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VOL 3 NUMBER 1 (2009)

- **Avoiding extinction: the future of economics**

New physical constraints emerged in the 20th century and are changing the decision criteria used until now. Two optimisation problems are equivalent: (1) maximising discounted utility with a long-run survival constraint and (2) maximising a new type of utility that treats the present and future equally. The latter originates in normative axioms introduced by the author in Chichilnisky (1996a), which capture the essence of sustainable development. The article shows that in the economics of the future, normative and positive goals converge: the axioms representing what we would like merge with what will be observed. The weight given to the long-run future is identified with the marginal utility of an environmental asset along a path that narrowly avoids extinction. No prior welfare criteria satisfy the axioms for sustainable development introduced by Chichilnisky (1996a; 1997). The implied decision criteria have practical implications for new forms of cost-benefit analysis, choices under uncertainty, optimal extraction of renewable resources and the optimisation of investment and trade. These preferences have been tested experimentally (Chanel and Chichilnisky, 2008) and identify the limits of nonparametric econometrics (Chichilnisky, 2009c).

DOI: 10.1504/IJGE.2009.026488

- **Book Review: Environmental Policy Convergence in Europe? The Impact of International Institutions and Trade by Katharina Holzinger, Christoph Knill and Bas Arts (Eds.)**

Environmental Policy Convergence in Europe? The Impact of International Institutions and Trade, by Katharina Holzinger, Christoph Knill and Bas Arts (Eds.). Cambridge University Press, 2008.

ISBN-10: 0521888816; ISBN-13: 978-0521888813

DOI: 10.1504/IJGE.2009.026495

- **Book Review: Globalisation, Democracy and Terrorism by Eric Hobsbawm**

Globalisation, Democracy and Terrorism, by Eric Hobsbawm. London, Abacus, 2007. ISBN 978-0-349-12066-9

DOI: 10.1504/IJGE.2009.026496

- **Economic growth and economic crisis**

This article argues that the recent financial crisis was caused largely by the long-term problem of the current world economy lacking a sustainable path of development. Limits to growth – expressed principally through rises in the price of oil and other commodities – created a crisis for the global financial system, which has been based essentially on the assumption that economic growth will continue indefinitely. A mismatch was thereby created between the real economy? and the finance sector.

DOI: 10.1504/IJGE.2009.026489

- **Power, political economy and environmental governance: staple chains as media of power**

This paper critically compares radical and reformist global commodity chain analysis with two other traditions: Canadian staples analysis and the analysis of filières. It considers what each can contribute to a critical analysis of essentially linear production and exchange complexes, particularly for the extraction and export of raw materials and semiprocessed goods. The article offers elements of a schematic model for such 'staple chains' and for the effective exercise of power through them. The article understands staple chains as media of power (Innis, [1930] 1970; 1936; 1954; McLuhan, [1964] 1965) and a problem of governance for environmentalists, fair-trade advocates and staple-chain stakeholders.

DOI: 10.1504/IJGE.2009.026490

- **Public finance and environment: correlations of selected taxes with pollution and CO₂ emissions in China between 1999 and 2006**

China's breakneck economic growth in recent decades was accompanied by visible environmental pollution and degradation. In the same period, tax revenues also increased sharply. Replacing existing taxes with the environment taxes called for by many environmental economists seems a promising solution to its environmental problems, but this needs more insight into the relationship of the existing taxes with the environment. The study of the relationship of the taxes with pollution and CO₂ emissions may offer the needed knowledge. This article will first explore the changes in China's pollution and CO₂ emissions and in selected tax revenues, and then examine the correlations between these changes. The findings of this study may help one to better understand the complex relationship between China's public finance and its pollution and degradation, and help justify and substantiate more effective and viable incentive-based solutions so that economic activities in the transition to a green economy may change the way they impact the environment.

DOI: 10.1504/IJGE.2009.026491

- **Rapid climate change: an overview for economists**

The possibility of future rapid climatic changes is a pressing concern amongst climate scientists. For example, an abrupt collapse of the ocean's Thermohaline Circulation (THC) would rapidly cool the northern hemisphere and reduce the net global primary productivity of vegetation, according to computer models. It is unclear how to incorporate such low-probability, high-impact events into the development of economics policies. This paper reviews the salient aspects of rapid climate change relevant to economists and policy makers. The main scientific certainties and uncertainties are clearly delineated, with the aim of guiding economics goals and ensuring that they retain fidelity to their scientific underpinnings.

DOI: 10.1504/IJGE.2009.026492

- **Traction in the world: economics and narrative interviews**

This article contributes to the methodological debate that is being taken up in green economics. A comparison with physics is used to argue that economics cannot be done as natural science, but must be done as social science using a set of methods tuned to the subject matter. Because of the nature of the data used, mainstream economics has insufficient traction in the real world – meaning that the data are sufficiently grounded in the world so that the comparison of models to data ensures the effective comparison of the model to the real world. Borrowing from realist social theory, narratives can have traction in the social world to the extent that they convey the internal conversations of key actors operational at the time under study as a real causal mechanism driving economic and social change. If, as Archer (1995; 2003; 2007) suggests, the internal conversation acts as a real causal mechanism mediating between structures and agency in the social world, then we need data that make that internal conversation tangible, giving us some traction in the real world of the actors involved. We can then perhaps compile knowledge from the data thus obtained or use it to evaluate various theories.

DOI: 10.1504/IJGE.2009.026493

- **Sex work: a survey of social, philosophical and human rights issues**

This paper looks at the social, philosophical and human rights issues around sex work, concluding that the so-called 'New Zealand model' of decriminalisation and labour protection is more compatible with the fundamental human rights of sex workers and the 'right of protection', which is one of green economics' key concerns, than the alternative models provided by Sweden or the USA.

VOL 3 NUMBER 2 (2010)

- **The costs of women's unequal pay and opportunity: transforming the unbalanced structure of our economy to meet the challenges of today: climate change, poverty and the twin crises of the economy and economics**

In the clamour to be green, it is often forgotten that women are more likely to be poor and earn less than men in all countries of the world. They have much less political, economic and institutional representation and are less present on the boards of the world's companies. If green economics means social and environmental justice, then gender must be included in all claims to be 'green'. This paper explores the gendered aspects of three formative aspects of the aims of green economics – poverty prevention, climate change prevention, and economic practise and reform. Highlighting gender absence, gender blindness, and gender justice, the paper explores how women are more likely to be victims of environmental change and of the economic crisis and it suggests how rebalancing of the structure of economics towards gender balance could possibly benefit everyone.

DOI: 10.1504/IJGE.2009.030988

- **Catastrophic risks**

Catastrophic risks are rare events with major consequences and of great interest to green economics. The article investigates the way economics deals with catastrophic risks. Classic expected utility theory is insensitive to rare events no matter how important these may be, based on the axioms of Von Neumann (1944), Arrow (1971) and DeGroot (1970/2004) that define proximity of observations in terms of 'averages' obliterating outliers. A new axiomatic extension to the theory of choice introduced new axioms that are sensitive to rare events, and characterised the criteria that these imply (Chichilnisky, 1996, 2000, 2002, 2010; Lawuers, 1993). These are expected utility combined with a new term that focuses on extremal events, explaining 'fat tails' and 'outliers'. Continuity based on 'the topology of fear' provides the required sensitivity to rare events (Chichilnisky, 2009c). Experimental evidence for the new axiomatic treatment is in Chanel and Chichilnisky (2009). The results relate to Debreu's (1954) work on Adam Smith's Invisible Hand and Le Doux's (1996) work on the neurological responses to fear.

DOI: 10.1504/IJGE.2009.030989

- **Moral reasoning about gender pay gaps**

In this paper, I practice using a pluralist approach to moral economy. Firstly, I summarise the main schools of thought about gender pay gaps. These include the marginal productivity theories, the human capital school, compensating differentials, institutionalist, feminist and Marxist viewpoints. I place my own work in a sustainable old-institutionalist school. I describe the normative and ontic assumptions of the various schools of thought. Secondly, a plurality of six complex moral reasoning strategies emerges from this review. The six moral reasoning strategies are the neoliberal growth strategy, human capabilities approach, redistribution approach, transformative approach, social equality approach and a Pareto-optimality approach. The study of these six strategies led toward the conclusion that we need more research on complex moral reasoning strategies. Scientific research can provide evidence to help people shape the moral reasoning that takes place in real-world dialogues and debates about this.

DOI: 10.1504/IJGE.2009.030990

- **Gender pay gap**

The article explains the origins of the gender pay gap as a Nash equilibrium of a game with incomplete information about women's work at home and in the marketplace based on the earlier results of Chichilnisky (2005, 2008a, 2008b). Expectations about women's lower market wages leads to the over utilisation of women in the household, and this, in turn, leads to lower productivity and lower wages for women in the marketplace. The situation is rational, but (as the prisoner's dilemma) it is generally Pareto inferior. Inequity at home breeds inequity in the marketplace and reciprocally, leading to a persistent gender gap. With learning by doing, at high levels of skill there is a Pareto superior equilibrium where men and women share efforts equally at home and receive the same pay in the marketplace, firms enhance their profits, and there is additionally more welfare at home. Updated Family Law and appropriate contracts can help resolve this Pareto inferior situation as well as increase productivity and economic growth in the economy as a whole (Pyle, 1990).

DOI: 10.1504/IJGE.2009.030991

- **Women migrant workers in China: grassroots NGOs facilitating empowerment?**

This paper discusses the current situation facing rural female migrant workers in urban China. It is the contention of the author that grassroots NGOs show very real promise as one source of support for such women. These workers, in spite of their immeasurable contribution to the country's economic growth, and their work which furnishes foreign consumers with cheap commodities, remain consistently low-paid, over-worked, marginalised and undervalued. The topic is dealt with in three sections: firstly an overview of the conditions that have prompted a rapid and sustained influx of migrants from rural to urban China during the last three decades; a summary of problems which many migrant women face; the final section will highlight the value of the burgeoning vitality of 'grassroots' NGOs in asking what can be done to support migrant women and to facilitate their empowerment. In the concluding remarks, the author will suggest areas which deserve attention in order to cultivate and harness the potential for NGOs to best work with and serve these women.

DOI: 10.1504/IJGE.2009.030992

- **The socio-cultural impacts of economic changes to matrilineal Garo society in Bangladesh**

An extension of the Garo hill towards south in Bangladesh along the mid-northern boundary with India is inhabited by a hill tribe called the Garo. They have a distinctive socio-economic background and culture. Their way of life has its origin in the uniqueness of the physiographic characteristics of the area which impelled them to live in isolation for long. But recently, with the initiation of different development activities in the area. A formal ban on jhum cultivation, severe deforestation, the intrusion of plainlanders and the intermingling with the latter due to improvement in transportation and communication facilities, various welfare activities of some Christian missionaries, etc. have brought about remarkable change in the socio-economic and cultural life of the Garo population. In this paper, the authors have tried to shed light on these particular issues with special focus on Modhupur sal (*shorea robusta*) forest area.

DOI: 10.1504/IJGE.2009.030993

- **The mother binary: fundamental conflicts facing women within the green movement, with reference to continental Green parties and the 21st-century ecofeminism debate**

The issue of whether caring, mothering, and nurturing is something to be escaped, celebrated, or androgynised presents particular challenges to feminists in the green movement. From the German Green Party in the early and mid 1980s to the Third World ecofeminists of today, the debate has proved a central site of unresolved conflict for a movement essentially concerned with ecology and nature. This paper explores the relatively new theory of ecofeminist citizenship, which seeks to value traditional female caring roles as an act of citizenship, and suggests that it offers significant possibilities for finding a way forward.

DOI: 10.1504/IJGE.2009.030994

- **An estimate of women's contribution to agricultural and regional communities in Australia**

The invaluable social and economic contribution that women collectively make is often undervalued and underestimated. This paper attempts to redress this to some extent, by providing a contemporary assessment of women's contribution to on farm work in rural and regional communities in Australia. As part of the analysis, women's contributions to on-farm activities, both their paid and unpaid work on farms was examined. Measures of the contribution of women in terms of their paid and unpaid on-farm work were calculated using values derived from specially constructed models. A thorough review of relevant research concerning the determinants of women's contribution to the agricultural sector is also incorporated. The findings presented are thus largely based on current research, with one of the main goals of the exercise being to provide more complete information regarding the contribution of women to agricultural and regional communities, to better assist future policy development.

DOI: 10.1504/IJGE.2009.030995

- **Gender discrimination in the construction industry of Bangladesh**

The construction industry in Bangladesh exhibits gender biases in many respects and for many reasons. Construction work requires physically strong labourers and that is why it is referred to as masculine work. Women construction workers are considered 'weak labour' in this sector. They are also regarded as unskilled, cheap, available and flexible labour. As a result of these gender stereotypes, women workers in Bangladesh's construction industry are appointed to do

simple tasks requiring the least skill, and in addition, as this sector does not offer them equal career opportunities, they also receive unequal pay.

DOI: 10.1504/IJGE.2009.030996

VOL 3 NUMBER 34 (2010)

- **Climate change: economics or science? The importance of the Copenhagen Summit. Technology innovation, reduction in carbon use or market trading and economic growth? The economics of the environment at a cross roads**

This paper introduces this special issue on the 'Economics of climate change' and describes contemporary policy attitudes in the economics of climate change, it explores features and differences in some examples from a variety of economic policy approaches in the run up to the Copenhagen Climate Conference. These include market based incentives, technological innovations, de-carbonisation and natural resource accounting as well as proposing that life style changes are necessary. The paper explains the significance of reaching agreement at the Copenhagen Conference and critiques some of the policies being suggested, (mainly in Europe) and some neo-liberal approaches to the economics of climate change. It puts forward a set of Green Economics policy ideas which are holistic, complex and multi-disciplinary and take a longer term perspective.

DOI: 10.1504/IJGE.2009.031320

- **Surviving Kyoto's 'do or die' summit**

This article sets out the importance of the Kyoto Protocol process to be decided at the Copenhagen COP XV Conference of December 2009. It clarifies the latest aspects of the clean development mechanism. It explains in practical terms, the relative negotiating positions adopted by developing and developed countries and possible impacts on world poverty. It presents two proposals that are win-win solutions and modest extensions of existing law. One is a financial mechanism that can help resolve the current impasse between China and the US – a conflict that is reminiscent to the Cold War in the last century. The second is a technological solution that is a small modification of the existing clean development mechanism to allow negative carbon technologies. This would allow poor nations to build power plants that reduce carbon in the atmosphere well beyond what they emit, encouraging economic progress while helping avert global warming risks. The funding can thus come from the Kyoto Protocol process – while increasing export revenues and technological employment in industrial nations – a win-win solution for the world economy. The paper warns about the costs of failure and the importance of the success of the Copenhagen process.

DOI: 10.1504/IJGE.2009.031321

- **Perceptions of stakeholder engagement – just what is it really?**

There is a wealth of literature available that discusses the theory of stakeholder management and engagement, and even lively debates about partnerships, but what does this all mean to the people who will be delivering it in the future, in particular, the students in higher education today. This paper is a meta-analysis which utilises material gathered through the use of class-based activities (debates, exercises and games) from undergraduate cohorts over a three-year period. The activities were designed to extract and collate student perceptions of stakeholder involvement. The research found that involving stakeholders was a complex activity with no easy solution and no single answer, and came to the realisation that what may be highly appropriate on one site was not easily transferable elsewhere. Whilst identifying the negative attributes of stakeholder management was an easy task, thinking through how to apply stakeholder engagement in a real life situation, especially when considering the sustainability agenda, was much more difficult. The majority felt that the current level of stakeholder involvement adopted at development sites was in reality inadequate (and found to be less 'engaging' than publicity material may suggest) and that more should be done to encourage partnerships and higher levels of engagement.

DOI: 10.1504/IJGE.2009.031322

- **The clash between economics and ecology: frames and schemas**

The central problem of the clash between economics and ecology is a clash of what psychologists call 'frames'. Frames are the set of values, norms, assumptions and theories we use to understand, even describe a situation. It is now recognised that one of the most important sources of intractable conflicts is a difference in frames between the participants. Ecology is

about systems, complex systems whose properties cannot be predicted from its components. Conventional economics is about individual economic actors. It does not even see systems. We need a different frame for economics. But frame changes are often best accomplished one step at a time. A framework which allows the emphasis on mathematics beloved of economics but which is also readable for the wider membership of the green movement is network analysis. It allows us to describe, mathematically, complex emergent systems, and yet graphically illustrates the flow of money and resources around the economy, just like water flowing through pipes. It reveals where money and resources end up and how the system sucks ever more resources in.

DOI: 10.1504/IJGE.2009.031323

- **Climate change policy and the social discount rate: political not ethical**

A prominent strand in recent discussions of climate change policy concerns the value of the social discount rate (SDR). Some argue that the parameters that determine the value of the SDR should be viewed as ethical parameters. Additionally, those who defend an ethical approach tend to believe that normative support for the value of the SDR should come from the general public's moral beliefs. However, it should be shown why a non-anthropocentric approach, one that bypasses what people think altogether, has no claim to determine climate change policy. I argue in this paper that a political, pluralist approach towards the determination of the SDR is required to take adequate account of non-anthropocentric points of view. However, once the SDR is viewed as political, rather than ethical, the policy model, of which the SDR is a key part, becomes of little theoretical or practical use.

DOI: 10.1504/IJGE.2009.031324

- **Reducing problems through reduced complexity? Considering the benefits and limits of economic perspectives on climate change**

Economic perspectives on climate change loom large since the publication of the commonly called Stern Report, Economics of Climate Change. A great number of studies subsequently employ similar approaches. Considering the huge uncertainties in climate science, however, these calculations raise a number of questions: How can costs and benefits of emissions reductions be assessed and compared for time frames up to 200 years? What is the basic rationality these studies rely on? And how can the high relevance of this perspective be explained? To answer these questions, this paper examines three corresponding studies and highlights their role for current political debates. The reduction of complexity in these studies allows for a certain economic perspective on climate change. Drawing on discourse theory, this perspective is located within a wider economic rationality within climate politics that suggests finance and investment as response strategies.

DOI: 10.1504/IJGE.2009.031325

- **Personal carbon trading and sustainable consumption: the art of the state**

Anticipating a new prominence for the carbon market and lifestyle change in post-2012 implementation of ambitious carbon mitigation targets in OECD countries, including the UK, this paper draws on Foucauldian scholarship to support an argument that personal carbon trading (PCT) may be consistent with New Labour's understanding of the role of the 'consumer citizen' in modern Britain, and that PCT may also prove to be an advanced tool for triggering and supporting some of the elusive behaviour change required by the demands of sustainable consumption in the context of climate change. The article proposes that PCT sits at the apex of a number of debates of interest to political ecologists, including climate change, sustainable consumption and individual freedom in an era of environmental constraints.

DOI: 10.1504/IJGE.2009.031326

- **Gender and climate justice**

The authors look at how to bridge the gap between science, technology and social justice in their examination of the gender dimension of climate change. The authors argue for the need to understand in both analysis and policy the profound link between gender and climate change. They ask in the context of the current search for ecologically justice how to take a nuanced gender approach to in sustainable development policy. The authors conclude that effective and enduring solutions to climate change will have to come from those who have protected the environment – indigenous peoples, women, peasant and family farmers, fisherfolk, forest dependent communities, youth and marginalised communities in the global South and North.

DOI: 10.1504/IJGE.2009.031327

- **Energy issue perception, responses and solutions from green economics: a discussion paper**

We currently rely on fossilised energy to power society. This comes at a cost, not only in financial terms, and not only to us as human beings, but also in non-financial and non-human terms. Among the concerns of green economists are the cost of energy as opposed to its price, high levels of direct and indirect consumption, the need for a redistribution of energy resources, and engendering a greater respect for the power of energy to change the world. To address the issues associated with energy such that an environmentally and socially just economic system can be developed, an action plan is required. The intention of this paper is to reflect on perceptions of and responses to energy issues, and to develop the elements and direction of an action plan for the energy sector in a green economy.

DOI: 10.1504/IJGE.2009.031328

- **The changing structure of the renewable industry – implications for a green transition to sustainable energy**

This paper investigates the transition process from carbon to renewable energy. How a transition occurs, whose values are solicited and whose voices are listened to will determine the contours of the future economy. Section 1 will briefly discuss the current contours of global energy. Section 2 will discuss the large international oil companies (IOCs) as a possible obstacle to the transition to renewable energy. Section 3 will discuss the current structure of the solar and wind sectors of the renewable energy industry. Section 4 will offer suggestions for green economics for a democratic and equitable transition. And Section 5 will offer concluding comments.

DOI: 10.1504/IJGE.2009.031329

- **A replacement for Trident – can the UK afford it?**

Cash shortages caused by the credit crunch will force the UK's next government to choose between replacing the Trident nuclear weapons system and meeting flagship social policy goals. Replacing Trident will be a high risk project because a long lead-in time means that changing circumstances may make new nuclear weapons far less relevant to national security needs by the time they enter service. Global climate change is emerging as a major future security challenge, but it is not clear what role nuclear weapons can play in addressing this threat. Expenditure on nuclear weapons could consume resources that might otherwise be used in the fight against climate change and climate change is itself one of the drivers which will influence the long-term affordability of nuclear weapons. The credit crunch is likely to magnify the risks associated with replacing Trident and compound pressure on the affordability of Britain's nuclear weapons.

DOI: 10.1504/IJGE.2009.031330

- **Perspectives of energy efficient housing: Estonia and other European nations**

In this paper the possibilities for greening the economy in the area of housing are discussed and the role of different level political administration are described. Some concrete numerical data on raising the energy efficiency of buildings is originating from a recently published (www.been-online.net) international project BEEN – Baltic Energy Efficiency Network for the building stock financed by the Interreg III B programme and carried out in seven countries around the Baltic Sea. The reasons for limited use of available funds for renovation are discussed. In spite of variety of technological innovations, the existing institutional system still needs changing. Comparison with experiences from other countries is used in the discussion.

DOI: 10.1504/IJGE.2009.031331

- **Where neoclassical economics fails: impacts on renewable electricity in the UK**

This paper explores the appropriateness and effectiveness of using a market-based governance system, in the form of the renewable obligation (RO) in the UK, to drive the uptake of electricity from renewable technologies. The paper will argue that neoclassical thinking around markets makes key assumptions on efficiency, effectiveness and equity that are not suitable for emerging renewable electricity technologies. The workings of the RO and the planned addition of a feed-in tariff (FIT) will be critiqued using alternative assumptions of the market under a green economic framework (Kennet and Heinemann, 2006). The paper discusses what a green economics vision of the structure of renewable electricity in the UK could be.

DOI: 10.1504/IJGE.2009.031332

- **Energy security, economic development and global warming: addressing short and long term challenges**

Energy security, economic development and averting global warming are conflicting objectives in a fossil fuel economy. In the long run, sustainable development requires a shift to renewable energy sources. In the short run it requires swift action (IPCC) and different strategies. The article

analyses a negative carbon process to co-produce electricity while reducing carbon concentration in the atmosphere (Jones, 2008, 2009; Chichilnisky, 2008b; Chichilnisky and Eisenberger, 2009; Eisenberger et al., 2009). While providing additional energy the process makes fossil power plants net carbon sinks. The article addresses short and long run challenges with this capability in the context of the economic incentives provided by the carbon market of the UN Kyoto Protocol, created by one of the authors in 1997 (Chichilnisky, 1993, 1996; Chichilnisky and Heal, 1994, 1995; Chichilnisky and Sheeran, 2009; Pagnamenta, 2009). We propose extending Kyoto's clean development mechanism (CDM) in a way that benefits Latin America and Africa (Chichilnisky and Heal, 1999; Chichilnisky, 1996), and analyse the global transition from a fossil to a renewable economy.

DOI: 10.1504/IJGE.2009.031333

- **Permeable (pervious) pavements and geothermal heat pumps: addressing sustainable urban stormwater management and renewable energy**

Water and energy are the two most fundamental ingredients of modern civilisation and are also the most precious and essential resources around the globe. They are inseparably coupled and with increasing pressures on these resources as the world's populations grow, the concepts of a combined approach can be applied while addressing the economic, climate, water and energy crises. Sustainable development depends on the efficient use of water and energy resources and on the widespread of water recycling, reuse and renewable energy. The use of permeable pavements with integrated geothermal heat pumps (GHP) for the treatment of urban runoff is a novel application and addresses the concept of concurrently reducing the carbon footprint for non-conventional heating and cooling systems whilst treating urban stormwater runoff. At the University of Edinburgh, Institute of Infrastructure and Environment, research is being carried out on GHP (ground source) and permeable pavement systems (PPS) to provide scientific evidence of their workability as a combined system for residential and commercial uses. The research enables decision-makers to assess public health risks, treatment requirements and removal efficiencies, and the potential for urban water runoff recycling as well as alleviation of flood risk.

DOI: 10.1504/IJGE.2009.031334

- **Heathrow campaigners – heading for a historic victory?**

The article assesses the reasons why the government may be heading for a historic defeat over its plans to expand Heathrow. It shows how the people and organisations campaigning to stop the expansion learnt vital lessons from past defeats. It highlights three key tactics the campaigners have used: building a wide-ranging coalition encompassing such diverse groups as local authorities and direct action activists, running a high-profile, pro-active, agenda-setting campaign and a willingness to challenge the government's economic arguments. The campaign is set against a background of peak oil, a deep economic recession and the threat of climate change.

DOI: 10.1504/IJGE.2009.031335

- **Book Review: Saving Kyoto: An Insider's Guide to What it is, How it Works and What it Means for the Future by Graciela Chichilnisky and Kirsten Sheeran**

Saving Kyoto: An Insider's Guide to What it is, How it Works and What it Means for the Future, by Graciela Chichilnisky and Kirsten Sheeran. London, New Holland Publishers Ltd., 2009.

208pp. ISBN: 9781847734310

DOI: 10.1504/IJGE.2009.031336

VOL 4 NUMBER 1 (2010)

- **The role of strategic health impact assessment in sustainable development**

Health is one of the main ways of judging effects on humans and is a component of the three overlapping dimensions of sustainable development: environmental, social and economic. Yet, the assessment of health impacts has been neglected as a way of arguing for the importance of policies to foster sustainable development or of evaluating policies from this viewpoint. Health impact assessment (HIA) is one way of trying to do this and has developed considerably in recent years, but its impact is small compared to the challenges that we face. In addition, time constraints and other limitations mean that the role of good quality evidence is not as prominent as it should be and collaboration between different types of expert cannot be adequately developed. It is proposed that a more thorough process should be introduced, 'Strategic Health Assessment' (SHA), that is not tied to particular capital projects and can therefore overcome

these limitations.

- **Book Review: Selling Olga: Stories of Human Trafficking and Resistance by Louisa Waugh**

Selling Olga: Stories of Human Trafficking and Resistance, by Louisa Waugh. Weidenfeld & Nicolson, 2006. 272pp. ISBN-10: 0297850709, ISBN-13: 978-0297850700

- **Determining the economic-environment relation: a regulationist approach**

Regulation theory offers a cogent analytical framework to explain the contemporary environmental challenge, capitalism's responses to environmental issues and the challenge of sustainable development to accumulation. The paper outlines the insights provided by this analytical framework and seeks to develop a regulationist approach to the ecological by building on two contributions directed at overcoming the past regulationist 'environment-deficit-syndrome'. It is contended that the economic-environment relation is not a social relation peculiar to capitalism but is given definition and form by the mode of regulation which secures accumulation. A method for empirical investigation of the economic-environment relation is proposed and it is concluded that the prospects for sustainable development are constrained to that which do not challenge accumulation. Thus, regulationist analysis can provide a more realistic picture of capitalism's challenges to be overcome to achieve the more equitable solutions sought by Green Economics to climate change, poverty and biodiversity.

- **Why do we need green economics when we have ecological economics? A proposal for 'pulling people together' at the crossroad of environmental and social sustainability**

This paper argues that the epistemological and intellectual space of green economics is or should be located where ecological economics, even in its socio-economic perspective, still fails to provide a coherent conceptual framework such that environmental problems could be analysed in a holistic and inclusive way. Based on explanations of this failure, this paper provides a brief but structured research proposal which is based on the potential convergence between various heterodox 'schools' and which espouses explicitly Green Economics' aims.

- **Measuring abundance: the case of Cittaslow's attempts to support better quality of life**

True economic advances promote abundance – the condition when all people feel that they have enough, and are enabled to live life as art, meaning self-expression to others. How can we assess whether particular projects are creating greater abundance? This question is addressed by reference to an actual attempt to improve quality of life: the Cittaslow network of cities, which began in Italy but now has member cities in a number of different countries. Are cities that belong to this network creating the conditions for greater abundance? Applying a list of criteria based on the concept of abundance to Cittaslow's charter and list of standards shows that issues of equity receive little attention, while issues of environmental quality and the stimulation of local economic development are addressed comprehensively. The analysis also shows that a list of criteria based on the concept of abundance can be used to pinpoint important policy gaps.

- **Pro-poor low carbon development and the role of growth**

Climate change adaptation and mitigation need to cut across all poverty reduction efforts, including any post-2015 architecture. However, low carbon development (LCD) debates to date have been mainly about high and middle-income countries. There are good reasons why even the poorest countries with low emissions might be interested in pursuing LCD. This article assesses the controversial role of growth for LCD. The article argues that we need to link up pro-poor policy debates with the low carbon debates as part of a post-MDG agenda. The paper explores several policy responses to LCD and analyses how pro-poor these policy responses are.

- **Indian women entrepreneurs and employment – local economic impact and lessons for green economics**

Research undertaken in South India (Taylor, 2008), investigated the local economic impact of small businesses and considered whether female entrepreneurs in India exhibit different economic behaviour to men. This involved in-depth qualitative interviews with 20 women's businesses and 10 men's, covering a range of small business types and locations in Mysore. The research investigated the effects each business had on employment, income and poverty alleviation. The research, grounded in the literature of gender and small businesses in India (e.g., Harriss-White, 2003) found differing employment patterns between male and female entrepreneurs (Taylor, 2008). The local economic impact of the businesses differed according to the gender of the owner due to the different spending imperatives of male and female entrepreneurs and the women they employ. The paper considers whether there is any evidence that the differing employment patterns of female entrepreneurs inform the emerging Green Economics agenda and

issues of sustainability.

VOL 4 NUMBER 2 (2010)

- **The care paradox: devaluing and idealising care, the mother, and mother nature**
Care work, such as that carried out by 'angelic' nurses, mothers, and other carers, is treated in a dualistic fashion: it is both idealised and poorly valued. The puzzling phenomenon before us is something of a paradox. The objective of this paper is to explain this hitherto unaddressed phenomenon. The explanation provided for the apparent contradictions draws on particular mechanisms inherent in the patriarchal system under which this paradoxical phenomenon occurs. Though the paper centres on care, nature is also both widely idealised and taken for granted. Thus, what is true of 'care' in our analysis is in more than one way also a story about 'nature'.
- **Inequality and the commodification of urban life: challenges to sustainable development in contemporary Brazil**
This paper presents a discussion about the unequal nature of the transformations in urban living conditions resulting from the prevailing neoliberal economic model in Brazil. In a historical perspective, it suggests that the social organisation in urban areas has been increasingly subordinated to the logic of the financial capital. As a result, housing markets and infrastructure services have been completely transformed into a locus of money and land commodification. In the current process of urban expansion, inequalities have been strengthened within cities overwhelmed by violence.
- **Exploring the operating efficiency of semiconductor industry by a sustainable development approach**
This study attempts to characterise performance in terms of a simple indicator (revenue) to a multi-dimensional systems perspective, which includes the development of eco-efficiency and the sustainable development indicator. The influence of Perfluorocompounds (PFCs) on the operating performance of the semiconductor industry is studied by using data envelopment analysis (DEA), which inherently recognises tradeoffs among various measures. Samples used in this study included 14 global semiconductor firms, each of which was treated as a decision making units (DMUs) under DEA analysis. The empirical result reveals that the overall technical inefficiencies of the firms are due primarily to pure technical inefficiencies rather than the scale inefficiencies. In addition, the results in this study indicate that the operating efficiency ranking changes when the amount of PFCs emission is considered in the analysis.
- **Linking environmental management systems with cost reduction in enterprises: an analysis of managerial responses**
The goal of this research is to find if and what types of costs have been reduced as a result of implementing environmental management systems and of what significance it was to the firms involved. The research suggests that one-third of the enterprises polled have managed to reduce costs. In most cases the reductions pertained to the costs of waste management as well as energy and water consumption. A further study revealed that the longer the time of system operation and the bigger the enterprise, the more likely it is to achieve cost reduction. It suggests that an enterprise is likely to achieve a cost reduction considerable enough to affect its economic performance and competitiveness if: 1) the enterprise's operations rely heavily on environmental resources; 2) organisational changes are followed by significant technological changes, as the former only lead to a slight improvement, in both environmental and economic performance.
- **Policy instruments for reducing greenhouse gas emissions from transport in Europe**
Transport is one sector of the European economy in which CO₂ emissions are still growing, both because transport demand as a whole is growing and because the most carbon intensive modes – air and road transport – are growing fastest. The experience of Britain in the last decade shows that these trends can be slowed or reversed, although Britain's success is only partly the result of deliberate policy. Tackling the problems of greenhouse gas emissions from transport will require a mixture of the use of price, regulation and investment. But more efficient transport pricing plays a key role; without it, the other measures will be far less effective.
- **Weak-form efficiency of European Union emission trading scheme – evidence from variance ratio tests**
In this paper, we applied single period and multiple period variance ratio (VR) tests to European

Union allowance (EUA) spot and futures data since their availability in June 2005 and April 2005 respectively up to the end of January 2010. Comparing Phase 1 (2005-2007) and Phase 2 (2008-2012), we find that the products traded in Phase 2 show weaker rejection against the random walk hypothesis than the products traded in Phase 1. We further divide the two phases into four sub periods, 2005/06/24 for spots and 2005/04/25 for futures to 2006/04/26, 2006/04/27 to 2007/12/31 as Phase 1, 2008/02/26 for spots and 2008/01/03 for futures to 2008/12/15 and 2008/12/16 to 2010/01/28 as Phase 2. It is revealed that even the products traded in the later stage in Phase 1 after the price adjustment on 26th April 2006 showed much weaker rejection than the primary stage of the market. Thus, it is proven that the market efficiency is improving from Phase 1 to Phase 2 and the market has turned more efficient after the adjustment on 26th April 2006.

- **Adjusting China's GDP: a green accounting illustration**

When green national accounts are calculated, environmental damage will have a negative impact on economic growth figures and therefore countries will be more likely to take potential damage into account when planning their growth path. Using China as an example, the following illustration will place monetary values on environmental problems and consequent health problems, using them to adjust GDP. The aim is to arrive at a figure for green GDP which will give a truer estimation of wealth and well-being.

- **Forest accounts: a primary case study in China**

Forest accounting considers physical and monetary data relating to the degree of substitutability for natural capital, and composes accounts for forest assets measured in physical and monetary terms to show the impact of the economy on the environment. It is extremely useful in formulating and evaluating macroeconomic and sectoral policies. This study has for the first time built up forest physical and monetary accounts for China and shows opening and closing forest assets balances and their related changes over the course of 1999-2003. The study indicates that the total stock value of forest lands and standing timber in 1999 was 4,301.30 RMB billion, and in 2003 was 4,887.80 RMB billion. The total flow value of forest resources from 1999 to 2003 was 533.47 RMB billion annually, but the trend of afforestation has slowed down in China. The study proposes that the values of forest ecological services should be considered and promotes forest resources used effectively and for sustainable development.

VOL 4 NUMBER 3 (2010)

- **Gender perspectives of the financial and economic crisis**

The crash of the financial markets 2008 has prompted numerous debates about the causes of the crisis and its impacts. However, the question of how the crisis is affecting men and women differently has tended to be marginalised. This paper proposes a framework for characterising and monitoring the main arguments which have emerged with regard to the role of gender in the crisis, both in the media and in gender research. It also examines the political responses to the crisis, especially the stimulus packages and the predictable impacts of planned austerity programmes, from a gender perspective. The paper argues that it is not only the impact of the crisis which has a gender dimension but also that main causes of the crisis have an important gender dimension. It concludes by highlighting the role of gender in the global financial architecture and proposing more extensive research in this area.

DOI: 10.1504/IJGE.2011.039731

- **The economic situation and (tentatively) prospects: September 2009 (revised)**

The paper analyses the evolution of the financial crisis as it spread throughout the real economy during 2009. It is argued that public funding of failed banks and financial institutions does not represent a path to a more stable financial system. It is also pointed out that structural international imbalances are not likely to be solved. In this context the link between green economics and the road to full employment must be sought in a different conceptual framework such as Joan Robinson's Accumulation of Capital.

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- **Green IT framework for small and medium scale Indian IT services companies**

The information technology (IT) industry has a vital role to play in abating the threat of climate change and global warming. Green IT is defined for the purpose of this paper, as a specific set of initiatives that IT companies are taking to optimise their resource-utilisation, with the aim of becoming environmentally sustainable. The literature suggests that there are many Green IT

frameworks available that can help companies to develop their Green IT strategies. It was also observed that Indian IT services companies, specifically that small and medium scale companies, operate in a different environment and that existing frameworks are not suitable for them. This paper proposes a more suitable Green IT framework using a sample of IT services companies in Bhubaneswar, India. The small and medium scale IT companies were defined as those which are not listed on any stock exchange – unlisted. An extensive framework was then developed and tested with six unlisted IT services companies in Bhubaneswar.

DOI: 10.1504/IJGE.2011.039731

- **Are ENGOS empowered through EU accession? The case of Maltese ENGOS**

Malta joined the European Union in 2004 and carried out vast changes in its environmental legislation during the process. Environmental NGOs have been key actors in this regard. This paper verifies whether Malta's EU accession has helped empower such organisations. The paper argues that EU accession has enhanced empowerment of ENGOS. This has occurred as a result of EU-driven policy and legislative reforms, leading to the institutionalisation of various ENGOS – especially if conservationist, but not if local or radical – through their participation in environmental reform. In addition, lobbying opportunities for ENGOS within EU institutions have increased. However, various factors constrain the ENGOS' empowerment, including neo-liberal ideology; political pressure from other lobby groups; and economic pressures. It should be qualified that empowerment has effected ENGOS differently, with conservationists gaining most, followed by sustainable development, radical and local ENGOS respectively.

DOI: 10.1504/IJGE.2011.039731

- **The social impact of liberalisation of plastic bottles in Malta**

This paper analyses the social impact of liberalisation of plastic bottles in Malta, wherein the system of returnable glass bottles has effectively been replaced by a system of disposable plastic bottles. The paper applies concepts such as Ulrich Beck's (1992) 'risk society', and Michael Cahill's (1994) 'consumer society' to the issue under research. A quantitative survey administered in two Maltese localities shows that whilst there is a wide-ranging opposition towards the plastic bottles system, at the same time, most respondents are not ready to make financial contributions for a better environment. Such perceptions are compared with those of European counterparts.

DOI: 10.1504/IJGE.2011.039731

- **The economies of the Baltic Sea Region in relation to green economics, with particular focus on Latvia: environmental sustainability and well-being**

Economic activity has an impact on the environment, but the potential degree of this impact will depend on several factors which are mainly determined by the technology used. This paper analyses the potential environmental impact the economies of the Baltic Sea Region have on their respective countries. The Baltic Sea Region countries are characterised by two economic development scenarios, namely, market and transition economies. Income levels, applied technologies and environmental management practices in these countries differ considerably, and affect a variety of complex indices. These are used to evaluate a country's overall environmental situation and the well being of its inhabitants. An examination of the Baltic Sea Region indicates that high income levels and a stable development path in the 'old' EU member states can provide the grounds for technological advancement to reduce environmental impact. The Baltic Sea and good neighbouring relations serve as a common resource and as facilitators for active cooperation in environmental issues in the region.

DOI: 10.1504/IJGE.2011.039731

- **Development and sustainability in contemporary Brazil**

In the current global crisis, the Brazilian 'pre-salt oil-fields' agenda, under the control of the state, could be considered a solution which supports the development pattern. Our purpose is to highlight the investment trends in the natural resources sector and the challenges to sustainability in contemporary Brazil. The article suggests that the relation between investment patterns and the development process in Brazil has exposed deep tensions related to the social dimensions of its ecological problems.

DOI: 10.1504/IJGE.2011.039731

- **Ecological modernisation as bureaucracy – organic food and its certification in the UK and India**

This paper seeks to analyse ecological modernisation using a focus on how bureaucracy contributes to constituting ecological modernities in the case of organic food trade in the UK and

India. Ecological modernisation is a way for business to apply ecological technologies to satisfy the demands of increasingly affluent publics for higher quality of life, including high environmental standards. However, a key part of the distinction between what can be called traditional agriculture and organic farming is in the certification system itself. This reflects Weber's assertion that modernity is associated with a rise of bureaucracy to regulate the expansion of the capitalist market. The organic food industry may be vulnerable to classic criticisms of ecological modernisation that it is merely ameliorating unsustainable growth, but it is also reducing the environmental impact of agriculture whilst improving the living standards of poor farmers.
DOI: 10.1504/IJGE.2011.039731

VOL 4 NUMBER 4 (2010)

- **"In the midst of economic disaster, can the USA still care about green accounting? Which is more important a sustainable economy or a sustainable environment?"**
The Obama administration has called for a heightened amount of transparency in financial reporting culminating from the recent debacle on Wall Street. Interestingly, as our economy wavers between recession and or depression, the worldwide economy is focused on gross domestic product or GDP which measures the total production and consumption of goods in our domestic economy (Curwood, 2004). How much transparency can there be reported when GDP does not include the costs of the 'greening of the economy'? Many of the costs and benefits associated with environmentally sound business practices are intrinsic in value and therefore difficult to place a realistic value on (Patrut et al., 2008) US generally accepted accounting practices or GAAP has resisted including contingent environmental assets to be reported on the balance sheet or environmental cost savings on the income statement because they have no GDP value (Fuld, 2009).
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Awareness of environmental limits has led to a proliferation of accounting methodologies designed to measure the impact of human activity on the earth's ecological systems and resources. Such methodologies can be collectively described as green accounting, and categorised in three different ways; first, by whose actions are being accounted for; second, by the time period being considered; third, by how environment impacts are measured. Current practice tends to focus on parallel reporting with financial accounting still having greater importance. Green accounting remains largely voluntary and unaudited. The key challenges for green accounting can be summarised as first to determining the scale of change in human activity required to prevent environmental degradation and incorporating some reference to these limits within its metrics, and second to be effective in prompting the necessary behavioural change within the necessary timescale.
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- **Sustainable development: equal treatment of the present and the future?**

This article provides two axioms that capture the idea of sustainable development, and characterises the welfare criterion that they imply. It presents a formal theory of sustainable development, created by the author (Chichilnisky, 1996a, 1997). The axioms require that neither the present nor the future should play a dictatorial role in society's choices over time. Theorems 1 and 2 show that there exist sustainable preferences which satisfy these axioms and provide a full characterisation. Theorems 3 to 5 study a standard dynamical system representing the growth of a renewable-resource economy, give a 'turnpike' theorem, and exhibit the differences between sustainable optima and the ones according to discounted utilitarianism. (JEL 013)

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The authors have used social cost benefit analysis (SCBA) to evaluate a sample of firms in Malaysia to investigate the claims made in support of financial liberalisation. Social prices rather than market prices are used as social prices incorporate both the growth and distributional objectives of the country. Contrary to theory, results showed that the pre liberalisation cases are more efficient in terms of achieving the country's objectives. It revealed that banks which employed market orientated mechanisms to allocate resources did not result in the resources being put to their best possible uses for the period studied. It is time every nation makes a conscientious effort at allocating its resources in a more efficient and equitable manner, in order to live within the boundaries of nature and the planet, putting limited resources to their best possible uses to help achieve a green economy.

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- **Towards a green economics approach to cost-benefit analysis**

Traditional cost-benefit analysis is based on a number of assumptions found in neo-classical economics. The paper argues that these assumptions could be considered to be deeply flawed. It suggests that these assumptions include a belief in perpetual growth and result in a particular

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- **The need to move to a qualitatively-improving steady-state economy to resolve the climate change dilemma**

The climate change issue is a policy concern that falls within the broader issue of sustainable development. Sustainable development means different things to different people. Green economists argue that sustainable development involves the adequate provisioning for people everywhere, of other species, and of the planet and its constituent systems. Essentially concurring with this view, ecological economists believe that achieving sustainable development requires the resolution of three major policy goals: (a) sustainable scale (ensuring the scale of the human economy relative to the supporting ecosphere is ecologically sustainable); (b) distributional equity (ensuring the distribution of income and wealth is equitable both within and across nations); and (c) allocative efficiency (ensuring the resources entering an economic system are allocated to their best possible use). Human-induced climate change is primarily the result of a failure to resolve policy goal (a). That is, in a world where economic activity is largely driven by the use of hydrocarbon (fossil) fuels, climate change is a consequence of the rate of resource throughput exceeding the waste assimilative capacity of the global ecosphere. Should the global economy continue to grow at its current rate, it is unlikely that renewable energy will be available in the quantities needed to reduce climate change-inducing emissions. For this and other reasons, the world's high-income countries must immediately make the transition to a steady-state economy – in effect, a non-growing but qualitatively-improving economy maintained by a declining rate of resource throughput. The movement by high-income countries to a steady-state economy would not only reverse the recent decline in their own well-being, it would provide low-income countries with the room required to enjoy a spurt of welfare-increasing growth before they, too, must make the transition to a qualitatively-improving steady-state economy.

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VOL 5 NUMBER 1 (2011)

- **The path to a sustainable economy: sustainable consumption, social identity and ecological citizenship**

Green economists have argued for years about the need to develop sustainable economies. Given the central focus on consumption activity in post-industrial economies, a change in attitude towards 'sustainable consumption' will be needed in order for societies to engage on a sustainability path. Among three approaches to sustainable consumption, it is argued here that only the ecological citizenship approach is truly compatible with sustainability; however, it is also the approach that requires the most profound socio-cultural changes. Based on a critical realist notion of a relational society, this paper contends that significant changes may be needed to socio-cultural structures that currently legitimise consumption growth as an engine of progress. Because the goal of a sustainable economy is to improve and maintain human well-being, policies and institutions seeking to foster pro-sustainable behaviour, such as an ecological citizenship curriculum in education, may be necessary to avoid future environmental, economic and cultural crises.

DOI: 10.1504/IJGE.2011.039725

- **Is there a role for contemporary practices of askesis in supporting a transition to sustainable consumption?**

This article draws on recent Foucauldian scholarship and Michel Foucault's writings on askesis (from the Greek: ἀσκησις, askesis, 'exercise' or 'training?') to explore the emerging role of contemporary mindfulness practices and associated teachings in advancing our understanding of consumerism and promoting sustainable consumption, as lifestyle change is forced up the international policy agenda by climate change (IPCC AR4, 2007). The article bridges a number of current concerns at the heart of green economics, namely the critique of consumption, well-being, mindfulness and an appreciation of the consumer-citizen as a site of critical opposition to consumerism as biopolitics. The article investigates Zen meditation practices as a contemporary form of askesis consistent with the transformations sought in our current relations with the material world as mediated by an all-pervasive culture of consumerism. The article draws on a series of interviews conducted by the author with noted Zen teachers based in the USA and Europe.

DOI: 10.1504/IJGE.2011.039726

- **Act first, ask questions later: the cognitive-behavioural implications of the liberal model of freedom**

Recent events in the Gulf of Mexico have revealed that major oil companies were not prepared for what happened. Their preparations suggest a "do first, worry about it afterwards" attitude. Schemas are cognitive structures which have strong, often unconscious, effects on thought, behaviour and group functioning. The writings of John Stuart Mill are taken as a significant source for our cultural tradition of liberalism and the model is considered in the light of knowledge about schemas. It is suggested the limited causal schema implied in Mill's writings informs a model of individual freedom that no longer works for a large scale interconnected society and that for the sake of those who may be harmed by the actions of others we must begin to articulate a new one.

DOI: 10.1504/IJGE.2011.039727

- **What is 'green' in the green new deal – criteria from ecofeminist and post-Keynesian economics**

This article aims in general at further fulfilling the ambition of green economics to be a holistic paradigm synthesising and integrating a diverse set of heterodox economic approaches and philosophies. In particular, it addresses the current lack of macroeconomic and more specifically post-Keynesian short run theories in green economics. This new paradigm is in its essence a radical ecofeminist approach to economics. From this vantage point, the ecofeminist framework of (re)productivity developed by Biesecker and Hofmeister is indeed very congruent with green economics. Moreover, the goal of the article is to develop normative (ecofeminist) criteria for green stimulus packages. This could improve green economic policy formulation and real-world implementation [Turk, (2008), p.267].

DOI: 10.1504/IJGE.2011.039728

- **Exploring the link between development and migration in Ethiopia**

Situated in eastern Sub-Saharan Africa, Ethiopia has one of the highest diaspora populations in Africa. There are several challenging issues (political and socio-economical) causing fluctuating migration patterns in the country, which hinder economic progress. The aim of this paper is to present these issues, focusing on common factors such as war, famine, drought, and government intervention. It also seeks to address the implications of the brain drain in respect of economic progress. The loss of skilled workers aggravates the stagnation of Ethiopia's economic development. In addition, the paper will also question the role of climate change in economic development critically examining the Gilgel Gibe III project. Finally, the paper will conclude by suggesting solutions to these problems.

DOI: 10.1504/IJGE.2011.039729

- **The overexploitation and illegal trade of *Prunus africana* in the protected areas in the light of international environmental law (a case study of the Democratic Republic of Congo)**

The increasing demand in natural resources for various reasons has driven humanity to unsustainable consumption of natural capital. Meanwhile, the emerging concept of sustainability, which emphasises on the intersection and balance between economy, society and environment, is becoming a gospel. The Brundtland report defines sustainable development as "development, which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). Hence, two ethical elements have been drawn: the intra-generational justice or equity and the inter-generational justice. The latter element of the inter-generational justice, which links with the concern for future generations, is a key point in international environmental law. Therefore, this study will cover the overexploitation and illegal trade of *Prunus africana* in Virunga and Kahuzi-Biega national parks in the Democratic Republic of Congo (DRC) and the legal framework which regulates the preservation and trade of wild flora and fauna under the convention on International trade in endangered species of wild flora and fauna (CITES) from 1996-2009.

DOI: 10.1504/IJGE.2011.039730

- **Industrial development and the trade-off to environment: measurement techniques, meanings and outcomes in the context of water poverty in Egypt**

Industrialisation is one of the main pillars of economic development but it is usually associated with significantly negative impacts on the environment. Environmental damage impedes development efforts; destroys resources; especially water; and redirects government objectives towards reducing pollutants emission. This study aims to estimate the pollution load for the industrial sectors in Egypt using industrial pollution projection system (IPPS), with respect to employment. These projections are based on the four-digit levels in the international standard industrial classification (ISIC). The purpose of such estimation is to provide an assessment to quantify the effects of the industrial pollution in Egypt, to guide the regulatory framework with information to prioritise its monitoring efforts, and more efficient managing of resources. It also addresses the potential consequences of industrial pollution on water poverty.

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VOL 6 NUMBER 4 (2013)

- **The role of human development on deforestation in Africa: a modelling-based approach**

The rate of deforestation in Africa is of paramount concern not only to the future of Africa, but also to the world. This study uses country-level data to model changes in forest area over an 18 year period (1990-2007) in 35 African countries and investigates the role played by important development indicators of human development. The results reveal that the net loss of forests was 0.19% every year between 1990 and 2007. Human development, which involves life expectancy, education and income, is found to have a positive effect on forest growth and conservation, while logging trees for wood fuel is a significant cause of deforestation. Using generalised linear mixed models and generalised estimating equations, it was possible to calculate expected estimates of forest area for 2010, 2020 and 2030 under the assumption that nothing is done to change observed trends.

DOI: 10.1504/IJGE.2012.051493

- **Happiness and air pollution: evidence from 14 European countries**

The causal relationship between happiness and air pollution is examined using a sample of 14 European countries. Two sets of results are presented using the notion of Granger causality. For

individual countries, the existence of a unidirectional or bidirectional causal structure for almost half of the countries can be observed. The panel approach, on the other hand, provides some support for the existence of bidirectional causality between happiness and air pollution for the region taken as-a-whole.

DOI: 10.1504/IJGE.2012.051492

- **Urban green compensation**

Green compensation is an alternative approach towards urban-green-planning. Green-compensation is defined as replacing or relocating green space values in an urban area, an action to ensure quality enhancement and protection of urban green spaces. Due to increasing pressures of urbanisation and population growth, the concept of green-compensation is gaining importance in planning approaches. The aim of this paper is to evaluate the urban green compensation concept within the urban planning perspective. From literature research and case studies conducted it was concluded that green compensation can be successfully realised in qualitative and quantitative ways, but are subject to specific urban green space values which is bounded to the locality. Green-compensation is an approach to guide sustainable planning by ensuring qualitative living spaces, as the practical implementation thereof will lead to integrated development planning where spatial planning and environmental management are interlinked.

DOI: 10.1504/IJGE.2012.051494

- **Validation of green IT framework for implementing energy efficient green data centres: a case study**

The research highlighted in this paper is based on the results obtained from a case study performed in different tier level data centres in Pakistan to test the validity, reliability and credibility of proposed green IT framework for implementing green energy efficient data centres. The results clearly indicate that proposed framework is valid, flexible and easy to implement at any tier level data centre. It considers all issues related to green data centres and helps data centre managers to implement proposed framework, to save power consumption and reduce the emission of greenhouse gases to lower the effects of global warming. The framework uses latest energy saving techniques like virtualisation, cloud computing and green metrics to achieve greener data centres.

DOI: 10.1504/IJGE.2012.051499

- **Green ergonomics and green economics: the effect of feed-in tariff schemes on user behaviours and attitudes towards energy consumption**

On 1 April 2010 the UK government introduced feed-in tariff (FIT) legislation to provide incentives for small-scale renewable energy generation, particularly by residential home-owners. This paper investigates the existing knowledge base to consider if living in a property with on-site renewable energy generation may affect user attitudes and behaviours. This knowledge is interpreted from an ergonomics/human factors perspective whilst also addressing underlying economic issues. Suggestions are made as to what effects FIT schemes may have on public attitudes and where further research efforts should be focused. A key finding is that FIT schemes are likely to result in a shift in public behaviour, particularly towards reduced energy consumption but only if initiatives address fundamental issues of green ergonomics and green economics.

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- **Reduction in carbon emissions in the Brazilian agricultural value chain through a decrease in transported volume**

Privileged characteristics have helped Brazil to consolidate itself as a leader in agricultural exports. These exports, however, have unique characteristic. They are heavily focused on commodity items, its production areas are relatively far from seaports and its transport matrix is strongly focused on road transportation. This combination of factors brings several environmental impacts. Popular alternatives to reduce them include replacing traditional diesel for green fuels, such as biodiesel, or changing the Brazilian transport matrix, concentrated on roads, to less polluting train and river transportation. There is, however, a third option to be considered. Not broadly discussed yet the focus of this paper: a change in Brazilian agricultural exports currently focused on food commodities to one oriented to the export of value added food products. There, carbon reduction would be achieved through a reduction of transported volume, a natural consequence of the industrial transformation process required to produce value added items.

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- **Quantifying of farmers' acceptance and perception in developing kenaf, Hibiscus cannabinus, industry in Malaysia**

Kenaf is a new crop to farmers in Malaysia. Although kenaf has much potential as an alternative raw material to wood fibre, the cultivation is developing at slow pace. This paper aims to gather farmers' acceptance and perceptions on developing kenaf as a new industry. A survey to registered Kenaf farmers was conducted in the East Coast region of Malaysia through structured questionnaires and personal interviews. Factor analysis result shows that there are five elements that contribute to the farmers' acceptance levels, which are; level of satisfaction and knowledge, kenaf programme's performance and resource availability, availability of land and crop protection, and industrial linkages. Out of these elements, only the first two elements are highly significant to the level of acceptance on developing the kenaf industry. The results contribute to a better understanding of factors that significantly affect farmers' acceptance in developing a new crop in Malaysia.

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