

EVALUATION AND ENVIRONMENTAL DEMOCRATIZATION OF URBAN GOVERNANCE**Alessandro Bonifazi**

Technical University of Bari

a.bonifazi@poliba.it

This doctoral research aims to contribute to the academic debate about whether and how evaluation is fostering the environmental democratization of urban governance in the European Union. The dissertation starts with identifying a long-lasting intellectual stalemate regarding the extent to which democratic forms of governance are able to address and tackle major environmental issues. It is argued that, once civil and political rights have been secured in a society (and that is the case in the chosen research context), democratization may further advance in terms of authentic political participation of different groups, and the coming under public scrutiny of previously neglected issues. Although these advancements may well occur within the state, a wider perspective on the polity in general may highlight emerging spaces of democratization at the crossroads where representative and non-elected authorities, civil society and market actors meet up.

Environmental democratization is defined as a progress along three complementary processes: increasing franchise, expanding scope, and fostering authenticity. Three key environmental issues (namely voicing non-human agents, settling on the distribution of environmental pros and cons, and coping with socially disrupting risks) cut across environmental democratization processes. A mixed conception of democracy, both procedural and substantive, underpins the resulting model.

As for evaluation, current environmental assessment systems are first reviewed to point to both strengths and weaknesses. Cross-fertilization with other evaluation traditions, including evaluation in planning and policy and programme evaluation, leads to a more articulated understanding of environmental evaluation that entails co-production of knowledge and action within governance networks, a mix of analytical and deliberative methods, and openness to multiple value systems.

The interface between urban governance and environmental evaluation is then conceptualized by focussing on the framing role through which evaluation may influence both governance networks and discourses. More precisely, this alleged influence is discussed by resorting to a typology of different forms of environmental evaluation for democracy, each mirroring a well established approach to describing democratic practice: the elitist, the participatory, and the deliberative.

The empirical work develops in three directions. First, a survey of 23 strategic environmental assessments (SEA) of Italian spatial plans (plus a pilot comparative analysis with 10 English cases) was carried out by applying a

systematic analysis matrix (made up of three governance dimensions, 17 key concepts and 78 indicators) to relevant evaluation documents (environmental reports, administrative and planning acts, public hearing's minutes, media clippings, etc.). Findings point to a limited contribution of SEA to providing creative solutions to the friction between economic and environmental imperatives, whereas interesting developments in environmental policy integration occurred across planning levels, administrative sectors and disciplinary boundaries. As for democratization processes, SEA seems able to improve public consultation and decision makers' accountability. In general, SEA influence looks greater in those aspects that reinforce current trends in spatial planning (such as reflecting on carrying capacity, promoting energy efficiency and fostering communication), rather than attempt to induce more radical shifts (e.g., advancing environmental justice, curbing urban sprawl, and involving disadvantaged groups).

Second, attention was turned from practices to systems, based on the assumption that the former are partly structured by the latter, because of variations in legislative frameworks, available expertise, administrative and professional culture, socio-political conditions. A comparison between two Italian regions (Apulia and Piedmont) was based on profiles of the respective systems (according to a detailed checklist) and semi-structured interviews with planners, evaluators, policy-makers, public officials, and representatives of civil society. The investigation was further expanded to England (via the profile alone) to account for a completely different political and cultural setting, though the homogenizing influence of the common EU legislative framework proved relevant. In Italy, a remarkable regional diversity - in institutional capacity, governance dynamics, planning systems and strategies for the introduction of SEA - blends with national coordination efforts. Across Europe, there seems to be a trend to steer SEA systems towards providing procedural assurance rather than re-tracking spatial planning. Nevertheless, SEA systems may nurture important innovations: although most attention is directed to processing information, other processes seem to be already at work, such as enhancing the role of environmental advocates within organizations and opening up planning to pluralist politics.

Third, an in-depth analysis of the interplay between environmental evaluation and urban governance in a specific Italian city (Taranto) aimed to unravel the synergies among six forms of environmental evaluation and to help explain how these may interfere with urban governance dynamics. The adopted methodology combined a systematic analysis of evaluation documents with a series of semi-structured interviews. The results suggest various reflections. The links between different forms of evaluation are extremely weak, save for a relatively growing role played by the environmental baseline information that is slowly building up, and capacity-building processes - especially evident within the Regional Environment Protection Agency and platforms of local NGOs. A critical factor to enable actual participation into evaluation processes seems to lie in the distributed nature of knowledge and skills, which could be described as emerging properties of organizations and networks. Such networked expertise took shape, for instance, with respect to persistent organic pollutants, by connecting the hands-on experience of workers with the analytical accuracy of scientists and engineers, and the communication strategy of social activists. Finally, no ideal type environmental evaluation for democracy matched the dominant traits in the observed practices, which revealed instead interesting similarities with the theory of agonistic pluralism.

When observations from the different empirical strands are contrasted with each other, some tentative reflections may be drawn that verge on a widespread tendency to keep evaluation systems within the boundaries of highly procedural, merely consultative, and mildly reactive practices. Though only scant traces of an inducement of ecological rationality through evaluation were detected, there are signs of an on-going institutionalization of environmental concerns, predominantly articulated in terms of administrative rationalism and democratic pragmatism. As for substantive issues, environmental evaluation appears poorly cognizant of distributive effects and inequalities, tends to handle risk with care – as it often generates intractable conflicts, does not indulge on the implications for non-human entities, and could partly challenge some vested interests (economic rather than political).

Overall, a possible role of evaluation in fostering environmental democratization may be assumed along differentiated time perspectives: in the short term, evaluation seems to be effective when consistent with the prevailing governance mechanisms (e.g. improving accountability of competing administrative elites, staging multilevel governance relationships); in the longer term, and over iterative rounds, learning and empowerment may significantly affect the “play of the game” by the most dynamic social networks, a possibility corroborated by strong evidence especially with respect to the rise of e-democracy. Hence, environmental evaluation - from this research’s limited standpoint – seems to be framed into elitist conceptions of democracy, and yet hints to agonistic pluralism and associative democracy are widespread, whilst deliberative approaches are more difficult to trace. Under a “connected intelligence” hypothesis, the original distinction between franchise and authenticity tends to get blurred, and could be replaced by a relational understanding of active environmental citizenship whereby awareness, competence and willingness to participate in evaluation, are interwoven properties of networks, rather than of individuals alone.

CORPORATE CARBON REPORTING: DO LEADING PRACTICES IMPLY LEADING EMISSIONS REDUCTIONS?

Anne Dickson

University of Sidney Business School

a.dickson@econ.usyd.edu.au

Participation in schemes to guide and assess public disclosure of corporate sustainability practices have become common corporate practice. Often these schemes associate a leadership ranking with corporations who achieve a certain standard of disclosure. This paper investigates the association of leadership in the public disclosure of environmental management practices with reductions in corporate greenhouse gas reductions.

The development, implementation, and use of voluntary environmental management disclosure schemes represent considerable social projects. The schemes typically have both a primary and a secondary aim. The schemes firstly seek to enhance transparency regarding the sustainability and climate change risks and impacts associated with large corporations. This is an important concern for corporations in the management of different stakeholders including investors, employees, government and the general public. Presenting an appropriate image of corporate action relates to a variety of reputational and regulatory risks that corporations face with regards to climate change (Bebbington et. al., 2008). To varying extents, reporting scheme developers also have a second intention of

promoting a consequential reduction in environmental risks at both the level of the company and the wider society. The first aim is evaluated directly by the schemes. The schemes however are silent on an assessment of the environmental outcomes achieved.

That these schemes leave their intended consequences unevaluated is of concern for several reasons. The attribution of a leadership ranking to certain practices serves to standardise those practices as the benchmark for other corporations to follow (Espeland & Sauder 2007). Should these practices not deliver improved environmental outcomes, the schemes not only fail to achieve the consequential aim of environmental improvement, but they are in danger of embedding practice norms that are difficult to replace with more environmentally effective practices (Kolk, Levy & Pinsk, 2008). The attribution of leadership also carries with it a certain legitimacy which firms may use to gain a seat at the table in public policy negotiations, enhancing their power to negotiate more favourable outcomes.

This paper aims to shed some light on the association between leadership practice and greenhouse gas emissions outcomes. Determining leadership in achieving greenhouse gas emission reductions presents a range of technical measurement challenges that include comparability between firms due to differences in emissions profiles and methods of measurement (Kolk, Levy & Pinsk, 2008); consequential shifts in emissions elsewhere in an organisation's supply chain due to shifts in production practices and potential consumption increases of more energy efficient and less costly products (York and Rosa 2003). These issues may in part explain the absence of the schemes' evaluation of environmental outcomes and dealing with the full range of these measurement challenges represents a research effort beyond the scope of this paper. However, the paper does present the initial results of a more modest research effort that aims to find linkages between leadership in environmental practice and leadership in greenhouse gas emissions reductions.

The research data set is an integration of the emissions intensity of the top 100 listed companies on the Australian Securities Exchange (ASX) with the companies' leadership attribution from the Dow Jones Sustainability Index (DJSI), the Carbon Disclosure Project (CDP) and the Global Reporting Initiative (GRI). The emissions measurement is from the 2008 and 2009 company reports to the Australian Government under the National Greenhouse and Energy Reporting System (NGERS). The NGER system mandates standardised reporting by companies over certain emission thresholds. For comparability between companies and time periods, annual revenue was used to determine intensity and economic sector was used to determine comparable activity profiles. The preliminary statistical analysis using multivariate regression finds no association between being classified as a sustainability or carbon disclosure leader and greenhouse gas emissions intensity; and the question of the extent to which companies perceived to be leaders are also leaders in emissions reduction remains outstanding.

Based on this result, the paper concludes with recommendations for two directions for further inquiry. The first line of inquiry considers options for improved data collection and analysis to validate the results of this initial analysis. The second line of inquiry assumes the preliminary results of this study are validated by further investigation, and asks the following research question: Are there aspects of these disclosure schemes when viewed as a social project that deliberately inhibit the ranking of companies as leaders being associated with leading improvements in environmental outcomes?

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COLLABORATIVE PRACTICES: EXPLORING NEW WAYS OF PREVENTING AND COPING WITH FOREST FIRES

António Patrão

CES-Universidade de Coimbra

antoniopatrao@gmail.comAbstract

Objectives: Following the environmental, economic and social impacts of the 2003 catastrophic forest fires in Portugal, national agencies developed a systematic plan aimed at increase the resilience of the Portuguese territory to forest fires. One of the main challenges facing decision makers as they formulate state and local risk mitigation programs is how to change the behaviors of private property owners regarding risk mitigation measures that involve actions in private property. Therefore, this exploratory study was designed to examine the public attitudes toward fire prevention measures encompassed in the National Plan of Forest Fire Defense. Results contribute to assess people level of knowledge and compliance with the program, therefore identifying possible obstacles to the program effectiveness. Insight into more effective strategies for risk reduction is important to public policy theorists, public decision makers and community stakeholders.

Methods: The study was developed in a small mountain rural community in the District of Coimbra (Center Region of Portugal), named Piodão, which have experienced several catastrophic forest fires, (the most recent one in summer of 2005). The sample comprised 20 participants (10 male, 10 female), ages ranging between 24 and 77 years old (mean age = 46,35 years old), all of them were local residents. Data were collected using a survey, including the following domains: i) socio-demographic data; ii) property regime/land use; iii) response to forest fire; iv) attitudes towards prevention and forest fire risk reduction. Data were analyzed through descriptive statistics.

Results and Discussion: Main findings suggest a positive tendency of public awareness and compliance with the program: people are informed about and accept the plan recommendations/actions, expressing their desire for more information, especially through media and public discussion. Among all measures, publicitation of forest fire risk, fuels management and rural burns restrictions in critical periods of risk, show the highest levels of public agreement. However structural measures, both at national, district and local level, are less known and there is a negative perception of the practical implementation of the program regulations, which may represent an obstacle to program effectiveness.

Conclusions: This study used a small sample in a specific context, and so future research should analyze variations with gender, socio-economic status, income, educational level, and residency (rural, urban, peri-urban). Overall, results point out the need to study the values, local knowledge, and patterns of behavior of local communities towards forest fire coping and prevention within the development of a collaborative practice model.

Keywords: forest fires; risk mitigation and perception; public attitudes; collaborative practices.

MARKETS FOR BIODIVERSITY CONSERVATION: CONFLICTING IDEAS OF NO NET LOSS

Carlos Ferreira

University of Manchester

carlos.ferreira@postgrad.mbs.ac.uk

Biodiversity loss has been identified as a major sustainability problem, generating extensive policy interest (MEA 2005). Part of the cause for this loss is the public good characteristics of biodiversity, which results in a generalised lack of incentives for conservation – a situation described as market failure (TEEB 2010a; TEEB 2010b). The creation of market-based mechanisms for the mitigation of biodiversity loss – biodiversity offsetting – has been proposed as a mechanism to help stem the rate of biodiversity loss, helping achieve no net loss of biodiversity from development and land-use change (ten Kate et al. 2004; ten Kate & Inbar 2008). This paper looks critically at the concept of no net loss of biodiversity, comparing and contrasting two perspectives: the first is a model of static efficiency, based on Neoclassical Economics; the second looks at changes to the Instituted Economic Processes relating biodiversity conservation, based on insights from Economic Sociology and Economic Anthropology. In the static efficiency model, human life, activity and economy are underpinned by an array of products, goods and services obtained from nature and contributing to human welfare – ecosystem services (Constanza et al. 1997; Daily et al. 1997; Balmford et al. 2002). Biodiversity, because it underpins ecosystem services, is a source of utility (Heal 2000) – a view described in the literature as the anthropocentric view of nature (Fromm 2000; Pascual & Perrings 2007; Wallace 2007; Fisher et al. 2008). The problem is one of allocation of resources: to decide on how much to develop and how much to conserve, considering individuals' preferences and within the feasible social and ecological outcomes. In this tradeoff, economic efficiency is achieved when no individual in society can be made better off without any other losing utility as a consequence – a situation known as Pareto efficiency (Kreps 1990; Perman et al. 2003; Besanko & Braeutigam 2005). If such an efficient equilibrium is reached, the marginal rates of utility substitution between development and conservation is equalised, and the market reaches the best possible outcome. Conservation is efficient, and society is providing to obtain the preferred amount of conservation. In the Instituted Economic Processes perspective we recognise that biodiversity is not an easily commodified good or service (Castree 2008), but a bio-socioeconomic and technological continuum, which constitutes a good proxy for nature. Nature has long been managed by humans, and its relationships with both the economy and society are instituted differently in different locations (Ostrom 1990). Market emergence is described as a framing of externalities (Callon 1998; Callon 1999), an historical phenomenon of changes to instituted economic processes (Polanyi 1957), whereby

hitherto-unmarketed goods are brought into the fold of the market (Polanyi 1944). The transformations to instituted economic processes depend on changes to the relationships between four processes: production, exchange, distribution and consumption (Harvey and Randles 2002; Harvey et al. 2002). Questions of scale emerge, as local-scale conservation is confronted with global free trade the outcomes it produces. We expect institutional diversity on the emerging schemes (Boyer 1997; Hollingsworth & Boyer 1997; Boyer 2005) and different forms of commodification and exchange at different scales (Appadurai 1986). Different agencements (Muniesa et al. 2005), such as the proliferation of images related to conservation (Brockington 2009; Igoe 2010), and market intermediaries (Howells 2006; Medd & Marvin 2006; Randles and Mander 2010) are poised to help determine the different forms in which exchange is instituted. In order to compare the two models, the paper presents the result of our preliminary research, tracing all the different existing biodiversity offsetting projects worldwide, and discusses the current iteration of the taxonomy of exchange mechanisms being developed to qualify the different emerging exchanges. Our results indicate that the static efficiency model of market for biodiversity conservation is unrealistic, as it ignores the variety of emerging institutions and the impact of the networks of agents involved in each instance. We conclude remarking that, while the intellectual, regulatory and economic movements towards the development of markets for conservation are in motion (via the influential idea of free-market environmentalism), historical and geopolitical specificities cannot be ignored in the way these markets are instituted. In any case, the creation of these markets constitutes a momentous change in the way that nature, society and economics interact, and in the way society provides for conservation.

WHOSE RESPONSIBILITY IS IT? THE STRATEGY OF CORPORATE SOCIAL RESPONSIBILITY IN THE CONTEXT OF BRAZILIAN ENVIRONMENTAL POLICIES

Daniela Pantani

Universidade de Coimbra, Faculdade de Economia

daniela.pantani@gmail.com

Introduction: The introduction of corporate social responsibility (CSR) concept into business strategies emerged as a phenomenon that has gained strength since the mid-twentieth century. Nowadays CSR is considered as an essential and desirable strategy in corporate planning, regardless of size, sector or expressiveness of the company. Although different theoretical perspectives can be found in the literature and their theories differ in several points, CSR is a developing study field and should be thoroughly researched in order to expose its limitations and highlight its potential. From the construction of a controversial hydroelectric dam in the state of Rondônia, Brazil, this study seeks to link the efforts coming from private companies, through their strategies of social responsibility, and the government, through the implementation of public policies, to ensure social welfare while promoting economic development. The choice from the research field is directly related to the richness of its universe, which demands a high degree of performance from public bodies to set guidelines for the Brazilian political environment, and the participation of Brazilian and foreign companies employing their entrepreneurial culture in everyday life in the work

site. Furthermore the dam attracts great visibility from general public, especially social movements and non-governmental organizations, due to huge sums of investment from a Brazilian governmental program named PAC (Program to Accelerate Growth) and enormous social and environmental impact caused by the construction. **Method:** The object of study was the consortium Energia Sustentável do Brasil and the contractor Camargo Correa during the construction of Jirau hydroelectric dam, in the state of Rondônia, Brazil. The sample was limited to employees of both companies, and from Instituto Camargo Corrêa, responsible for managing private social investment of Camargo Corrêa Group, and the community of Jaci-Paraná, considered by both companies as one of the communities most affected during the construction phase. Data collection was performed in three steps: participant observation, documental analysis and interviews. Data analysis was different for the two analytical models adopted (corporate social responsibility profile and categories of social issues and corporate responses) and was analysed by content analysis, carried out with NVIVO 8 software. Results: Corporate social responsibility profile indicates the prevalence of legal domain in both companies. This result may reveal the complexity faced by businesses in meeting legal requirements and the influence of Brazilian legislation in the companies' internal processes. Regarding the categories of social issues and corporate responses, both private companies focus on similar issues, although one is guided by legal requirements (PBA: Environmental Basic Plan) and therefore deals with a situation of greater complexity, while the other can conveniently select random social issues to manage claiming "social commitment". **Conclusion:** The results have shown that companies use social responsibility to support the fulfilment of legal obligations (Brazilian political environment) and to achieve national and international certifications, such as NBR 16001 and the various ISOs. Thus, not only social responsibility is a phenomenon supported by the sustainable development model adopted by the Brazilian government, as indeed it only makes sense in certain area, for some companies, and under specific circumstances.

NATURA 2000 AND THE VALUATION OF NATURE WITHIN STRATEGIC ENVIRONMENTAL ASSESSMENT — THE CASE OF THE "RIA DE AVEIRO COASTLINE POLIS"

David Sumares

Universidade de Aveiro

david.sumares@ua.pt

Natura 2000 sites, like most other environments, are spatio-temporal particulars that cannot be compensated by economic development or by environmental compensatory measures such as the creation of other protected areas, which cannot really replace specific areas with specific stories with significance for specific communities (O'Neill et al. 2008). Chiefly, this is because there is a plurality of expressive attachments between particular individuals or communities and local natural (and non-natural) spaces, which not only is the result of the historical interaction between the two, but also an important constitutive element of the former's sense of identity. Thus, many environmental conflicts are not about changes as such, but about conflicting claims concerning different possible stories – and respective trajectories – for particular places. Likewise, in the context of multi-level governance, an

European system of reference such as the Natura 2000 Network faces many difficulties in tying in with local cultures and translating “European” objectives into regional or local spatial policies based on local uses of nature (Pinton in Engelen et al. 2008). In this respect, the conservation objectives of EU and national institutions can, in some cases, be seen as disruptive by attempting to assert the trajectories of certain ecological elements that were part of (historically) specific socio-economic configurations.

Since discourse is at the heart of the social practices behind such tensions, we have argued that forms of Discourse Analysis may be instrumental in producing greater understanding about the representations that authorities and local stakeholders have of specific environments, the narratives through which they make sense of their place and role regarding both social and ecological environments, and also the way local actors strategically use language in the structures that are socially available to them (Sumares and Fidélis, 2011). Indirectly, this may contribute to improve participation and conflict resolution, promote inclusion and emancipation, and for better overall policy design and implementation. Because of its emphasis on the relations between language and power relations, Critical Discourse Analysis seems particularly suited for exploring discursive interaction at the heart of Natura 2000 and other conservation areas where management is most tense or difficult, ultimately with the aim of harmonizing the tensions between conflicting interests so as to enable collective action towards more sustainable, equitable, and transparent environmental governance. This claim, however, remains to be tested in practice.

In this paper we will attempt a preliminary discourse analysis of opinions submitted during the consultations carried out in the context of a Strategic Environmental Assessment (SEA). This recent but important procedure at the EU level has been strongly influenced by the requirements of the Aarhus Convention on issues of public participation and access to information regarding environmental matters. The respective consultations are thus a central part of the procedure and are expected to affect the output of the decisions in relation to assessed plans and programs. The SEA that concerns us in the context of this paper took place in 2009/2010, regarding the Strategic Plan of the Ria de Aveiro Coastline Polis, one of the four priority “Polis Coastline Programs” currently under way. Such programs constitute a governmental initiative of “integrated redevelopment and enhancement operations” to be applied to environmentally important coastal areas. The area covered by the Ria de Aveiro Coastline Polis includes four Natura 2000 sites of which the most important is the Special Protection Area (SPA) Ria de Aveiro, which largely corresponds to the estuary of the river Vouga. The Ria de Aveiro constitutes a wetland area of approximately 110 km², of which 60 km² is a permanently flooded lagoon, surrounded by 10 municipalities with a total population of 300,000. With a recent origin, the current shape of the Ria has been shaped and stabilized by the communities around it over centuries, mainly through the creation of salt evaporation ponds, the draining of salt marshes, the opening of inlets and the dredging of canals to facilitate navigation, and the harvest of the lagoon’s seagrasses to be used as fertilizers in local agriculture. In particular, works in the early 19th Century fixed the Ria’s mouth and reversed the trajectory of what was an increasingly silted and choked lagoon with intermittent openings to the Atlantic Ocean. Over the past 40 years, at the same time that traditional activities declined, this fragile ecosystem suffered strong development pressures (urban, agricultural and industrial), which have caused some severe environmental problems as water pollution, eutrophication, habitat destruction, among others. In particular, the expansion of the port and related interventions are being increasingly seen (by some actors) as especially damaging to the Ria’s ecosystems due to

related changes in the estuary's hydrodynamics. The dispersion of decision-making across the 10 municipalities and various entities that have overlapping jurisdictions over the area has led to constant difficulties in finding coherent and articulated management solutions for the Ria's ecosystem as a whole. The Ria's Coastline Polis attempts to address some of these problems in an integrated strategy.

However, as it becomes evident from the SEA's consultations, the meaning of sustainability in this complex semi-natural system is far from being consensual among different social actors, and is often in tension with the vision behind the planned interventions. In particular, the role that the port is seen to occupy in a "sustainable" future is an important focus of dispute. Apparently, discourses centered on "ecosystem services", which are becoming dominant in policy spheres in association to recent attempts to create biodiversity markets, have yet to penetrate the context of this SPA in any significant way. In this paper, we shall consider some of the ways in which the elements related to the conservation of this Natura 2000 site are being represented in discourse. More specifically, we will examine the forms of valuation of local (protected) environments and underlying representations of the relationships between human and non-human elements, including the ways these are framed by narrative. The number of submitted opinions, during both the institutional and the public consultations, totals 44. Due to the significant amount of text this entails, the proposed analysis will cover selected excerpts where the mentioned aspects are especially salient.

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ENVIRONMENTAL AND SOCIAL PARTICIPATION IN DECISION MAKING ABOUT THE HYDROELECTRIC DAMS IN THE AMAZON REGION: THE CASE OF THE MADEIRA COMPLEX

Deborah Werner

Universidade Estadual de Campinas

deborah_werner@hotmail.com

Environmental issues have become a relevant issue for decision-making in the public policy level, since emerging as one more aspect to be considered for the development process of nations. This article seeks to address the issue from the example of the construction of large hydroelectric projects in Amazonia. The expansion by the installation of electric power plants are considered a guarantee for Brazil to maintain the pace of economic growth while enhancing the clean energy mix and therefore compatible with sustainability. However, insofar as the expansion of hydropower is related to the appropriation of water resources in the Amazon, considered the last frontier economic, energy and mineral country, as set out by PDEE - ten-year plans to expand energy , environmental issues establish itself as a

challenge to the decision making of public policy, as open space for discussion about the national development process, this requires that the indiscriminate expansion of energy sources.

According to Lemos (1999), between 1960 and 1980, was institutionalized power sector in state databases. Established to meet the objectives of sector policy engineered by the Ministry of Mines and Energy and the State Eletrobrás, the state structure gave the Brazilian energy sector enormous autonomy and capacity to intervene in the territory and in social dynamics, economic, political and environmental autonomy cooled to from the establishment of the National Environmental Policy.

With the establishment of PNMA - National Environment Policy, an attribute of the law 6938/81, was the first step towards opening up the sector planning for public discussion (LEMOS, 1999), with the establishment of institutional spaces for participation social, such as public hearings and public civil action. Social participation, to be institutionalized within the public hearings, exhausts itself in this process and serves as an opportunity to legitimize the new developments as indispensable to regional development. From justifications based on measures of mitigation and compensation, society would ultimately be satisfied that the receiving regions of the projects would benefit from the economic dynamism of investment and the implementation of social and environmental programs that culminate in regional development, arguments that give large hydroelectric projects on the character of development poles (VAINER AND ARAUJO, 1992).

However, despite the institutionalization of social participation limit it to public hearings, the social dynamics will reveal that the environment suitable for the production of hydroelectric power will not necessarily be compatible with certain social forms by which certain groups are related to the environment because once installed, the hydroelectric project promotes the complete transformation at the heart of these relationships (ACSELRAD AND SILVA, 2004), at which settles the conflict and society seeks to establish itself as a subject of the decision process of installing the hydroelectric projects.

Since society participation in decision confronts different forms and meanings of appropriation of land and the environment, social and environmental struggles in addition to seeking the cause of preserving the environment, enforce standards of relationship between man and environment do not submit both the relentless rationality of capital accumulation, this promoter, in developing countries, social exclusion of the vast majority of the fruits of development (VAINER AND ARAÚJO, 1992). Accordingly, those struggles ultimately challenge the very concept of development to which the hydropower projects are linked. Thus, it is from the public debate and conflict over different forms of appropriation of the environment that the company guarantees their participation in decision-making installation of large hydroelectric projects.

Considering the period in which democratic states the new cycle of the installation of large hydroelectric projects, with emphasis on hydroelectric development in the Amazon region, the conflict that emerges when social participation requires policymakers questions about the development project to which the enterprises serve. Such questioning is evident in the process of environmental licensing of hydroelectric Santo Antônio and Jirau proposal discussed in this article. The plants, components of the Madeira Complex - located in the homonymous river, a tributary of the Amazon - are questionable for the link to the advantage of the hydroelectric projects of a model of international insertion linked

to the export of primary commodities and natural resource exploration, questionable in terms of development and sustainability, regardless of whether they are renewable and clean energy.

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GREEN TECHNOLOGIES: RESISTANCE AND SOCIAL (NON) ACCEPTANCE

Irene Tomasoni

Catholic University, Brescia

ire.tomasoni@gmail.com

Green technologies development – with main reference to the last renewable energy technologies (RET) and technologies for rational use of energy (RUE) - has often to deal with different levels of social non-acceptance; local stakeholders seldom adapt to these innovations without putting up their resistance.

Generally, final users, NGOs or local public authorities have different -and possibly conflicting- visions about many environmental issues, about the advantages obtained from green innovations and the future scenario in which these innovations should fit.

If these diverging views are neglected, the (innovation) projects can face severe social resistance before and during the implementation phase.

Fear and lack of information among users are, for sure, other important obstacles to green technologies.

In projects concerning environmental issues and sustainable development, researchers feel the need to analyse the interactions between local stakeholders, their different visions of the future and the reasons they have to obstruct or facilitate the adoption of new 'clean' technologies.

Some questions come after this preamble:

- What are the best tools and communication strategies to understand the level of (green innovations) social acceptance we have to face? how to make the acceptance grow?
- How to give people the information they ask for - including technical, risks/advantages and financial details?
- What about stakeholders' participation and involvement in environmental research projects? How to arrange and develop these projects making people be part (from the beginning?) of the process?

- In EU projects (again, renewable energies researches): can the local culture and/or the national level of trust in institutions, affect the strength of social opposition to the 'green' innovations?

Now following, one example of European innovation project (Intelligent Energy Europe, EACI agency) with special focus on its main stakeholders' involvement tools and the open questions around innovation and its social acceptance.

CASE STUDY

The project BioEnerGIS

The project BioEnerGIS – Agreement n° IEE/07/638/SI2.499702 –

intends to provide an instrument helping decision makers to plan, on a regional scale, a sustainable exploitation of biomass. A GIS-based decision support system (DSS) will be developed, locating the most suitable sites for biomass plants installation, in terms of energetic, environmental and economic sustainability. Four regional case study areas, representing different environmental and economic zones, have been identified: Lombardia, Walloon, Slovenia and North Ireland.

(you can refer to <http://www.bioenergis.eu>)

BioEnerGIS Work Programme:

WP2. Supply-side analysis

WP3. Demand-side analysis

WP4. Plants' configuration

WP5. GIS based decision support system

WP6. Support for public and private stakeholders in order to finalize specific Agreements

WP7. Dissemination of results

BioEnerGIS, stakeholders involvement and social participation (WP6):

Concerning stakeholders involvement and social participation/acceptance some steps and tasks are required:

- A. Creation of regional networks of stakeholders (contact and engagement + regional meeting)
- B. Consultation workshops/ Delphi survey with regional stakeholders and experts
- C. Analysis of local (stakeholders) consensus and discussion on pre-feasibility studies (regional meeting with presentation of BioEnerGIS first results and BioEnerGIS DSS)
- D. Signature of Local Agreement in every Region

The main BioEnerGIS social obstacles encountered -up to now- are connected with the NIMBY syndrome around biomass-energy infrastructures and plants realization.

Other important barriers to face are the level of risk perception and the non/consciousness around advantages and benefits brought from the new envirotech.

Besides the European project just presented, I'm encountering the same kind of social opposition in several local (Lombardy) projects still connected with the production of energy from greentech (eg. in the creation of chicken-dung exploitation plants).

In real terms, social non acceptance in energy production systems presents many similarities both at european and local level.

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THE PUBLIC MANAGEMENT OF SOCIAL AND ENVIRONMENTAL FUNDS: THE CASE OF THE NATIONAL FUND FOR THE ENVIRONMENT IN BRAZIL

Lidiane Carvalho

CES-Universidade de Coimbra

lidicarvalho@hotmail.com

From the opportunities created by the 1988 Constitution for the exercise of active citizenship, a broad and multifaceted network of democratic movements formalizes actions to promote more and better interfaces between state and society. In the last two decades the processes of democratization, political and economic decentralization and state reform, were accompanied by the emergence of new public and private actors in the political arena. Public policies became more complex with the multiplication of actors, decision spaces and the increased opportunities for

discussion and deliberation, which advocates a new political action, a renewed sharing of decisions and institutional powers.

These measures have gained contours related to the ideas of decentralization and participation that began to inform the political and administrative performance of the Brazilian federation, especially in the context of environmental management. In this sense, were created Environmental Councils and sector committees targeting specific environmental resources such as forests, water resources, conservation units. They are both at the national, state and municipal levels, in view of the system of division of powers between the federal entities in the country. To support the Policy and the National System of Environment, it has been established environmental funds - as gateways to public or private resources, specifically allocated to the environment - whose management is performed by a participating council, composed of state representatives and the civil society. The creation of such funds have generated a lot of interest and expectation by environmentalists as a means of potentially generating inclusive and participatory approaches at both technical and decision-making levels, environmental management, and transparent project selection process democratic guarantees and social control over the use of public funds invested in environmental projects. Brazil has actually a significant number of environmental funds. All units of the federation have some kind of deep socio-environmental fund legally constituted, such as of Environment, Water Resources, Reparation of Violated Diffuse Rights, Forest Protection, Pollution Control and Sanitation. However, most of these funds have no guidelines and defined mechanisms of action and, therefore, don't operate. It is estimated that there are over 1000 municipal environmental funds of which only 81 were active in 2001 (IBGE and MMA) and 50 state environmental funds, of which only about 15 were in operation in the year 2005 (FNMA). Brazil's National Environmental Fund (FNMA) is currently the main public fund investing in the environment at the national level. FNMA works in partnership with Brazilian society to improve the environment and quality of living. FNMA is also part of the Ministry of the Environment. The fund was established by the Law 7797 on 10th July 1989: its mission is to contribute, the agent and the financing through social participation, to Brazil's National Implementing Environmental Policy. Throughout its history, FNMA has invested more than 100 million euros in 1400 projects to foster conservation and sustainable use of natural resources. The board of the FNMA is a collegiate body of the Ministry of Environment and has among its tasks set priorities and guidelines for the performance, in accordance with the National Environmental Policy. Thus as it is the final decision instance, is up to the institution to judge the projects submitted to it. Presided by the Minister of Environment, the Council is composed of 17 government agencies of Representatives (9) and the civil society (8). The civil society representatives are nominated by their top leaders and chosen after a democratic election process among organizations registered in the National Register of Environmental Organizations (CNEA), the jurisdiction of the National Environment Council (CONAMA), for a period of two years. This study aims to examine the functioning and decision-making processes within the Management Council with FNMA and to identify conflicts of interest between the actors involved, as well as to examine the extent to which social participation influence the selection of the funded projects and the transparency and social control of utilization of resources designated to the preservation and improvement of environmental quality.

**THE INSTITUTIONAL ANALYSIS OF PAYMENTS FOR ENVIRONMENTAL SERVICES GOVERNANCE
MECHANISMS THROUGH TRANSACTION COSTS: WHAT DO WE LEARN ON THE NATURE OF PES AND ON
THEIR CONDITIONS OF EMERGENCE?**

Louison Cahen-Fourot

University of Auvergne – Clermont-Ferrand

louison.cahenfourot@gmail.com

The work presented here arise from a master thesis focusing on the institutional analysis of governance mechanisms of payments for environmental services (PES) through the concept of transaction costs. The study which is the basis of the master thesis and of this article has been led in France and Madagascar from July 1st 2010 to December 20th 2010 and was a part of the Serena research program on environmental services and rural space uses in France, Madagascar and Cambodia, a program which is funded by the French National Research Agency. This program is jointly led by researchers and scientists of several research institutions such as Development Research Institute (IRD), International Cooperation Center for Agronomical Research towards Development (CIRAD) and Research Institute in Sciences and Technologies for Environment (CEMAGREF) as well as several other research centers in France and abroad. The work presented here has been consequently led under the supervision of Philippe MÉRAL, economist and research associate within the IRD.

Payments for environmental services (PES) are a tool of environmental policy which knows an increasing popularity all over the world, including Madagascar. PES are defined as a voluntary transaction where a well-defined environmental service is being bought by one or more buyers from one or more providers, if, and only if, the provision of the service is effectively secured (Wunder, 2005). To date, about twenty five PES have been listed in Madagascar by local team members of the Serena research program. In this paper, we analyze the governance mechanisms of three of them: the water PES of Antarambiby and Andapa, and the mangrove forest Honko PES. The objective of Antarambiby and Andapa PES is to enable a better water supply for the cities of Fianarantsoa (Antarambiby) and Andapa through changing cultural practices in the watersheds as well as in financing improvement of infrastructures (Andapa). Antarambiby is located 25 kilometers away from the city of Fianarantsoa, and about 500 kilometers south of Antananarivo, the capital city. Andapa is located nearly 700 kilometers north of Antananarivo. These two PES are particularly interesting because of the degree of comparison they allow, as they share common goals, common initial funder and designer and similar stakeholders.

The Honko PES concerns preservation of a mangrove forest located 12 kilometers north of Toliara, about 1000 kilometers south-west of Antananarivo. All these PES have specific governance mechanisms and emergence conditions that we have given rise to in order to led our institutional analysis. The research question of this work is thus to establish what mean transaction costs for governance mechanisms and what do they enable us to understand about it and so about the nature of PES and the way they appear as institutions. We adopt a historical institutional bearing differentiating itself from the New Institutional Economics whose the concept of transaction costs originally stems from. We use transaction costs to characterize the governance mechanisms of the PES that we study in a similar way as Vatn (2010). We consider transaction costs as the means laid out to allow the possibility of

a transaction. They include all the actions undertaken for initial research, identification of actors and places, design of rules and control mechanisms, coordination and social networking allowing effectively the definition of alienable property rights and then leading in fine to the concrete realization of the transaction itself.

Thus, we outline some paradox which would have been unexplainable and odd according to the neoinstitutional paradigm : the water PES of Andapa, which is the one whose people have the most interest in participating and for which all the parties agreed they would be better off with than without - in other words the PES for which it is the most rational and opportunistic to take part in - is the one with the highest transaction costs, especially compared to its look-alike PES of Antarambibi, where actors are way more reluctant to take part in. We therefore show that transaction costs are the monetary illustration of an institutional path making them the result of complex social and political realities rather than of a purely economic rational and opportunistic calculus. Therefore we show that PES institutions are not emerging thanks to a will of economizing on transaction costs and that the latter are in the contrary higher when people want to cooperate, because they are then encouraged to lay out more means, that is more transaction costs, to design and implement better governance mechanisms. Therefore, we explain that PES governance mechanisms are hence the concrete expression of an institutional compromise about the exploitation of a natural resource and are hybrid forms between market, hierarchy and community. We finally question the initial definition of Wunder and fuel the debate about the definition of PES in agreeing with the new one suggested by Muradian & al (2010).

(Paper written with Philippe MÉRAL, Economist and research associate at the Research Institute for Development (IRD, France))

INCLUSIVE BUSINESS IN EMERGING COUNTRIES: THE ROLE OF FORMAL AND INFORMAL AUTHORITIES IN MANAGING ENVIRONMENTAL CONCERNS

Lucia Dal Negro

Catholic University, Milan

lucia.dalnegro@unicatt.it

“Inclusive business” refers to a family of theories which hint at business to define a way of shaping a future of development for poor countries.

Inclusive business is defined as a way of gather economic actors, politics and civil society around the common goal of rising per capita income to improve life conditions.

Under the conceptual umbrella of Inclusive Business (IB) there have been included different approaches ranging from the more institutionalized to the more nuanced as a simple intention of “doing something inclusively”.

Social Entrepreneurship aims at “simultaneously obtain a social and a financial return on investment using an innovative and disruptive way of doing business” (Institute of social Entrepreneur, 2002) more often within the social assistance sector.

The Bottom of the Pyramid Theory aims at multinational corporations reaching untapped markets to develop goods and services for extremely poor people, relying on market as the unique mean to improve social

conditions. Equally, the Sustainable Livelihoods Project (WBCSD 2002) tries to develop a way for companies wishing to invest in developing countries ending in a win-win result either for locals and for business.

Development agencies' perspective is no doubt the more difficult to define. Decades of field projects have shaped a diversified set of actions depending on local context and institutional mainstreamed vision, the latter reflecting political alliances, financial availabilities and proper agency's features. What can be highlighted in agencies' efforts of providing an inclusive business solution is the initial step of a favourable local context and the subsequent effort of anchoring local stakeholders to companies' decision processes, as for the Local/Regional Economic Development approach.

Business strategies as Design for Sustainability focuses on including social and environmental factors within the life cycle of the product, developing a good which responds to local needs. This way the production phase results inclusive.

Finally, Fairtrade movement is an inclusive business in the way it promotes local entrepreneurship selling artefacts and/or crops respecting local values and assuring the best working standards.

All these "currents" share the goal of creating development conditions leveraging on market and local stakeholders, nonetheless the environmental issue lay at the background.

Yet environment is extremely important since one of the most concerning issue of inclusive business deals with massive consumption patterns and their environmental effects on local and global balances.

According to WBCSD data¹, global drivers of consumption are:

- a) population growth (expected to raise 9 billions in 2050);
- b) rise in global affluence (middle class consumers are expected to triple by 2030);
- c) a culture of consumerism among global elites (3 planets would be required if everyone to adopt the consumption patterns and lifestyle of the average citizen from the UK; 5 planets according to consumption patterns of US²).

Hence, if a company decides to address exactly those countries characterized by the global highest birth rates (driver a) in the attempt of implementing their purchase power (driver b) planning a business way to export products and services coming from a different culture (driver c), this is something that needs to be figure out with extreme accuracy.

Considering that, the role of local authorities emerges as fundamental in the way it is crucial to set up a participative (public?) process to carefully manage the development of new foreign business (either goods, services or consequent habits) especially looking at environmental imbalances.

The relevant question is: how is possible in poor countries that local authorities³ could play a role advocating for environmental values toward multinational corporations?

Let's briefly focus on a classical Inclusive Business case-study (more precisely a BOP case) to imagine how concretely local authorities could behave⁴ in the attempt of correcting market failures which affect social and environmental balances.

Low-income consumers "shop every day but not for much. They can't afford to stock up on household items (...) they look for single-serve packaging⁵". Let's imagine that a MNC would seize on this habit producing large

¹ WBCSD, *Sustainable Consumption Facts & Trends*, 2008. Available at: www.wbcsd.org

² WWF, *Living Planet Report 2010*

³ Field experiences tell us that depending on the context, local authority in developing or poor countries might be extremely weak, while corruption might finally reduce it to nothing. For this reason I mean "authority" as not only public institutions (government, public institutions) but also traditional actors (such as religion leaders or village governors) and field actors such as NGOs which represent the power in that context.

⁴ This example comes from: C.K Prahalad, *The fortune at the bottom of the pyramid*, *Strategy + Business*, issue 26, 2002. Pages: 10-11.

quantities of single-unit shampoo bottles sold at affordable prices for poor people. Even though the company might be enough sensitive to environmental hazards producing with organic plastic, should the “targeted authority” be totally at the mercy of the MNC, or should it play its political role negotiating about the imperative of reducing environmental risks?

A possible way for local authorities to act as a credible stakeholder is to present to MNC some alternatives.

Referring to the case of single-use shampoo, the authority could take part in the process of collecting empty bottles (for instance putting sanctions for villages that do not contribute to the collecting). In return the company, which save money re-using old materials, might address the equivalent of its savings for humanitarian assistance at ground level.

A second option is to get consumers aware of the MNCs’ process of anchoring the market defining with locals how to sustainably deal with the upcoming flows of goods and services. Public talks or field surveys can be useful tools for authorities to build up a civic consensus about the business deployment.

Additionally, local authority can obtain from MNCs to hire a percentage of locals to spread the product over the country, especially in rural areas where it is more difficult to reach people. This way there is a mutual benefit for MNCs and local forces that would be involved in the process of production/distribution, indeed becoming actors within the business process, instead of just “passive consumers”.

Lastly, local authorities can place side by side MNCs carrying out public campaigns to prevent mis-behaviours related to the arrival of new products and goods either in terms of environmental practices and socially sustainable consumption habits. Launching campaigns, especially targeting schools or rural areas, is a way to prevent well-known globalization’s downsides, such as obesity, loss of local identity, water pollution and waste saturation, which have international trade and business as primary drivers.

The aim of my paper is to define other possible ways/techniques/strategies for authorities in developing countries (being them institutions, traditional actors or NGOs) to represent a reliable actor within the inclusive business process, playing the role of balancing market forces in favour of a sustainable and consequently inclusive business.

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GREENHOUSE PRODUCTION SYSTEM CHOICES: IS MODERN TECHNOLOGY BETTER FOR ENVIRONMENT?

Makbule Nisa Mencet

Akdeniz University Vocational School

nmencet@akdeniz.edu.tr

Turkey is the fourth biggest tomato producer country in the world. The contribution of greenhouses to the total production is very important for economy. However, environmental concerns are increasing especially about the greenhouse production. The environmental consciousness starts from the persons owning the land and from their instincts to keep the land for the next generations. This study is based on experimental data from fields, gathered by a survey and observations of producers' methods of production. Survey is covered face-to-face questionnaires with producers. Therefore, the sampling method was used to determine the number of producers. Homogenous classes needed to be gained in terms of greenhouse wideness to raise the level of prediction accuracy of their incomes and environmental awareness of deployments making greenhouse vegetable production. The level of prediction susceptibility is expected to increase when this kind of homogeneity is achieved. So, a survey is made in different deployments using the classified random sampling method in the research. According to sampling calculation, result is of 148 conventional small-scale producers. Producers from modern farming covering big scale producers number is remained 25. The total number of agricultural holdings is 169 in this research. In the field investigation steps of this research, the fact that the production done in modern greenhouses is less harmful for human and environmental health, which is commonly agreed by the consumers and the producers, emerged from this study. It has stated that, monitoring systems preferred because of various causes were applied in the 65 percent of the modern greenhouses covered by the research. However, according to LCA analysis, modern agricultural techniques and input usage is more than conventional ones per decare (ha-1). The materials emitted to water with the usage of pesticides and chemical fertilizers, causes accumulation by subsiding in water. Accumulated materials cause toxicities by moving towards to sea with the flowing waters and rains. Therefore, environmental impact to the marine water is high. When conventional and modern agriculture compared, the highest difference is in this category. There is also a misunderstanding among the people that if agricultural holding size gets bigger and be equipped with modern technologies, this would lead an environmental friendly production because of more consciousness, more certification, more authority etc. However, studies about those kinds of comparisons show that there is not a direct proportion between investments for technology and environmental friendly practices. The environmental consciousness starts from the persons owning the land and from their instincts to keep the land for the next generations. The main result of the study is that even though the unit tomato profit is higher in modern greenhouses there are huge differences in terms of environmental pollution.

(paper written with Cengiz SAYIN, Prof.Dr., Agricultural Economics Department in Akdeniz University, Antalya-TURKEY)

HOW DO WE DELIBRATE OVER OUR ENVIRONMENT? THE CASE OF WIND ENERGY IMPLEMENTATION ON THE ISLAND OF AMORGOS

Maria Proestou

Humboldt University Berlin, Faculty of Agriculture and Horticulture

melinpr@hotmail.com

Wind energy technology brings a new form of economic activity to areas hitherto untouched by industrialization such as the islands of the Cyclades in the Greek Aegean Sea. Somewhat, the Cycladic land is used for tourism, agriculture and stock farming, while land utilization in favor of wind power installations is apparently uncommon. Implementation of wind energy technology is a matter of dispute on the Cycladic islands.

Witnessing the majority of islanders letting out their frustration related to the erection of any potential wind farm, I address the contentious issue of wind energy implementation on the Cycladic island of Amorgos. The island of Amorgos is located in the southern Cyclades in the southeast Aegean Sea. In order to cover its electricity demands, Amorgos relies entirely on one small-scale self-sufficient power station, which utilizes diesel. The municipality of Amorgos has already rejected three wind energy proposals.

The main research question is to understand how locals deal with wind energy implementation in their environment, since Foucault stresses that our understanding will suffer if we do not start our analysis with a “How”. Based on Hodgson’s theoretical approach of institutional economics, I focus on the way institutions and habits affect deliberation over wind energy implementation within the society of Amorgos. Habits are defined as propensities to behave in a particular way in a particular class of situations. As institutions are considered property rights, rules governing property relations, norms and conventions, which fashion the process of deliberation over wind energy implementation. I lay emphasis on the deliberation process, within which locals confer, ponder, exchange views, negotiate, and attempt to persuade each other. Such a process may precede and influence processes associated with decisions and choices.

The research methodology is based on the philosophy of phronetic social science as described by Flyvbjerg. Phronetic research emphasizes on both understanding and explanation. It addresses questions about who gains and who loses, while it is primarily concerned with questions of “How”. In order to understand the situation on Amorgos, I proceed similar to Flyvbjerg, who demurs from the role of omniscient narrator and summarizer in favor of gradually allowing the case narrative to unfold from the diverse, complex, and sometimes conflicting stories that people, documents, and other evidence tell him.

Empirical observations of the everyday life as well as in-depth interviews with locals are significant tools to get close to the reality on Amorgos. Daily observations include my participation in public gatherings, rituals and discussions without neglecting phenomena associated with the weather and the landscape. The interview guideline addresses issues regarding property relations, land use practices, patterns of communication, habitual propensities, informal

rules, landscape perceptions, values, wind farms, the electricity generation, the local economy and the corruption within the local society. Interviewees are farmers, herdsman, tourist entrepreneurs and locals, who influence the political landscape and social life.

For the interviewees, the landscape of Amorgos is a place of memories. They are accustomed to manners and practices embedded in the way of living within their natural environment. They regard the mountains and coasts of their island with reverence and affection. This approach is entrenched in their deliberation over wind energy implementation. What they tend to see or experience is inextricably linked with the environmental setting fostering their tendencies.

Habits and institutions on Amorgos are connected with small-scale objects and the compulsory techniques. They are not connected with industrial innovations wind energy technology brings about. Locals appreciate the abandoned windmills, typical testaments to past agricultural activities, which shape the landscape and function as tourist attraction. Locals are used to preserve informal agreements in order to arrange land property relations. Such agreements determine land use methods, which disregard wind farms as symbols of both the environment and the common good.

The way people interpret and value their environmental setting is not only a matter of economic benefits. Factors such as social norms and propensities to behave are decisive to understand how people value things. Focusing on deliberation rather than decision making processes is crucial to shape policies, since deliberation embodies the complexity and unity of the social context. Research findings seek to contribute to the better understanding of economic activities in rural areas and to make a set of recommendations regarding local participation schemes.

Keywords: deliberation, landscape, wind energy, island

ARSENIC AND FLUORIDE GROUNDWATER CONTAMINATION IN ZACATECAS, MEXICO

Osiel González Dávila

University of London, School of Oriental and African Studies

osielgonzalezdavila@hotmail.com

Due to Mexico's climate and environmental features, groundwater plays a very important role in Mexican economic activities and welfare. On average, groundwater extraction provides more than 60% of the national water supply (CONAGUA 2010:68). Arsenic (As) and fluoride (F⁻) have been identified among the most severe inorganic contaminants present in groundwater worldwide (Fawell and Nieuwenhuijsen 2003; Ng et al. 2003). High As levels in drinking water may provoke skin, lung and bladder cancer and other adverse effects. Cutaneous changes due to arsenicosis include melanosis (patchy pigmentation of the skin), hyperkeratosis (thickening of the skin), desquamation and in severe cases gangrene. Anaemia and leucopenia are highly related with chronic As exposure (Das, Mallick and Sengupta 2003 and WHO 2001). A modification to the Mexican Official Norm NOM-127-SSA1-1994 (SSA 2000:77) established since 2005 a guideline value of 0.025 mg/L As. Dental fluorosis -an unsightly brown

mottling of teeth- can result from high F⁻ intakes. Higher intakes can provoke skeletal fluorosis, which can lead to fractures and crippling skeletal deformity. Fluorosis can manifest itself at an early age with the result that affected individuals cannot work properly and may be economically as well as physically disadvantaged for life (Fawell and Nieuwenhuijsen 2003:203). The permissible limit of fluoride in drinking water was set at 1.5 mg/L F⁻ (SSA 2000:77).

Groundwater As and F⁻ levels above the limits established by the Mexican Official Norm have been detected in several areas of Mexico. According to the National Commission of Water, the total population living in states where there is systematic information about high levels of As and/or F⁻ in the waterworks is 6.4 million people (Vega 2001:3). The association between consumption of water containing high levels of As and F⁻ and adverse health outcomes has been demonstrated in various epidemiological studies. Armienta and Segovia (2008:351) state that the results of these investigations have prompted the water authorities in some of the affected areas of Mexico to supply water from non-contaminated sources. Nevertheless, these studies have been conducted only in few zones. Therefore, the exposed population may be larger than that already identified and there is an urgent need to conduct similar studies in all contaminated areas.

In Mexico, the socio-economics of groundwater arsenic and fluoride occurrence is little studied, although it appears that awareness is lacking. To overcome this, a baseline survey in two potentially affected municipalities of Zacatecas, Mexico was undertaken to understand levels of awareness, health impacts and potential arsenic and fluoride avoidance strategies and practices. 41% of the interviewees stated that at least one household member shows brown mottling of teeth (severe fluorosis symptom). 18% reported that at least one household member shows dark skin spots in hand palms (advanced arsenicosis symptom). Statistically significant correlations between the presence of arsenicosis and fluorosis symptoms and the consumption of certain food items and tap water were found. PROBIT regressions confirmed the association between arsenicosis and fluorosis symptoms and food and water consumption patterns.

Water samples from five extraction wells supplying water to those municipalities were collected and tested for As and F⁻ as part of this study. The levels of As in two of the extraction wells were more than 10 times above the Mexican guideline and F⁻ levels were two times above the Mexican guideline. As a method to reduce the levels of As and F⁻ in the water supply of the region, the local water authorities mix water from highly contaminated wells with water from others less contaminated. Eight water samples were collected from households located in different areas of Guadalupe and Zacatecas cities and were tested for As and F⁻. All the samples presented levels of As and F⁻ above the Mexican guideline. One third of the interviewees reported that in their households they drink tap water and 59% use tap water for cooking. There is a severe information problem. The population is not aware of the high levels of As and F⁻ in the tap water and a huge majority has no information concerning arsenicosis or fluorosis symptoms and the strategies to avoid them. Data about toxic elements levels in the public water systems are not available to the public. A comprehensive public strategy to tackle the problem is required. A more detailed epidemiological study and a cost-benefit analysis for installing As and F⁻ water treatment plants are programmed to be conducted by the author during 2011.

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ENVIRONMENT – SOMEBODY ELSE'S PROBLEM

Ossi Ollinaho

Aalto University, Institute of Strategy

ossi.ollinaho@gmail.com

The purpose of this paper is to consider the outlines of transforming the aggregate human activity to a more sustainable direction. This transformation requires changes in general knowledge in terms of environment which is routinely passed to “everyone” and which to a large extent steer the aggregate human activity. In these considerations I lean to insights elucidated in sociology of knowledge. Environmental changes are not likely to inflict changes in aggregate human activity since the incremental and long-term nature of even the historically rapid changes in it and as the meaning of environment is every time less determined by the direct contact with it. Origins of change have to be sought from the provinces of special knowledge, including economics.

INTEGRATED RISK GOVERNANCE OF A TERMITE URBAN PEST, CHALLENGES IN RISK COMMUNICATION: MEDIATING CONFLICTS IN A PUBLIC DECISION PROCESS

Rita Sao Marcos

Universidade dos Açores
ritasaomarcos@gmail.com

Nowadays termites are among the urban pests that cause more damage worldwide (Borges& Myles, 2007).its aggressiveness is internationally recognized by invisibly consuming houses' infra-structures, furniture, books, clothes, statuary and other wood artefacts. The species is well established in the United States, Brazil and in the Portuguese Atlantic islands of the Azores where it has had greater impact . The occurrence of the drywood termite, *Cryptotermes brevis*, was only officially detected for the first time in 2002, at a moment when the pest had already infested large areas of the three major cities of the archipelago: Angra do Heroísmo, Ponta Delgada and Horta.

In the present time, the drywood termite is considered the most dangerous urban pest in the Azores and its economical and patrimonial impacts have raised considerable concern from citizens and the scientific community (Borges& Myles, 2007).Also alarming is the first record of *Cryptotermes brevis* in one building in Lisbon, since it is the first time that this serious invasive pest was detected in the Portuguese mainland (Nunes, 2010).Being Europe's front entrance to the pest as there are no policy control measures concerning customs doorway.

It is currently a well established pest in the region generating the alarm that the pest will spread to the entire archipelago and beyond its frontiers. Deserving special attention the main urban city centers due to their traditional architectural housing characteristics and design - infrastructures manly built with wood - whose distinctive features have been recognized by Unesco (Angra do Heroismo was classified World heritage in 1983) but that now threat the safety of its inhabitants. Especially when combined with the region's volcanic and seismic regular activity (with crisis ranging from moderate to high intensity) increasing the seriousness potential of its impacts. In 2002, when the problem was first addressed, by concerned citizens, in the public sphere, the primary concern of the government was to legitimate its action through the funding of research in the risk appraisal domain. These studies focused on risk assessment, enabled to biologically identify the hazard in question producing scientific knowledge in termite ecology, risk mitigation strategies and the regions' exposure and environmental vulnerability to the exotic species.

This investment did not have any impact in the control of the pest revealing a complete lack of integrated pest management strategy as it was not followed by mitigation, control and prevention measures as proposed by the researchers. Being the citizens completely left alone with "their problem" as it was thought, by the local government, that this was a private issue that each and every citizen should deal with "it" when "it knocked on their doors". Despite all the alarm caused by the ever growing cases of infested houses it was long before the government actually understood the need to create a taskforce (Resolução nº131/2004 de 16 de Setembro), composed by representatives of different departments, in order to plan a pest management program and trace a set of recommendations to the various stakeholders involved, concerning (1) information about the sources of risk and the strategies to manage it, (2) technical advice and information to the population under risk, (3) strategies to mitigate

and control the source of risk, and (4) law measures on prevention, and control of infested waste (Borges & Myles, 2007). Even in so doing it was only in 2005 that the Housing Secretary published an official document (Dec. Leg. Reg. n.º 20/2005/A de 22 de Julho de 2005) defining the first legal framework. This Legislative Decree reported only on the need to give financial support to the ones in need of substituting their homes damaged infrastructures by rehabilitation and/or reconstruction works, mainly trying to respond to the social pressures that spotlighted the political agenda and not to actually face the problem. This housing policy was followed one year later, by another one from the Environmental Secretary (Portaria n.º 32/2006 de 20 de Abril) to regulate the destruction of waste produced by reconstruction works, but those were to be applied only to the waste originated by construction works object of public financial support.

Another research project, from a social science perspective was then object of funding to study the socio-cultural determinants of the problem - risk perceptions, tolerability & acceptability assessment traced the risk profile as Cassandra (Klinke & Renn, 2001) characterized by a high probability of exposure, great damages felt as intolerable (by threatening the safety associated to 'our own home') but with a long delay between causal stimulus and negative effect, due to an invisible process of action. To cope with this kind of risk the authors propose the adoption of a discursive management strategy with "an emphasis on reaching political consensus or agreement, the importance of procedure and transparency, the establishment of trust-generating institutions, and investment in risk communication, the involvement of stakeholders, including industry and governmental organizations, and public participation". But more significantly this study enabled to trace this type of problem as a risk with 'induced complexity' (Reen, 2005) in need of an epistemological discourse where trust is instrumental to improve the capacity of facing this kind of risk in question by building strong reliable organizations and institutions putting an end to the existing give-and-take game where one stakeholder accuses the other of alienation and of being responsible for the worsening of the problem.

A risk communication framework was then adopted to promote dialogue between all the parts involved in order to trigger communicational mechanisms to foster the mediation of the different interests, deconstruct resistances and regain mutual trust in order to build the atmosphere of cooperation necessary to face this infestation. A regional campaign embracing different levels of public involvement was then planned to counterpart this "back office" enterprise of mediating the different stakeholder's agendas. Different Intervention strategies and communication devices were created are being tested, some more unidirectional (Outdoors, Comics, Radio spots) than others (Direct mail of magnets and traps to the citizens install in their houses, T-parades, T-squads, T-8 Summit meetings) comprising different levels of participation, but all with the same strategic goals: consolidate social conscious of the pest, involve all the actors, share responsibilities by compromising in risk mitigation actions. and cooperate in the monitoring and control of the pest in collaboration with the citizens' the local parish

Now finally the first true pest regulation law (Decreto Legislativo Regional n.º 22/2010/A) was recently published and has not yet been critically analysed. What is intended with this paper is to critically analyse the political context of the public policies that have been created by the regional government, since the publication of its first official document in 2005 to the latest in 2010, comparing the different goals, strategies, values, concepts and definitions of the problem over time, in a diachronic perspective but also in a synchronic point of view when comparing with the ones created and in current use in other political and social contexts, in countries where the pest has also been detected (Brazil

and the USA). In order to unveil the political intensions beneath the legal discourse through which each and every country defines and accomplish its state definition of this environmental and public health problem.

Qualitative research methods through descriptive-interpretative document examination will be applied by creating à posteriori an analytical grid to unveil the main themes and correspondent indicators that cross the legal normative, in order to understand the politico-ideological guidelines that officially frame the problem possibly in conflict with the other stakeholders' agendas. This legal speech examination will also be confronted with data collected through fieldwork that took place among the employees in four city councils in order to compare the actual implementation that took and is taking place in the institutions involved.

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TOWARDS BIOMIMICRY TECHNOLOGIES - A PARADOX FOR A SUSTAINABLE TRANSITION ? AN EVOLUTIONARY ANALYSIS OF ECODESIGN FOR GREEN CHEMISTRY

Romain Debref

Université Reims Champagne-Ardenne

romain.debref@univ-reims.fr

Nowadays, growing environmental issues are prompting industrial creators to design nature- inspired “green technologies” in the green chemistry sector. This paper aims to analyze - from an economic point of view - the principles and paradoxes of designing artifacts for a sustainable socio-technical paradigm.

Firstly, we shall present the theoretical landscape proposed by industrial ecology to highlight two technical and organizational configurations for biorefinery emergence - on the one hand ‘ industrial symbiosis’ and on the other ecodesign which is represented by the ISO 14000 range of standards (Anastas, Warner, 2000). Then, our analysis will study the crystallization of an environmental innovation issue which focuses on the product level. As a matter of fact, both are studied as energy and materials flow systems in which eco-efficiency becomes a strategic objective. Yet we see that this quest comes up against the ‘rebound effects’ problem (Polimeni, Mayumi and Giampietro 2008). That is why we argue for an epistemological debate about the construction of complex systems for efficiency because this methodology will be used by innovators to include natural phenomena in design.

Secondly, we emphasize that ecodesign, conceived as to become an environmental innovation, faces two major identity problems. First of all, the perception of ‘ nature’ as hybrid entities - there are both biophysical phenomena and social interpretations (Latour, 2005). Then, the intensiveness of innovation has created an identity crisis of products since the 80s (Hatchuel, 2006). Admittedly, this observation directly influences the evolution of technological paths but also competitors’ strategies (Dosi, 1982, 1988) (Powell, DiMaggio, 1983). These pressures take place within the organization and its supply chain - which influence the evolution of the identity of the firm, its organizational routines and rules for selection of choices (Nelson and Winter, 1982) (Kline, Rosenberg, 1986). As a consequence, the firm has to come up with its own dimension of the complexity of sustainable development. At the same time, it takes into account its own pressures and identity crisis. Thus, uncertainty and subjective representations of complexity can contribute to ‘rational myths’. It leads actors to a paradoxical perspective of sustainable transition, because the firm have to pursue their economic survival goals whilst working for a sustainable transition. Therefore what economic performance criteria could be used in a context of sustainable transition ?

Keywords : eco-design, complex adaptative systems, environmental innovations, technological trajectory, biomimicry

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THE ROLE OF NUMBERS IN ENVIRONMENTAL DECISION PROCESSES

Tone Smith Spash

University of Oslo

tonesmi@yahoo.no

Abstract

The demand for numbers to inform and support environmental decision processes is increasing. This article discusses problems with such a reliance on numbers. It covers issues of quality, reliability and validity in statistics, as well as values and assumptions in the construction of measures. The main focus is on those aspects that cannot be covered by quantification. I use the history of the Index for Sustainable Economic Welfare as a illustrative example.

Introduction

The demand for numbers - quantitative data, statistical measures, monetary valuation and indicators - to inform and support environmental decision processes as well as public debates is increasing. The demand is for both "more" and "better" numbers or measures. Several international projects exists dealing with the reformulation of key statistical indicators. The OECD formally established it's global project on "Measuring the Progress of Societies" in 2008. The European Commission had a similar project ongoing. In 2009, the Commission of the European Communities wrote to the Council and the European Parliament that "There is currently no comprehensive environmental indicator that can be used in policy debates alongside GDP. Such a single measurement for the environment would help foster a more balanced public debate on societal objectives and progress" (p. 4). A third example of the high focus on statistical measures is the so-called Stiglitz-commission, set up on by the French President, Nicolas Sarkozy, to review measures of social and economic progress (Stiglitz et al 2009). All these projects question some of the prominent measures used in today policy-making, but at the same time they none of them question what could be called the "quantification of public policy" – the tendency that policy-making and public debate make extensive use of numbers to argue for their case without questioning the underlying assumptions inherent it the choice of any measure. The same urge for quantification lies behind the focus on monetary valuation of biodiversity or natural capital as a help to prioritise in environmental protection issues.

In parallel with the increased demand for numbers, there are growing criticisms of monetary valuation and certain statistical measures (e.g. GDP or natural capital). However, much of the effort within the field of ecological economics seems to have been directed towards “getting the metrics right.” This paper challenges that focus, and discusses what is left out when there is such a focus on numbers.

Relying on numbers

One problem with the reliance of numbers in decision processes is naturally related to the quality of the numbers in terms of statistical uncertainty and reliability. However, what is even more important to bring awareness to, is the issue of validity. What about those aspects of an issue that cannot be quantified? By focusing on numbers, one risks to leave out certain aspects or to get a biased description of the issue to be dealt with. Aspects such as rights, ethics, culture, community and distribution might be undermined in the policy discourse and decision process by the strong focus on numbers.

Another aspect of validity concerns whether one uses the right numbers to illustrate one’s case. Often, a statistical measure is presented as objective and neutral. However, there is much truth in the old saying about three types of lies – lies, damn lies and statistics. Of course the saying doesn’t really mean that statistics are lies. It means that you can find statistics to support practically any case, depending on how you define and measure a phenomenon. Hence, an alone-standing measure does not provide much information. It is only when put into context or used to support a certain perspectives, opinions or narratives that it’s potential is fulfilled. In addition there are the assumptions, values or ideologies underlying the case made. These underlying factors tend to be overlooked and under-communicated. At this point, the problems of metrics have much in common with those identified within research on post-normal science and the science-policy interface. The idea of objective metrics and evidence-based decision-making is therefore a false one. That is why we have contested numbers. Hence, the limits of metrics as a decision-support tool.

The influence of statistics on society

Relying on numbers as a decision-support tool implies some belief in them as objective facts or representations. On the other hand, concepts like complexity and incommensurability, represent a challenge when dealing with metrics, since any measure will to some extent be reductionist. Some historical insight into the parallel development of “statistical evidence” and positivism/reductionism gives an important context for the further discussion here. Drawing from the works of Hacking (1975, 1990) and Desrosières (2001), I will give a brief historical account of the role of statistics, how it has come to shape society, and show some consequences of that development.

Some examples

Not only among public or governmental organisations, but also among NGOs and the environmental more broadly, can one observe an increasing reliance on numbers in the environmental discourse. Why is it that even the environmental movement switched from reliance on emotions and engagement to the use of “objective facts”? Or did they? I will look at some examples to illustrate this suggestion, e.g. the WWF’s Living Planet Index and The New Economics Foundations Happy Planet Index.

I’ll look particularly at The Index for Sustainable Economic Welfare (ISEW), developed by Daly and Cobb Jr. (1989). The ISEW, is a well-known indicator within the ecological economics community and much used as an alternative to GDP as a measure of progress or welfare, or to show the flaws of GDP. The index was first presented as an annex to the book called “For the Common Good” which outlined elements for redirecting the economy toward community, the environment and a sustainable future. Many of the topics treated in the book cannot be either quantified at all or they consist of incommensurable dimensions. Therefore, the ISEW cannot really capture what the book tries to promote. Still, it is the ISEW that has gained attention in the years since and not the rest of the book’s content. The ISEW is an excellent example of two of the main critiques presented in chapter 2 in the same book: that everything cannot be quantified or added together and that quantified measures tend to get more attention than qualitative measures or perspectives.

Concluding remarks

O’Neill (2007) gives a convincing account of how we can and do manage without prices. Can we also manage nature without other numbers? I am not upholding that quantitative measures cannot be useful for anything. Of course they can. But why is it that quantified input always seems to be given more weight than the qualitative one? If this is the case, we need to be more restrictive with the use of quantification.

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SUSTAINABLE PUBLIC DECISION-MAKING, ETHICS AND COMMUNICATION

Wiepke Wissema

Dublin University

wwissema@gmail.com

The crises in the areas of the environment energy, food inequality and both the financial and the real economy emphasise that decision-making procedures and the economic tools commonly used to support them are not sufficiently comprehensive. These methods are partly based on fundamentally irrelevant or unrealistic assumptions. Specialisation has led to a lack of connectedness between individual economic studies or even theories on the one hand and the ecological, evolutionary and social context on the other hand. This leads to smaller scale and short-term decisions that accumulate to harmful large scale and longer-term changes. With the disconnection of economics from other disciplines like philosophy (esp. ethics), history, political science, sociology, psychology, evolutionary biology and geography, both research questions and research methods in the 'main stream' of economics have been reduced in applicability.

Since advice from economists is still sought when various types of policy decisions need to be made, probably even in case of more democratic and decentralized (interdisciplinary or even trans-disciplinary) decision-making processes, economists need to have instruments at their disposal that meet the requirements of sustainability. New theories of production and consumption, not based on endless competition and accumulation but more on cooperation and more equal distribution, fully sustainable goals and multi-criteria indices to measure progress, developed for and by the relevant people specifically for its context, need to be implemented.

Institutionalizing new ethics is most important. Environmental decisions are ethical because norms guide behaviour and negative external effects are wrong if nature has intrinsic value or if organisms have rights. O'Hara examined the potential of three ethical concepts to contribute to sustainability.

Utilitarianism would, even with familiar adjustments in terms of e.g. internalization of external effects using valuation methods, still not lead to a desirable social outcome as long as the assumption that more is better prevails. Also, it allows people to apply objective rational rules for decision-making at work while they may have different emotional subjective norms at home.

Discursive ethics adds context and a communal dimension by means of open interdisciplinary discourse and practically links the private and public spheres. It requires specific conditions, however. If it were possible to completely rid people of biases and implicit assumptions could all be made fully explicit, then this would be a positive development towards sustainable decision-making.

The ethic of care puts relationships at the centre instead of reason. The awareness of dependence on and responsibility for human communities and nature make this ethic a potentially fully sustainable foundation that redefines conceptions of reason and value.

By now, economists and others who heavily criticise the commonly used neoclassical theories and models have begun to develop alternatives. However, it seems that most economists either do not hear the critiques or do not

(want to) fully comprehend them. Most critics apply insights from other disciplines and use terminology and knowledge of theories and models of those disciplines, unfamiliar to economists, even those who dare to be very interested. This communication difficulty can cause misunderstandings or even irritation. Also, people who feel accused can respond in a defensive manner. This hampers the full integration of relevant insights from different disciplines into economic policy recommendations. In time, education can be improved to prepare economics students for such interdisciplinary discussions. In the meantime, critical economists can improve this situation by more clearly introducing and explaining unfamiliar definitions and emphasizing the positive developments in making economics – and with it, partly, decision making processes and thus the economy and society – more sustainable.