidence from Household Panel Data." *Land Use Policy* 41: 193-205.

Bezu, Sosina and Stein Holden. 2014. "Are Rural Youth in Ethiopia Abandoning Agriculture?" *World Development* 64: 259-272.

Di Falco, Salvatore. 2014. "Adaptation to Climate Change in Sub-Saharan Agriculture: Assessing the Evidence and Rethinking the Drivers." *European Review of Agricultural Economics* 41:3: 405-430.

EfD Discussion Papers

Alem, Yonas and Jonathan Colmer. 2014. "Optimal Expectations and the Welfare Cost of Climate Variability" EfD Discussion Paper EfD DP 14-03. Washington, DC: RFF/EfD.

Alem, Yonas. 2014. "Life-Satisfaction in Urban Ethiopia: The Role of Relative Poverty and Unobserved Heterogeneity" EfD Discussion Paper EfD DP 14-04 Washington, DC: RFF/EfD.

Alem, Yonas. 2014. "Poverty Persistence and Intra-Household Heterogeneity in Occupations: Evidence from Urban Ethiopia" EfD Discussion Paper EfD DP 14-05 Washington, DC: RFF/EfD.

Bezabih, Mintewab, Salvatore Di Falco and Alemu Mekonnen. 2014. "On the Impact of Weather Variability and Climate Change on Agriculture: Evidence from Ethiopia" EfD Discussion Paper EfD DP 14-15 Washington, DC: RFF/EfD.

Bezabih, Mintewab, Andrea Mannberg and Eyerusalem Siba. 2014. "The Land Certification Program and Off-Farm Employment in Ethiopia." EfD Discussion Paper Series 14-22.

Damte, Abebe, Alemu Mekonnen and Zenebe Gebreegziabher. 2014. "Natural Resource Collection and Children's Literacy - Empirical Evidence from Panel Data in Rural Ethiopia" EfD Discussion Paper 14-18.

Gebreegziabher, Zenebe, Alemu Mekonnen, Tadele Ferede and Gunnar Köhlin. 2014. "Profitability of Biofuels Production: The Case of Ethiopia" EfD Discussion Paper 14-19.

Research briefs

Alem, Yonas. 2014. "Unobserved Household Differences Have a Significant Impact on Subjective Well-being, a Study Shows in Urban Ethiopia" EfD Research Brief 14-04.

Alem, Yonas, Abebe D. Beyene, Gunnar Köhlin, and Alemu Mekonnen. 2014. "Urban Households in Ethiopia Use Multiple Fuels as They Get Richer – Determinants of Household Fuel Choice in Urban Ethiopia." EfD Research Brief DRB 13-14.

Gebreegziabher, Zenebe, Alemu Mekonnen, Rahel Deribe, Samuel Abera and Meseret Molla. 2014. "Climate Change Can Have Significant Negative Impacts on Ethiopia's Agriculture" EfD Research Brief 13-14.

Ferede, Tadele, Zenebe Gebreegziabher, Alemu Mekonnen, Fantu Guta, Jörgen Levin and Gunnar Köhlin. 2014. "While Biofuels Expansion Can Help Improve Economic Growth, It Can be Harmful to the External Sector" EfD Research Brief 13-08.

Books and Book Chapters

"Impact of Forest Management Decentralization on Rural Livelihoods: Evidence from Ethiopia" (Dambala Gelo and Tekie Alemu); "Local Forest Management Institutions and Their Role in Conserving Woody Species and Biodiversity: A Case Study in Tigray, Northern Ethiopia." (Tirhas Mebrahtu and Berhanu Gebremedhin); and "Forest Tenure Reform in Ethiopia" (Alemu Mekonnen and Randall Bluffstone) in *Forest Tenure Reform in Asia and Africa: Local Control for Improved Livelihoods, Forest Management, and Carbon Sequestration*, edited by Randall Bluffstone and Elizabeth J Z Robinson. Washington, DC: Taylor & Francis/RFF.

2014 RESEARCH PROJECTS

Adaptation to Increase Resilience to Climate Change in Ethiopian Agriculture: Empowering Farmers to Adopt the Right Water Management Technologies for their Farms. Theme: Agriculture Climate Change (ongoing in 2015), PI: Mekonnen, Alemu

NEW RESEARCH PROJECTS IN 2015

An Economy-Wide Analysis of GHG Emissions Tax in Ethiopia: Towards Inclusive Green Growth. Theme: Climate Change and/or Policy Design, PI: Tadele Ferede

ACADEMIC CAPACITY BUILDING

A complete list of courses is available at efdinitiative.org/ethiopia/academic-program.

EfD Ethiopia has a new PhD program. 11 PhD students had work in progress as of the end of 2014.

DONORS AND PARTNERS

List of donors	Funding by donor during 2014
The World Bank	14%
International Development Research Center (IDRC)	50%
The Horn of Africa Regional Environment Center and Network (HoA-REC&N)	5%
Sida/EfD funding as share of total center budget (incl. univ. salaries)	31%

EfD in Kenya

EfD Kenya is hosted by the School of Economics, University of Nairobi. EfD Kenya aims to strengthen the existing capacity in training and research in environmental economics at the School of Economics, University of Nairobi and the Kenya Institute for Public Policy Research and Analysis (KIPPRA). At the same time, we aim to become a leader in research and policy advice in environmental and resource economics in Kenya. The center recognizes the importance of addressing environmental concerns in achieving economic development and poverty reduction. EfD Kenya therefore continues to make substantial contributions in promoting the use of environmental economics tools to shape policy directions in Kenya. We are delighted to share with you our annual report for 2014, detailing the various activities in which we engaged.

In 2014, the center engaged in a number of research activities and policy interactions. In June, EfD Kenya held a three-day writing workshop for water research projects. The specific objectives of the workshop were to: (i) discuss outcomes of fieldwork; (ii) finalize data cleaning; (iii) start data analysis; (iv) discuss the papers to be produced from the projects; and, (v) identify and plan next steps for the projects. This was followed by an EfD Kenya seminar on “Urban water use in Kenya” at the Nairobi City Water and Sewerage Company (NCWSC) to share research findings with the NCWSC Research and Development Committee. On October 27, 2014, EfD Kenya held a water policy day with the theme “Water for Development.” The objective of the workshop was to share and receive feedback on ongoing research work on water sourcing in rural Kenya, increasing block tariffs and the relationship between income and water use in Kenya, as well as to deliberate on the water policy direction in Kenya. The meetings saw active participation by key stakeholders in the water sector, including the Nairobi City Water and Sewerage Company, Ministry of Environment, Water and Natural Resources (MEWNR), and Water Regulatory Services Board (WASREB). Members of EfD Kenya also participated actively at the EfD 8th annual conference held in Dar es Salaam, Tanzania.

Research at the Center in 2014 focused on water and climate change. We completed a joint project between EfD Kenya researchers and researchers from the University of North Carolina and

University of Washington on rural water demand. A study on urban water tariffs and water use, involving EfD Kenya, NCWSC and researchers from the University of North Carolina was also completed. The projects are expected to spawn further research and strengthen collaboration between the participating institutions, as well as bring in new partners such as WASREB.

On behalf of the University of Nairobi and of all EfD Kenya members, I would like to thank Sida for its continued support. I also thank the EfD Initiative team at the University of Gothenburg for tireless efforts to ensure that EfD Kenya remains strong. Finally, I thank all our members, collaborators, associates and well-wishers for all the support in 2014. We look forward to working together to make EfD Kenya a center of excellence.

We hope that you will find this report comprehensible, informative and interesting. Your feedback regarding the information contained here will be highly appreciated.

Jane Kabubo-Mariara, PhD
Director, EfD Kenya

Prof. Kabubo-Mariara, Coordinator of EfD Kenya, hosted by the University of Nairobi



RESEARCH POLICY INTERACTION

An Efd Kenya Policy day was held on October 27, 2014. The theme was water. The audience included key stakeholders in the water sector, such as the Nairobi City Water and Sewerage Company (NCWSC), Ministry of Environment, Water and Natural Resources (MEWNR), and Water Regulatory Services Board (WASREB). Efd Kenya had interacted closely with NCWSC and WASREB during implementation of the “Urban Water Use in Kenya” project. This is expected to ensure buy-in of the policy messages by these stakeholders. Policies related to water pricing in urban areas and water access in rural areas have important implications for the welfare of poor households.

Subsidies delivered through the water tariff are not reaching the poor in Nairobi, shows Efd research. Learn more on page 14 of this report.

Workshops, policy seminars and in-service training

Efd researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops

As part of its evaluation of urban water use, Efd Kenya held a seminar with the Research and Development Committee of NCWSC on June 26, 2014. The presentation, made by center director Jane Kabubo-Mariara and international research associate David Fuente, focused on the research process, survey design, data collection, and results from the preliminary data analysis. We also discussed proposed next steps for the ongoing project and proposed follow-up research.



Members of the study team and staff from Imetha Water Company examine a private water connection where neighborhood households come to purchase water.



PUBLICATIONS

Peer reviewed

Kabubo-Mariara, Jane. 2014. "Integrating Market Access and Tenure Security: The Role of Institutional Isolation in Crop Productivity in Kenya." *International Journal of Economic Perspectives* 8:1.

Publications with associates

Kassie, Menale, HaileMariam Teklewold, Moti Jaleta, Paswel Marenia and Olaf Erenstein. 2014. "Understanding the Adoption of a Portfolio of Sustainable Intensification Practices in Eastern and Southern Africa" *Land Use Policy* 42: 400-411.

Kassie, Menale, Simon Wagura Ndiritu and Jesper Stage. 2014. "What Determines Gender Inequality in Household Food Security in Kenya? Application of Exogenous Switching Treatment Regression." *World Development* 56:1: 153-171.

Onjala, Joseph, Simon Wagura Ndiritu and Jesper Stage. 2014. "Risk Perception, Choice of Drinking Water and Water Treatment: Evidence from Kenyan Towns." *Journal of Water Sanitation and Hygiene for Development* 4:2: 268 -280.

MacGregor, James, Åsa Nordin and Jesper Stage. 2014. "Strategic Alliances in Kenyan Smallholder Farming" *Business Excellence* 8:1: 49-63.

Wagura Ndiritu, Simon, Menale Kassie and Bekele Shiferaw. 2014. "Are There Systematic Gender Differences in the Adoption of Sustainable Agricultural Intensification Practices? Evidence from Kenya." *Food Policy* 49:1: 117-127.

EfD Discussion Papers

Nyangena, Wilfred and Maurice Juma Ogada. 2014. "Impact of Improved Farm Technologies on Yields: The Case of Improved Maize Varieties and Inorganic Fertilizer in Kenya." *EfD Discussion Paper Series* 14-02.

Books and book chapters

Khoshroo, A. and Richard Mulwa. 2014. "Improving Energy Efficiency of Walnut Production: A Data Envelopment Analysis Approach." In Emrouznejad, A. and E. Cabanda eds. 2014. *Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis*. Idea Group, U.S.

Khoshroo, A. and Richard Mulwa. 2014. "Non-parametric Estimation of Environmental Efficiency Using Data Envelopment Analysis and Free Disposable

Hull." In *Handbook of Research on Strategic Performance Management and Measurement Using Data Envelopment Analysis*. Idea Group, U.S.

2014 RESEARCH PROJECTS

Climate Change, Agricultural Adaptation and Food Security in Kenya. Theme: Agriculture, Climate Change, PI: Jane Kabubo-Mariara

Co-management in Natural Resources in Kenya. Theme: Water, Forestry, PI: John Omiti

Increasing Block Tariffs and the Relationship between Income and Water Use in Nairobi, Kenya. Theme: Water, PI: Dale Whittington

Water Sourcing in Rural Kenya. Theme: Water, PI: Peter Kimuyu

NEW RESEARCH PROJECTS IN 2015

Influence of Weather Factors and Climate Change Adaptation Strategies on Farm Productive Efficiency in Kenya. Theme: Agriculture, Climate Change, PI: Richard Mulwa; Jane Kabubo-Mariara

Water Pricing and the Demand for Municipal Water and Sanitation Services in Kenya. Theme: Water, PI: Jane Kabubo-Mariara; David Fuente, Peter Kimuyu, Dale Whittington

ACADEMIC CAPACITY BUILDING

A complete list of courses is available at efdinitiative.org/kenya/academic-program.

Five PhD students had work in progress as of the end of 2014.

DONORS AND PARTNERS

List of donors

Funding by donor during 2014

List of donors	Funding by donor during 2014
Sida/EfD funding as share of total center budget (incl. univ. salaries)	95%

EfD in South Africa



EfD South Africa director Jane Turpie with former director Tony Leiman

2014 has seen EPRU's research productivity continuing to rise. This has been demonstrated through the rising number of academic papers and book chapters published but also, and as importantly, in the extent to which these publications have resulted from research conducted by our fellows and senior fellows in order to inform public sector decision makers. Our researchers produced sixteen peer reviewed journal articles and book chapters and twelve research briefs and discussion papers. To some extent, this surge in output is a consequence of timing; many papers submitted during 2013 (when the number of papers published fell to three) were only accepted for publication this year. It does, however, demonstrate the consistent performance of EPRU's members.

Particularly gratifying has been the productivity of our former junior research fellows, in particular Sue Snyman, Johane Dikgang and Byela Tibesigwa, who retained their links with us after completing their PhDs, and continue to publish actively in their fields. Two of our junior fellows, Kerri Brick and Coretha Komba, completed their PhDs this year; we hope that they too will retain their links with us.

EPRU continues to draw good graduate students with an interest in environmental issues. These are not only students of Economics;

we are also actively assisting and co-supervising graduate students from elsewhere on campus. In addition to those who completed their dissertations, in 2014 we had 11 PhD candidates researching theses on environmental topics under the supervision of EPRU staff members. Importantly, not all were students of our parent department, the UCT School of Economics; a number came to us from departments as diverse as Engineering and Zoology, with research that required an environmental economics co-supervisor. Although we had few master's students graduating in 2014, we are lucky to have a large cohort who should graduate in 2015.

EPRU's research has, for some years, emphasized three research areas: conservation zones (terrestrial and marine) and their management, fisheries, and climate change. However, the focus has not been exclusive and numerous "other" topics have been explored. Looking at the key outputs of the year, however, we find that this trio still dominates.

The year saw EPRU reconfirmed by the University's Research Committee after our five-yearly external appraisal. The URC also supported our move towards a slower (five year rather than two year) administrative rotation. We appointed a dedicated dissemination officer in the second half of the year, and, on the strength of the results, will be reappointing her in 2015.

On the policy side, EPRU has continued to be actively involved with an array of local and central government agencies, NGOs and international organizations. Our researchers have made significant input into policy decisions by the United Nations Environmental Program (UNEP), the World Bank, the South African Department of Trade and Industry, the Department of Agriculture, Forestry and Fisheries, the Water Research Commission, South African National Parks (SAN-Parks), the Zambezi River Authority and the Cape Town City Council.

Anthony Leiman
Director (2014)

Jane Turpie
Director (2015)



Even when they have roofs of corrugated asbestos cement, low-cost houses pose health problems and need insulation. Evaluating the retro-fitting of insulation in low-cost rural houses has been one of EPRU's 2014 studies with direct policy implications

RESEARCH POLICY INTERACTION

It is worth stressing that all of our work is policy based. As examples, research fellows have been asked to investigate such diverse topics as the rezoning of forest land in the town of George, the impacts of national anti-trust regulations for sustainability in the squid and hake fisheries, the design of pricing policies for parks, energy saving through behavioral nudges (prompts), and policies to encourage retrofitting of solar water heating and home insulation in rural areas. Our policy work has spread beyond South Africa – in 2014, fellows also worked on mining and conservation policies in Tanzania, hydro-electricity in Zambia and Zimbabwe and ecotourism in Botswana.

Mixed strategy farming is best in face of climate change, shows Efd research. Research also asks: Are fisheries floundering? Efd South Africa researchers make the case for better regulations to prevent overfishing. Learn more on page 16 of this report.

Workshops, policy seminars and in-service training

Efd researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops.

South Africa is facing acute shortages of power and water. In an attempt to broaden the range of tools available to decision makers

addressing these problems, EPRU obtained a large bilateral grant with SANCOOP (Norway) to investigate the impacts of behavioral nudges on energy and water usage amongst local households. The logistics of this involved intense interactions with a number of local municipalities. This culminated in a contract with Cape Town's water management unit, which will work closely with EPRU over the next three years. Rather than offer a dedicated in-service training course, we collaborated with the university's School of Engineering, which was running refresher courses for professional engineers working for the local and national government.

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. Efd researchers are interviewed by news media and write their own opinion articles. Efd Centers strive to keep track of media coverage. At least 190 interviews and reports about Efd were published in news media 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.

Ecotourism Provides More than Jobs; It Can Increase Social Resilience Amongst Rural Communities.

Work of the South African Efd Center was referenced in the South Cape Argus on November 11, 2014.

Water remains a critical concern for South African policy makers. EPRU researchers are actively engaged with the Water Research Commission in addressing water related issues.



PUBLICATIONS

Peer reviewed

Brick, K. and M. Visser. Accepted in 2014 for publication in 2015. "What is Fair? An Experimental Guide to Climate Negotiations." *European Economic Review* 74: 79-95.

Black, A. and H. Gerwel 2014. "Shifting the Growth Path to Achieve Employment Intensive Growth in South Africa." *Development Southern Africa*, 31 (2): 241-256.

Cooper R., A. Jarre and A. Leiman. 2014. "An Analysis of the Structural Changes in the Offshore Demersal Hake (*Merluccius capensis* and *M. paradoxus*) Trawl Fishery in South Africa." *Marine Policy* 50: 270-279.

Dikgang, J. and E. Muchapondwa. 2014. "The Economic Valuation of Nature-Based Tourism in the South African Kgalagadi Area and Implications for the Khomani San 'Bushmen' Community." *Journal of Environmental Economics and Policy* 3: 306-322.

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Muchapondwa, E., M. Visser, and K. Brick. 2014. "Abalone Conservation in the Presence of Drug Use and Corruption: Implications for its Management in South Africa." *International Journal of Sustainable Economy* 6(2): 201-216.

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Thondhlana, G. and E. Muchapondwa. 2014. "Dependence on Environmental Resources and Implications for Household Welfare: Evidence from the Kalahari Drylands, South Africa." *Ecological Economics*. 108: 59-67.

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Tibesigwa, B., M. Visser, and J. Turpie. 2014. "The Impact of Climate Change on Net Revenue and Food Adequacy of Subsistence Farming Households in South Africa." *Environment and Development Economics* 19: 1-27.

Publications with associates

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Liu, Ying, Mare Sarr and Timothy Swanson. 2014. Resistance to the Regulation

of Common Resources in Rural Tunisia. EfD Discussion Paper. EfD DP 14-17. Washington, DC: RFF/EfD.

Tibesigwa, Byela, Martine Visser, Wayne Twine and Mark Collinson. 2014. "Investigating the Sensitivity of Household Food Security to Agriculture-related Shocks and the Implication of Informal Social Capital and Natural Resource Capital." EfD Discussion Paper Series 14-21.

Other Working Papers

Tibesigwa, Byela, Martine Visser and Wayne Twine. 2014. "Investigating the Sensitivity of Household Food Security to Agriculture-related Shocks and the Implication of Informal Social Capital and Natural Resource Capital: The Case of Rural Households in Mpumalanga, South Africa." ERSA working paper 470

Tibesigwa, Byela and Martine Visser. 2014. "Effects of Social Norms on Multiple Partnerships: Evidence from Young Adults in the Metropolitan Communities of Cape Town, South Africa." ERSA working paper 456

Tibesigwa, Byela, Martine Visser and Mintewab Bezabih. 2014. "Know Your Epidemic": The Effects of Expected Health and Contextual Health Uncertainty on Risky Sex." ERSA working paper 455

Visser M., A. Child, J. Moorad and W. Akpalu. The Impact of Announcing Future Punishment Opportunities in a Public Goods Game. ERSA working paper 484.

Other books and book chapters

Black, A. "The Evolution and Impact of Foreign Direct Investment into South Africa since 1994." Ch 9 in *The Oxford Companion to the Economics of South Africa* Bhorat, H. et al. (eds.) OUP 2014.

Leiman, A. "Environmental Policy and the State in Post-Apartheid South Africa." Ch 52 in *The Oxford Companion to the Economics of South Africa*. Bhorat, H. et al. (eds.) OUP 2014.

Pittock, J., Finlayson, M., Arthington, A. H., Roux, D., Matthews, J. H., Biggs, H., Harrison, I., Blom, E., Flitcroft, R., Froend, R., Hermoso, V., Junk, W., Kumar, R., Linke, S., Nel, J., Nunes da Cunha, C., Pattnaik, A., Pollard, S., Rast, W., Thieme, M., Turak, E., Turpie, J., van Niekerk, L., Willems, D. and Viers, J. 2014. "Managing Freshwater, River, Wetland and Estuarine Protected Areas. In G. L. Worboys, M. Lockwood, A. Kothari, S. Feary and I. Pulsford (eds.) *Protected Area Governance and Management*, ANU Press, Canberra.

RESEARCH BRIEFS

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Dikgang, J. and E. Muchapondwa. 2014. "The Economic Value of Natural Features in Kgalagadi Trans-frontier Park" EfD Research Brief DRB 13-16.

Dikgang, J. and E. Muchapondwa. 2014. "Conservation Fees in the Kgalagadi Transfrontier Park between Botswana and South Africa in the Presence of Land Restitution" EfD Research Brief DRB 13-09.

Dikgang, J. and E. Muchapondwa. 2014. "The Valuation of Biodiversity

Conservation by the South African Khomani San 'Bushmen' Community" Efd Research Brief DRB 12-10.

Brick, Kerri and Martine Visser. 2014. "Can Communication Facilitate Cooperation in Reducing Greenhouse Gas Emissions?" Efd Research Brief DRB 12-14.

REPORTS

Van Zyl H. and A. Leiman. 2014. Economic Specialist Study of the Burgan Cape Terminals Fuel Distribution and Storage Facility, Eastern Mole, Port of Cape Town.

Lokina R. and A. Leiman. 2014. Managing Natural Resources for Sustainable Growth and Human Development – the Case of Extractive Industry. Background Paper # 6: Tanzania Human Development Report (THDR) Project.

Ingle, K. and A. Leiman, 2014. Garden Route Dam Development: Cost Benefit Analysis

Smith G. and M. Visser, 2014. Behavioral nudges as a water savings strategy. Research report. WRC, June 2014.

2014 RESEARCH PROJECTS

Bringing About Behavior Change in Provincial Government: Using Behavioral Nudges to Reduce Energy Consumption in Provincial Government Buildings. Theme: Climate Change, PI: Martine Visser

Gender Dimensions of Natural Resource Use, Farming and Food Adequacy: Climate Change Risk, Vulnerability and Adaptation. Theme: Climate Change, PI: Martine Visser

Park Pricing Research on Kruger, Masai Mara and Serengeti National Parks. Theme: Parks and Wildlife Biodiversity Conservation, PI: Edwin Muchapondwa, Wilfred Nyangena, Stephen Kirama and Gardner Brown

NEW RESEARCH PROJECTS IN 2015

Welfare Effect, Design Preference and Enforcement Mechanisms of Common Property Forestry Management: Econometric and Experimental Studies in Ethiopian Villages. Theme: Forestry and Experiments, PI: Edwin Muchapondwa

The Role of Behavioral Interventions in Climate Change Adaptation and Mitigation: The Case of Local Communities in South Africa. Theme: Climate Change, PI: Martine Visser

Loss Aversion and Water Conservation. Theme: Water, PI: Martine Visser

Economic Modelling for Climate-Energy Policy. Theme: Climate Change, PI: Mare Sarr

The Adoption of Clean Energy Technologies in South Africa: The Costs to Adopting Technology Restrictions. Theme: Energy, PI: Mare Sarr

Analysis of Environmental and Economic Consequences of the Proposed Batoka Gorge Hydroelectricity Scheme. Theme: Energy, PI Jane Turpie and Anthony Leiman

Role of Behavioral Interventions in Climate-Change Adaptation and Mitigation: The Case of Local Communities in South Africa. Theme: Climate Change, PI: Martine Visser

Ecosystem Service Accounting for Development. Theme: Biodiversity Conservation, South African PI Jane Turpie

Does Fiscal Decentralization Improve Community Welfare Under Campfire? Theme: Biodiversity Conservation, PI: Edwin Muchapondwa

Towards a Meta-Analysis of Fisheries Theory and Policy: Points of Divergence between the Situation in Southern Africa and the Textbook Standard. Theme: Fisheries, PI: Tony Leiman

Urban ecosystem services: The Influence of Natural Systems on Property Values. Theme: Biodiversity Conservation, PI: Jane Turpie

Adoption of New Technologies for Home Insulation and Solar Water Heating by Low Income Households in South Africa. Theme: Climate change, PI: Anthony Black

The Role of Currency Interventions in Climate-Change Adaptation and Mitigation: The Case of Community Currencies in South Africa. Theme: Climate Change, PI: Martine Visser

ACADEMIC CAPACITY BUILDING

A complete list of courses is at efdinitiative.org/south-africa/academic-program.

MSc Theses completed

Ingle, Kim 2014. "Cost Benefit Analysis as a Project Appraisal Technique for Local Government in South Africa: The Case of the Proposed Developments at the Garden Route Dam." Supervised by Tony Leiman.

Andrew Grant. 2014. Use of Diffusion Modelling to Forecast the Sales of Plug-in Hybrid and Battery Electric Vehicles (PH/BEVs) in South Africa. Supervised by Anthony Black

PhD Theses completed

Kerri Brick. 2014. "Behavioral Economic Applications to Climate Change Mitigation and Adaptation: Public Good Games and Risk Experiments." Supervised by Martine Visser.

Coretha Komba. 2014. "The Economics of Climate Change Vulnerability, Adaptation and Mitigation in Tanzania." Supervised by Edwin Muchapondwa.

An additional 11 PhD students had work in progress.

DONORS AND PARTNERS

List of donors	Funding by donor during 2014
UCT School of Economics (University Salaries)	36%
Center of Interdisciplinary African Studies of the Goethe University, Frankfurt	2%
George Municipality	0.5%
National Research Foundation SA/Norway research collaboration SANCOOP	8%
Water Research Commission	2%
Dept. Science & Technology	1%
Nat. Res. Foundation/Switzerland research cooperation: Clean Energy Technologies	3.5%
Sida/Efd funding as share of total center budget (incl. univ. salaries)	47%

EfD in Sweden

Firmly rooted in a long tradition of applied microeconomics, researchers at the Department of Economics, School of Business, Economics and Law at the University of Gothenburg are prolific in fields such as behavioral economics, development economics and environmental economics.

Established in 1990, the Environmental Economics Unit today has four full professors, five associate professors, several research fellows and post docs, about fifteen PhD candidates, four policy advisors, a communications officer and a number of support staff. We also have a large international network of research associates who have been students, visiting researchers or lecturers at various points in time or with whom we have other forms of collaboration.

The unit offers a PhD program in Environmental and Climate Economics for students from lower- and middle-income countries, and so far 31 students have graduated. The purpose of the Climate Economics program, which is financed by the Swedish International Development Cooperation Agency (Sida), is to strengthen global capacity, in particular the capacity to teach environmental and climate economics at the university level, as well as to establish a firm basis for research that can be used for policy advice. Apart from the PhD program, we provide specialization courses in climate and environmental economics; so far, approximately 300 persons from countries in Latin America, Africa, China and other regions have participated in these specialization courses since 1998.

Most of the EEU's research concerns climate, transport, industry and natural resource management, particularly in countries where growth is essential for poverty alleviation. The work includes the selection and design of policy instruments; the management of natural resources, and a close interaction between traditional economics approaches with the emerging applications of behavioral and experimental approaches in the field.

Interdisciplinary collaboration with climate scientists, fishery biologists, psychologists, anthropologists and others is of great importance. The research project COMMONS – Human Cooperation to Manage Natural Resources – includes research teams at Indiana University, the University of Gothenburg, and Resources for the Future.

The EEU received high marks from the international evaluation team that reviewed the EfD Initiative in 2014. "The evaluation has determined that the Environmental Economics Program is of a very high standard," reported the team. "The work is embedded in an economics department of notable (top 100 globally) and growing international stature, and is producing well trained graduates with the capacity and ambition to conduct and deliver high-quality, policy-relevant research."

Gunnar Köhlin
Director, EfD and Associate Professor, EEU



Gunnar Köhlin Director, EfD, and Associate Professor, EEU. Photo: Johan Wingborg

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. Efd researchers are interviewed by news media and write their own opinion articles. Efd Centers strive to keep track of media coverage. At least 190 interviews and reports about Efd were published in news media in 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.

Extensive media coverage of IPCC author

On April 6, 2014, Dagens Nyheter, one of Sweden's daily newspapers, published, "Vi kan nå klimatmålen" ("We can reach the climate targets"). Prof Thomas Sterner was one of the coordinating lead authors of the IPCC report, "Climate Change 2014: Mitigation of Climate Change". His comments on the report received widespread media coverage, including stories by the Associated Press, Fox News, Sveriges Television Rapport, Svenska Dagbladet and Göteborgs-Posten. Learn more at www.efdinitiative.org/news/archive/extensive-media-coverage-ipcc-author.



Prof Thomas Sterner is interviewed by Vetenskapsradion (Science Radio) and The Echo, Radio Sweden at the UN climate conference in Berlin.

ENVIRONMENTAL ECONOMICS AND POLICY GROUP

To improve the outreach of Efd research, and to identify opportunities for links with international policy processes, Efd works with the Environmental Economics and Policy Group, based at the Centre for Environment and Sustainability (GMV) at Chalmers University and the University of Gothenburg. GMV hosts Sida's Helpdesk for environment and climate change, which has a strong network among donor agencies and international organizations such as the Organization for Economic Cooperation and Development, the United Nations Development Program and the World Bank.

During 2014, GMV staff coached Efd centers via Skype and during the Efd Annual Meeting in Tanzania on how to advance their policy engagement. GMV staff has also contributed to the development of a joint research program between EEU, Efd, the Stockholm Resilience Centre (SRC) and the Beijer Institute.

The Helpdesk is also an outlet for disseminating knowledge generated within Efd. To assist in developing results-based strategies for Swedish development cooperation, GMV and the Efd center in Addis Ababa had extensive discussions with the Swedish Embassy in 2014, which aimed to deepen analytical support on integration of environment and climate issues. Efd has also acted as a resource for the Helpdesk to respond to Sida's requests. For instance, an Efd research fellow supported the Helpdesk in assessing availability and quality of data that could be used as indicators in results-based cooperation with Kenya. In addition, discussions with Efd researchers from Efd Tanzania and Efd Kenya provided valuable input to the Helpdesk's writing of an environment and climate change policy brief for the Swedish regional program in Sub-Saharan Africa.

PUBLICATIONS

Peer reviewed

- Akay, A., Giulletti, C., Robalino, J., and Zimmermann, K.F. 2014. "Remittances and Well-being among Rural-to-urban Migrants in China." *Review of Economics of the Household* 12: 517-546.
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- Alem, Y., Hassen, S., and Köhlin, G. 2014. Adoption and Disadoption of Electric Cookstoves in Urban Ethiopia: Evidence from Panel Data." *Resources and Energy Economics* 38: 110-124.
- Alem, Yonas. Accepted in 2014 for publication in 2015. "Poverty Persistence and Intra-Household Heterogeneity in Occupations: Evidence from Urban Ethiopia." *Oxford Development Studies* 43 (1).
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- Aronsson, T., and Johansson-Stenman, O. 2014. "When Samuelson Met Veblen Abroad: National and Global Public Good Provision when Social Comparisons Matter." *Economica* 81 (322): 224-243.
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- Carlsson, F., Johansson-Stenman, O., and Nam, P. K. 2014. "Social Preferences are Stable over Long Periods of Time." *Journal of Public Economics* 117: 104-114.
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- Choumert Johanna, Jesper Stage and Claudine Uwera. 2014. "Access to Water as Determinant of Rental Values: A Housing Hedonic Analysis in Rwanda." *Journal of Housing Economics* 26: 48-54.
- Coria, J., and Villegas Palacio, C. 2014. "Regulatory dealing: Technology adoption versus enforcement stringency of emission taxes." *Contemporary Economic Policy* 32 (2): 451-473.
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- Di Falco, Salvatore, Felice Adinolfi, Martina Bozzola and Fabian Capitanio. 2014. "Crop Insurance as a Strategy for Adapting to Climate Change." *Journal of Agricultural Economics* 65:2: 485-504.
- Eggert, H. and Greker, M. 2014. "Promoting Second Generation Biofuels: Does the First Generation Pave the Road?" *Energies* 7: 4430-4445.
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- Sterner, T., Motel, P. C., Choumert, J., and Minea, Alexandru. 2014. "Explorations in the Environment-Development Dilemma." *Environmental and Resource Economics* 57 (4): 479-485.
- Sterner, T., Revesz, R. L., Howard, P. H., Arrow, Kenneth, Goulder, Lawrence H., Kopp, Robert E., Livermore, and Oppenheimer, Michael A. 2014. "Global warming: Improve Economic Models of Climate Change." *Nature*. 508: 173-175.
- Sterner, T. 2014. "Mission Started - But Far from Accomplished." *Environment and Development Economics*. 19 (3): 295-297.
- Westerlund, Joakim, Jean-Pierre Urbain and Jorge Bonilla. 2014. "Application of Air Quality Combination Forecasting to Bogota." *Atmospheric Environment* 89: 22-28.
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- Yi, Y., Köhlin, G., Xu, J. 2014. "Property Rights, Tenure Security and Forest Investment Incentives: Evidence from China's Collective Forest Tenure Reform." *Environment and Development Economics*. 19: 48-73.
- Zhang, X-B. 2014. "Optimal Strategic Oil Stockpiling and Import Tariffs: The Case of China." *Energy Economics*. 45: 463-474.

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Alem, Yonas and Jonathan Colmer. 2014. "Optimal Expectations and the Welfare Cost of Climate Variability" EfD Discussion Paper EfD DP 14-03. Washington, DC: RFF/EfD.

Alem, Yonas. 2014. "Life-Satisfaction in Urban Ethiopia: The Role of Relative Poverty and Unobserved Heterogeneity" EfD Discussion Paper EfD DP 14-04 Washington, DC: RFF/EfD.

Alem, Yonas. 2014. "Poverty Persistence and Intra-Household Heterogeneity in Occupations: Evidence from Urban Ethiopia" EfD Discussion Paper EfD DP 14-05 Washington, DC: RFF/EfD.

Alpizar, Francisco, Peter Martinsson and Anna Nordén. 2014. "Do entrance fees crowd out donations for public goods? Evidence from a protected area in Costa Rica." EfD Discussion Paper 14-10. Washington, DC: RFF/EfD.

Nordén, Anna. 2014. "Payment Types and Participation in Payment for Ecosystem Services Programs: Stated Preferences of Landowners." EfD Discussion Paper Series 14-11.

Other Working Papers

Bonilla, Jorge, Jessica Coria, Kristina Mohlin and Thomas Sterner. 2014. "Diffusion of NOx Abatement Technologies in Sweden" Working papers in Economics - Gothenburg University 585.

ACADEMIC CAPACITY BUILDING

The Environmental Economics Program is a capacity building program managed by the Environmental Economics Unit at the Department of Economics, University of Gothenburg. It is financially supported by the Swedish International Development Cooperation Agency (Sida). The program includes the EfD Initiative, a full PhD program in Global Change and Climate Economics and a number of Specialization Courses in Environmental and Climate Economics.

PhD program in Global Change and Climate Economics

The PhD program in Global Change and Climate Economics started in 1991. Since then, 30 PhD's have graduated from 15 developing countries, with 80 per cent returning home, and others working elsewhere with (or for) their own countries.

During 2014, a total of 14 Sida-funded PhD students from 8 countries were enrolled in the program, one of whom was financed by the bilateral program with Tanzania. The synergies with the EfD centers are very strong, since 10 of these students come from "EfD countries". Ten peer reviewed papers were published by the PhD students during 2014, which is an exceptional number.

The objective of the PhD program is to build capacity in developing countries to teach, to carry out policy relevant research, and to give policy advice in environmental and climate economics and sustainable development.

In accordance with Sida's wish to have more collaboration with universities in our countries of cooperation, we have entered into an agreement with the University of Cape Town to fund four PhD students, with the specific condition that they take four or five specialization courses in environmental, climate and global change economics.

Specialization courses in Environmental and Climate Economics

Over the years, 270 students have participated in one or more of our specialization courses. In 2014, 33 students from 15 countries attended the four specialization courses given during the spring. The lecturers come from 9 countries. The courses were entitled:

- The Climate Challenge: Science, economics, and global energy perspectives (with Chalmers University)
- Modeling natural resources in the context of climate change (with the Beijer Institute)
- The design of environmental policy instruments (including negotiations)
- Development economics.

As a part of the PhD program, these courses are second year courses especially designed for our students. The courses are

offered every other year. The courses are also open to students, teachers, researchers, and policy makers from relevant developing countries. The participants have, over the years, mostly been PhD students and university teachers from developing countries, with or without a PhD in economics, as well as some policy makers or other analysts. The gender balance has improved during the years and we recruit more and more female candidates to our courses.

To our knowledge, there is no other program that offers such a series of specialization courses in environmental economics at the PhD level. Our main target groups are PhD candidates in other programs in developing countries, such as the African Economic Research Consortium (AERC), and local PhD programs in developing countries throughout the world. Another important target group is researchers from the regional networks, including the Center for Environmental Economics and Policy in Africa (CEEPA), Latin American and Caribbean Environmental Economics Program (LACEEP), Economy and Environment Program for Southeast Asia (EEPSEA) and South Asian Network for Development and Environmental Economics (SANDEE). Recently, we have accepted PhD candidates from European universities as well, as long as the students are from a suitable developing country.

EfD in Tanzania

Environment for Development Tanzania (EfDT) is hosted by the Department of Economics University of Dar es Salaam, with a primary focus on research, policy advice and training/teaching. The center intends to support poverty alleviation and sustainable development through increased use of environmental economics capacity in policy making processes. Specifically, it strives to increase the number of trained environmental economists by creating a favorable working environment by, among other things, supporting local MA and PhD economics candidates working on environmental and development issues. Since EfD Tanzania launched in 2007, the number of graduate students writing theses/dissertations on environment, poverty and policy analysis has increased gradually. Our aim is to strengthen the capacity of environmental economics and economics graduates to do applied research on poverty and environmental management, and also be able to link research fellows with ministries, departments, agencies and research organizations, enabling them to develop international and national collaborations. It is our hope that this will make a significant contribution to capacity building in the area of environment and natural resource economics in the country.

Apart from an increase in the number of theses, their quality also has improved. I thank the Research Committee of the Environment for Development Initiative for their decision to award this year's Gunnar Köhlin's Best MSc Thesis Award to a student from our center. This is clear testimony that our graduate students and the quality of their work can withstand international competition.

The center continued to conduct research and consultancy of high quality and to conduct dissemination seminars and workshops. The process of disseminating research results has increased environmental awareness among policy makers and created a better understanding of environmental realities. Most of the workshops, conferences, and internal seminars are the result of the activities carried out by the center and Department of Economics in collaboration with the Ministry of Finance, National Environmental Management Council, President's Office, Planning Commission and development partners, in particular the UNDP (United National Development Program) country office. Increasingly, the center works hand-in-hand with the department of Economics and the College of Social Sci-

ences in the University of Dar es Salaam to organize seminars and dissemination workshops at various levels.

I also wish to take this opportunity to thank all those who contributed to success in organizing the 8th Annual EfD Meeting, held in Dar es Salaam in October 2014. In particular, I extend my thanks to the organizing team led by Dr Stephen Kirama; the EfDT Policy Board; the EfD Secretariat; the Department of Economics, University of Dar es Salaam and UNDP (the UN Development Program). The 8th EfD annual meeting was a great achievement in terms of policy interactions. We thank all those contributed to these successes.

Razack B. Lokina
Director

Dr Razack Lokina, Director of EfD Tanzania, hosted by the Department of Economics, University of Dar es Salaam.



A group photo of invited community officials discussing small hydropower production in the Southern Highlands of Tanzania at the Dissemination Workshop at the Rural Electrification Agency in July, 2014



POLICY INTERACTION

In 2014, EfD Tanzania took quite an interesting turn in its policy interactions. Over the last eight years or so, EfD-T has provided extensive research and consultancy services to national ministries and United Nations agencies, contributing to key plans such as the National Strategy for Growth and Poverty Reduction. However, when we focus our policy interactions mostly on government agencies and large organizations, active and fruitful contact with the grassroots is not realized. So, for 2014, a strategic decision was made to add close working collaborations with community-based organizations and civil society organizations in addition to non-governmental organizations. EfD Tanzania applied this new approach to the overarching issue of energy, which has a significant impact on growth and development. Researchers gathered data and insights at the grassroots level for three projects. One was a review of policies for the oil and natural gas sector. Another focused on management of small hydro-power electricity generation plants. The third was a “Baseline Survey and Capacity Needs Assessments for Strengthening the Role of Civil Society Organizations in Delivering Sustainable Energy Solutions in Tanzania.” The findings from these studies have been disseminated to the level of the civil society organizations as well as the community-based organizations that are closely working with the grassroots.

EfD Tanzania researchers have found that small hydro plants can benefit by forming networks. These plants provide rural electrification that can boost farmers’ earnings. The research also shows that small hydro plants depend on good agricultural and environmental practices. Learn more on page 18 of this report.

Workshops, policy seminars and in-service training

EfD researchers organized or participated in well over a hundred workshops, policy seminars and in-service training sessions for policy practitioners and decision makers in 2014. See one example below and learn more at www.efdinitiative.org/seminars and www.efdinitiative.org/workshops.

Rural Electrification Boosts Farmers’ Earnings

Environment for Development Tanzania, in collaboration with

ACRA-CCS Tanzania, organized a workshop on the Handbook on Management of Mini Hydro Power Plants in the Southern Highlands, Tanzania: Identifying the Strengths, Weaknesses, Challenges and Needs of Different Existing Utilities in the Southern Highlands. The workshop was held on August 12, 2014 at the REA conference room, Mawasiliano Tower, Dar es Salaam, Tanzania. It attracted 30 participants from ministries, government agencies, departments, nongovernmental organizations, community-based organizations, faith groups and media representatives. The workshop was a result of the consultancy carried out by researchers from Environment for Development Tanzania, at the Department of Economics, University of Dar es Salaam.

SPREADING THE WORD

Media outreach influences policy. Decision makers are influenced by public opinion, and households and businesses need information about how their decisions affect the environment. EfD researchers are interviewed by news media and write their own opinion articles. EfD Centers strive to keep track of media coverage. At least 190 interviews and reports about EfD were published in news media in 2014. See example below and learn more at www.efdinitiative.org/news/efd-media.

“Economist warns Tanzania over gas revenue.”

East African Business Week, November 2, 2014

Several Tanzanian newspapers reported from the EfD Policy Day 2014. www.busiweek.com/index1.php?Ctp=2&pl=2144&pLv=3&sr=53&spl=20&cl=11



Honorable Dr Binillith Satano Mahenge and Policy Board members examine the EFD outputs.

PUBLICATIONS

Peer reviewed

Hepelwa, Aloyce. 2014. "Dynamics of Watershed Ecosystem Values and Sustainability: An Integrated Assessment Approach." *International Journal of Ecosystems* 4(2): 43-52.

Kassie, Telemu, Razack Lokina, Phares Mujinja and Bruno P. Mmbando. 2014. "Determinants of Delay in Care Seeking among Children under Five with Fever In Dodoma Region, Central Tanzania: A Cross-Sectional Study." *Malaria Journal* 13:348.

Publications with associates

Bulte, Erwin, Gonne Beekman, Salvatore Di Falco, Joseph Hella and Pan Lei. 2014. "Behavioral Responses and the Impact of New Agricultural Technologies: Evidence from a Double-blind Field Experiment in Tanzania." *American Journal of Agricultural Economics* 96:5.

Kassie, Menale, Moti Jaleta and Alessandra Mattei. 2014. "Evaluating the Impact of Improved Maize Varieties on Food Security in Rural Tanzania: Evidence from a Continuous Treatment Approach." *Food Security* 6 (2): 217-230.

Kassie, Menale, HaileMariam Teklewold, Moti Jaleta, Paswel Marennya and Olaf Erenstein. 2014. "Understanding the Adoption of a Portfolio of Sustainable Intensification Practices in Eastern and Southern Africa." *Land Use Policy* 42: 400-411.

Robinson, Elizabeth J.Z., Heidi J. Albers, Guylain Ngeleza and Razack Lokina. 2014. "Insiders, Outsiders, and the Role of Local Enforcement in Forest Management: An Example from Tanzania." *Ecological Economics* 107: 242-248.

Robinson, Elizabeth J.Z., Heidi J. Albers and Stephen Kirama. 2014. "The Role of Incentives for Sustainable Implementation of Marine Protected Areas: An Example from Tanzania." *International Journal of Sustainable Society* 6:1/2: 28-46."

Books and book chapters

Coria, Jessica; Robinson, Elizabeth; Smith, Henrik; and Sterner, Thomas. 2014. "Biodiversity Conservation and Ecosystem Services Provision: A Tale of Confused Objectives, Multiple Market Failures and Policy Challenges." In *Handbook on the Economics of Ecosystem Services and Biodiversity*, Edward Elgar Publishing, Cheltenham, UK.

2014 RESEARCH PROJECTS

Evaluating the Socio-Economic Impacts of Solar Lanterns and Education Campaigns in Tanzania. Theme: Poverty Reduction, Environmental Sustainability, PI: Razack Lokina

What Drives the (Non) Adoption of Agricultural Technologies? Time Preferences and Social Networks in Rural Tanzania. Theme: Poverty Reduction, Environmental Sustainability, PI: Salvatore Di Falco

Land Conservation Technologies Adoption and its Impact on Smallholder Agriculture in Tanzania: A Case Study of REDD Implementing Areas. Theme: Agriculture, PI: John Mduma

Sustainable Financing Options of the Climate Change and Climate Variability Adaptation Measures by Rural Smallholder Farmers in Tanzania. Theme: Agriculture and Climate Change, PI: Aloyce Hepelwa

NEW RESEARCH PROJECTS FOR 2015

Easy Come, Easy Go? Transitory Income and Household Spending Behavior. Theme: Policy Design, PI: Remidius Ruhinduka

Wildlife Corridors and Communities in the East and West Usambara Mountains: Toward Integrating Social and Biological Information in Conservation Policy and Priorities. Theme: Forestry; Parks and Wildlife, PI: Heidi J. Albers

ACADEMIC CAPACITY BUILDING

A complete list of courses is at efdinitiative.org/tanzania/academic-program

PhD Theses completed

Madina Guloba. 2014. "Gender and Household Welfare: Analysis of Responses to Climate Variability and Change in Uganda." Supervised by Dr Razack Lokina

An additional 11 PhD students had work in progress as of the end of 2014.

MSc Theses completed

Gloria Mapunda. 2014. "Willingness to Switch from Charcoal to Alternative Energy Sources." Supervised by Razack Lokina.

Rosemary Taylor. 2014. "Assessment of the Impact of Wildlife Management Areas (WMA) on Welfare of Local Communities. Case study of Burunge WMA." Supervised by Razack Lokina.

Mussa Martine. 2014. "Natural Resource Use Sustainability: A Case of Tanzanian Fisheries of Lake Victoria." Supervised by Razack Lokina.

Lusekelo George. 2014. "Estimating the Use Values of Kilombero Valley Wetlands: A Choice Experiment Modelling." Supervised by Razack Lokina.

Pima Masolwa. 2014. "An Assessment of Economic Benefits of Forest Landscape Restoration in Rural Shinyanga: Contingent Valuation Approach." Supervised by Razack Lokina

Alphoncina Kagaigai. 2014. "The Impact of Climate Change on Food Production in Tanzania." Supervised by Razack Lokina

Magashi, Joseph. 2014. "An Assessment of Willingness to Pay for Improved Water Services in Tanzania: A Case Study of Igunga Town." Supervised by Aloyce Hepelwa

Kaanael, Gabriel. 2014. "Poverty-Environment Linkages in Tanzania: The Case Of Land Management among Farming Households." Supervised by Aloyce Hepelwa

Mlay, Joseph. 2014. "Contribution of Fisheries Resources to Poverty Reduction: Case Study of Coast Residents in Dar es Salaam." Supervised by Aloyce Hepelwa

Novatus Apolinary Tesha. 2014. Assessment of the Willingness to Pay for Coral Reefs Conservation in Marine Protected Areas of Tanzania: The Case Study of Mbudya Marine Reserve." Supervised by Aloyce Hepelwa

Novat Benedict. 2014. "Estimating Recreational Use Value of Amboni Conservation Area: A Travel Cost Approach." Supervised by John Mduma

DONORS, PARTNERS AND NETWORKS

List of donors	Funding by donor during 2014
United Nations Development Fund -UNDP- Studies/conference/workshop	14%
Ministry of Finance-MOF (Consultancy)	11%
Pathfinder (Consultancy)	2%
Ministry of Finance - Poverty Eradication Division (PED) (consultancy)	2%
Tanzania Revenue Authority TRA (consultancy)	3%
University of Dar es Salaam – (Researcher Salaries and utilities)	21%
Sida/EfD funding as share of total center and annual meeting	47%

EfD in the USA

After seven years as an informal participant in EfD, Resources for the Future (RFF) was granted full membership in 2013. While RFF has long contributed to EfD through collaborative research, short- and long-term staff exchanges, and research dissemination, formal membership – and, in particular, the designation of a core group of eight RFF researchers as EfD Senior Research Fellows – has strengthened and raised the profile of these activities.

2014 was a productive year for the RFF EfD center. Research focused on three areas: forest conservation, eco-certification, and climate and energy. A key theme of the work on tropical forests was rigorous evaluation of forest conservation policies. With support from the InterAmerican Development Bank (IADB), the National Aeronautics and Space Administration (NASA), and various foundations, Allen Blackman and co-authors completed studies of the deforestation effects of protected areas in Mexico, Guatemala and Peru, as well as a review of evidence on synergies among forest conservation policies. In addition, with funding from the IADB and the World Bank, Juha Siikamaki led studies on valuation of forest ecosystem services. Finally, with support from IADB and the Moore Foundation, Blackman, Boyd and Siikamaki published a book and several articles on systematic planning of forest and other types of conservation investments.

The RFF EfD center’s work on eco-certification was similarly wide-ranging. For example, Carolyn Fischer and a co-author published an analytical study of competing eco-labels. With support from the Swedish foundation Mistra and the US Agency for International Development, among others, Blackman and co-authors completed empirical assessments of forest and coffee certification, as well as an agenda for evaluating eco-certification of tropical agriculture.

Finally, RFF EfD researchers wrote more than a dozen papers on climate and energy topics. Energy in China was a prominent theme. Zhongmin Wang and co-authors published a symposium in Energy Policy on shale gas development in China. Anthony Liu and co-authors completed a study of a transportation policy in China. Wang and others co-authored studies of Chinese “green growth” strategies. In addition to this work on China, Carolyn Fischer, Siika-

maki, and co-authors completed papers on unilateral climate policy design, international emissions leakage, energy subsidies, border carbon adjustments, and carbon taxes. We look forward to an equally productive 2015.

Allen Blackman
RFF EfD coordinator and Senior Research Fellow

Allen Blackman, RFF EfD coordinator and Senior Research Fellow, Photo: Rolf Hallin



PUBLICATIONS

Peer reviewed

Blackman, A. Pfaff and J. Robalino. 2015. "Paper Park Performance: Mexico's Natural Protected Areas in the 1990s." *Global Environmental Change* 31: 50-61.

Blackman, A., M.A. Naranjo, J. Robalino, F. Alpizar and J. Rivera. 2014. "Does Tourism Eco-Certification Pay? Costa Rica's Blue Flag Program." *World Development* 58(1): 41-52.

Boehringer, C., C. Fischer, and K.E. Rosendahl. 2014. "Cost-Effective Unilateral Climate Policy Design: Size Matters." *Journal of Environmental Economics and Management* 67(3): 318-339.

Boyd, J., B. Epanchin-Niell, and J. Siikamäki. 2015. "Conservation Planning: A Review of Return on Investment Analysis." *Review of Environmental Economics and Policy* 9(1): 23-42.

Fischer, C. and T.P. Lyon. 2014. "Competing Environmental Labels." *Journal of Economics and Management Strategy* 23(3): 692-716.

Jardine, S. and J. Siikamäki. 2014. "Global Predictive Model of Carbon in Mangrove Soils." *Environmental Research Letters* 9 (10) 104013.

Krupnick, Alan, and Zhongmin Wang. 2014. "Introduction to the Special Issue: Current Energy Issues in China." *Energy Policy* 75: 107-108.

Lambin, Eric F., Patrick Meyfroidt, Ximena Rueda, Allen Blackman, Jan Borner, Paolo Omar Cerutti, Thomas Dietsch, Laura Jungmann, Penelope Lamarque, Jane Lister, Nathalie Walker and Sven Wunder. 2014. "Effectiveness and Synergies of Policy Instruments for Land Use Governance in Tropical Regions." *Global Environmental Change* 28: 129-140.

Milder, J., M. Arbutnot, A. Blackman, S. Brooks, D. Giovannucci, L. Gross, E. Kennedy, K. Komives, E. Lambin, A. Lee, D. Meyer, P. Newton, B. Phalan, G. Schroth, B. Semroc, H. Rikxoort, and M. Zrust. Accepted in 2014 for publication in 2015. "An Agenda for Assessing and Improving Conservation Impacts of Sustainability Standards in Tropical Agriculture." *Conservation Biology*.

Newell, R. G. and J. Siikamäki. 2014. "Nudging Energy Efficiency Behavior: The Role of Information Labels." *Journal of the Association of Environmental and Resource Economists* 14(4): 555-598.

Takeda, S., T. Arimura, H. Tamechika, C. Fischer, and A. K. Fox. 2014. "Output-Based Allocation of Emissions Permits for Mitigating the Leakage and Competitiveness Issues for the Japanese Economy." *Environmental Economics and Policy Studies* 16:89-110.

Tian, Lei, Zhongmin Wang, Alan Krupnick, and Xiaoli Liu. 2014. "Stimulating Shale Gas Development in China: A Comparison with the US Experience." *Energy Policy* 75: 109-116.

Yang, Jun, Ying Liu, Ping Qin and Antung Anthony Liu. 2014. "A Review of Beijing's Vehicle Lottery: Short-term Effects on Vehicle Growth, Congestion, and Fuel Consumption." *Energy Policy* 75: 157-166.

EfD Discussion Papers

Blackman, Allen. 2014. "Strict versus Mixed Use Protected Areas: Guatemala's Maya Biosphere Reserve." *EfD Discussion Paper Series* 14-08.

Blackman, Allen, Alicia Raimondi and Frederick Cabbage. 2014. "Does Forest Certification in Developing Countries Have Environmental Benefits? Insights from Mexican Corrective Action Requests." *EfD Discussion Paper Series* 14-09.

Miranda, Juan Jose, Leonardo Corral, Allen Blackman, Gregory Asner and Eirivelthon Lima. 2014. "Effects of Protected Areas on Forest Cover Change and Local Communities: Evidence from the Peruvian Amazon." *EfD Discussion Paper Series* 14-14.

Yang, Jun, Ying Liu, Ping Qin, Antung Anthony Liu. 2014. "A Review of Beijing's Vehicle Lottery: Short-Term Effects on Vehicle Growth, Congestion, and Fuel Consumption." *EfD Discussion Paper Series* 14-01.

Other Working Papers

Boyd, J. 2014. Measuring the Return on Program-Level Conservation Investments. *Resources for the Future Discussion Paper* 14-12.

Fischer, C., M. Greaker, and K.E. Rosendahl. 2014. Robust Policies against Emission Leakage: The Case for Upstream Subsidies. *CESifo Working Paper Series* No. 4742.

Banzhaf, S., Dallas Burtraw, Susie Chung Criscimagna, Bernard J. Cosby, David A. Evans, Alan J. Krupnick, and Juha V. Siikamäki. 2014. Valuation of Ecosystem Services in the Southern Appalachian Mountains. *RFF Discussion Paper* 14-16.

Ho, Mun, and Zhongmin Wang. 2014. Green Growth (for China): A Literature Review, *RFF Discussion paper* 14-22.

Munnings, Clayton, Dick Morgenstern, Zhongmin Wang, and Xu Liu. 2014. Assessing the Design of Three Carbon Trading Pilots in China, *RFF Discussion Paper* 14-36.

Books and Book Chapters

Blackman, Allen, Rebecca Epanchin-Niell, Juha Siikamäki and Daniel Velez-Lopez. 2014. *Biodiversity Conservation in Latin America and the Caribbean: Prioritizing Policies*. Published by Environment for Development.

Boyd, J. 2014. Ecosystem Services Evaluation. In *Encyclopedia of Natural Resources: Land, Taylor and Francis*, New York: 150-155.

Cosbey, A. and C. Fischer. 2014. International guidance for border carbon adjustments to address carbon leakage, in T. L. Cherry, J. Hovi, and D. McEvoy (eds.), *Toward a New Climate Agreement: Conflict, Resolution and Governance*. Routledge, UK. pp. 220-232.

Fischer, C. and S. Salant. 2014. Quantifying Intertemporal Emissions Leakage. In K. Pittel, F. van der Ploeg and C. Withagen (eds.), *Climate Policy and Non-Renewable Resources: The Green Paradox and Beyond*. MIT Press, Cambridge, Mass.

Fischer, C., D. Morgenstern and N. Richardson. 2014. Carbon Taxes and Energy Intensive Trade Exposed Industries: Impacts and Options, in Parry, I., A. Morris and R. Williams, eds., *Carbon Taxes and Fiscal Reform: Key Issues Facing US Policy Makers*. Washington, DC: IMF, Brookings Institution, and RFF.

Reports

Siikamäki, J. and F. Santiago-Ávila. 2014. Improving the Forest Database to Support Sustainable Forest Management: A Scoping Study Final Report. PROFOR (Program on Forests), the World Bank, Final Report, June 2014.

About EfD

THE EFD SECRETARIAT

The EfD Secretariat at EEU, University of Gothenburg, is the administrative hub of the EfD Initiative. The secretariat serves the EfD centers with research management, central communication functions, core support management and administration, and acts as an incubator for policy interaction issues to share experiences between the EfD centers and other relevant actors. Learn more about the functions of the secretariat, and meet the people, at www.efdinitiative.org/about-efd/organisation. Contact us at info@efdinitiative.org.

THE EFD BOARD

The EfD Board oversees the overall planning and organization of the EfD Initiative. It consists of the Directors/Coordinators from all nine centers, the EfD Director and the Chair of the EfD Research Committee. The Research Officer, Communications Officer, Program Officer and Project Coordinator also attend their meetings, but have no vote. The Board convenes twice a year, during the EfD Annual Meeting and the European or World Environmental Economics Congress.

RESEARCH COMMITTEE

The EfD Research Committee is made up of individuals who provide strategic and academic guidance to the EfD Initiative. According to the evaluation team, "A particularly notable aspect of the EfD research process is the strength of the Committee containing external international experts." The Research Committee prioritizes research themes, screens research programs, and allocates resources from the Research Fund. Members are nominated by Centers or the EfD Secretariat from amongst international leaders in relevant areas of the EfD Initiative's research themes, and are appointed by the EfD Board for a renewable two-year term. The EfD Board also appoints the Chair of the Research Committee. The Executive Director is an ex officio member of the Research Committee without vote. To learn about the current members of the Research Committee, please see <http://www.efdinitiative.org/about-efd/organization>.

DONORS AND PARTNERS

The Swedish International Development Cooperation Agency (Sida) provides core funding for the EfD Initiative, in total 15 million SEK in 2014. Other donors supporting EfD research include The Swedish Research Council Formas, The World Bank and the Canada-based International Development Research Center. Additional research funds totalled 1.5 million SEK in the past year. We are grateful for the trust and support provided by all donors and partners during 2014.

EfD partnerships build on the shared objectives of poverty alleviation and sustainable development. Dynamic partnerships at local, national and international levels provide an exchange of experience, promote best practices and facilitate interactions between academia and the policy community.

Key partners during 2014

The Green Growth Knowledge Platform provides an excellent opportunity for EfD researchers to reach out with their findings, and enables collaboration and knowledge sharing activities.

The Environmental Defense Fund and EfD shares experiences in using research in policy interaction

The Center for Research on the Economics of Climate, Food, Energy and Environment at the Indian Statistical Institute is a top-ranked research department that became an EfD partner in late 2014. CECFEE and EfD aim to strengthen the collaboration through joint research.

EfD also has close interactions with UN environmental and development agencies and with the Beijer Institute and the Stockholm Resilience Centre.



Environment for Development



THE WORLD BANK

Donors

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EfD in Ethiopia

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