From Activism to Policy Research:

Key Issues and Topics for Future Collaborative Sustainability Research

SEVENTH FRAMEWORK PROGRAMME

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List of CEECEC Partner Organisations

NGO Partners

- Centre for Science and Environment, India
- Centre pour l'Environnement et le Développement, Cameroon
- Acción Ecológica, Ecuador
- Ecological Society Endemit, Serbia
- A Sud - Ecologia e Cooperazione, Italy
- Vlaams Overleg Duurzame Ontwikkeling, Belgium (Flanders)
- Sunce, Association for Nature, Environment and Sustainable Development, Croatia
- Instituto Rede Brasileira Agroflorestal, Brazil

Research Institutions

- ICTA, Universitat Autònoma de Barcelona, Spain (CEECEC Coordinators)
- IFF, Universität Klagenfurt, Austria
- GEPAMA, Universidad de Buenos Aires, Argentina
- Foundation of the Faculty of Sciences and Technology, New University of Lisbon, Portugal
- Université Libre de Bruxelles, Belgium
- SERI Nachhaltigkeitsforschungs und Kommunikations GmbH, Austria

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1. Summary

This report by the CEECEC project identifies key issues and topics across a range of sustainability policy areas for future collaborative research between Civil Society Organisations (CSOs) and ecological economists. CEECEC (**C**ivil Society **E**ngagement with **EC**ological **EC**onomics) is a European Commission FP7 funded Science in Society project that aims to enable CSOs to engage in and lead collaborative research with ecological economists. The overall focus is not on theory but on case study learning, whereby CSOs and academics identify and explore key issues for research based on CSO needs and interests.

Most of the issues identified within this report have been drawn from collaborative work between CSOs and researchers in the CEECEC network to design case studies for the development of ecological economics teaching/learning materials (see the Handbook and the Course). The development of case studies took place over a 2 year process (see "Ecological Economics and CSOs: A Blueprint for Collaboration"), involving an initial meeting where CSO partners presented their topics of interest to research partners who listened and made initial proposals for approaches; the development of a framework for describing the issues at stake; ongoing electronic exchange of case study drafts, carefully guided by project co-ordinators; workshops where partners met to explore the issues at stake from both activist and research perspectives in greater detail; and the co-production of CSO stories, embedded with illustrations of the concepts and tools of ecological economics. In this report, where topics are the product of these collaborative processes, they are hyperlinked to the original case study drafts on the CEECEC website. Other topics come from open workshops embedded in conferences of the International (land grabbing in the Tana Delta) and European (light pollution, transport infrastructure and nuclear power generation, all in Slovenia) Societies for Ecological Economics (ISEE and ESEE), where non-CEECEC CSOs where invited to participate.

The report is structured thematically, highlighting gaps in research on issues relevant to environmental governance: waste management; forest management; protected area management; corporate accountability; transport infrastructure; mining/mineral extraction; development aid and natural disasters; energy production; watershed protection and payment for ecosystem services. Within each theme different cases of conflict are briefly described (see the Table of Contents for an outline). After a brief description of each topic, a short section follows with suggestions for further collaborative research. These suggestions were developed co-operatively, with input from both CSO partners working on the issues, and research partners of the CEECEC network. In addition to the suggestions outlined in this report, further possibilities for collaborative CSO/research specifically in the region of South East Europe can be found in another CEECEC report, "A Study of Environmental Conflicts and Issues in South-Eastern Europe: Possible Collaboration between CSOs and Ecological Economists ", also available on the CEECEC website.

It is our hope that this report will enable other CSOs active in similar areas to see how the concepts and methods of ecological economics might benefit their work and frame their research agendas, and at the same time encourage researchers of the sustainability sciences to collaborate with these and other CSOs on such highly relevant and often urgent environmental issues.

2. Issues and Topics Identified for Future Policy Research

2.1. Waste Management

2.1.1. Waste Management in Campania, Italy (A Sud)

Issues at Stake

From 1994 to early 2008, a state of emergency was declared in Campania, south-west Italy, due to saturation of the region's waste treatment facilities. There is growing evidence, including a World Health Organisation (WHO) study of the region that the accumulation of waste, illegal and legal, urban and industrial, has contaminated soil, water, and the air with a range of toxic pollutants including dioxins. High correlations between incidences of cancer, respiratory pathologies and genetic malformations and the presence of industrial and toxic waste landfills were alleged to be found. The Government has been unable to resolve this crisis, adopting measures that have raised public unrest, thus exacerbating the conflict. Local communities continue to organise and protest, risking arrest in order to be heard by the government that has so far excluded them from the decision-making process.

Meanwhile the management of waste has worsened in the eyes of critics: from the failure to separate dry from wet waste and resultant inability to produce compost (necessary for the regeneration of contaminated land) to the continued production of the inaccurately named "eco-balle" which continue to accumulate because of delays in incinerator construction, delays which are necessitating the creation of new stocking areas, the re-opening of old landfills and the creation of new ones. While the issue of urban waste is a global one, the question of illegal waste treatment remains one of the hottest environmental issues in Italy, yet the expression of public opinion on the matter has been completely stifled along with media attention.

Opportunities for Collaborative Research

The complexity of the waste crisis in Campania is clear, and the social, environmental and economic externalities of the case are well known. What is missing however is an accurate estimation of the true costs of remediation of contaminated land across the region. Without this type of research, strategies for remediation cannot be developed. Civil society can collaborate with researchers to identify areas of concern and provide valuable information on the history of waste treatment activities and known impacts.

The application of a life- cycle approach could also be of value to local activists developing strategies for their zero-waste campaign, as the case study also focuses on problems arising in the final stages of waste management (disposal/incineration). Post-normal issues also rise from the need to take action when there is high uncertainty, but also a high level of health and

environmental risks at stake. A “popular epidemiology” campaign to track local health impacts could become the basis for forceful action on the part of the government.

2.2. Forest Management

2.2.1. Forestry and Communities in Cameroon (CED-FoEI)

Issues at Stake

Cameroon’s logging industry involves power issues, impacts on local populations, and problems of illegality. In order to mitigate the negative impacts of logging, laws such as the 1994 forestry law and the new Forest Law Enforcement have been implemented, as has the Government and Trade (FLEGT) process launched by the European Union. A positive point of the FLEGT is that it offers an opportunity for civil society to try to improve the legal framework and its enforcement by regulating the logging sector. However, it is based on the same economic rationale of the colonization period, one which prevails today, namely one of extracting timber from peripheral poor regions and exporting it to wealthy European nations.

One of FLEGT’s major flaws is the presumption of the Cameroonian state’s respect for legality, and its entrustment to the state of a monopoly on the verification process. Also, the FLEGT does not challenge the legitimacy of Northern consumption patterns, nor does it question the legitimacy of private operators that originate from the North and accumulate the lion’s share of the produced wealth of Cameroonian forests. Consumers in importing countries do not know where their wood comes from, they suffer from “consumer blindness”. The concept of ecologically unequal exchange is implicit everywhere in the case of forestry in Cameroon, where unequal extractive processes clearly indicate a need for a more participatory democracy.

Opportunities for Collaborative Research

In addition to the concept of ecologically unequal exchange, there are many other strong themes in this conflict. Notably, the issue of corruption in environmental management, which highlights a need to develop a better approach to the analysis of such matters in ecological economics. There is also in this case, potential for the application of Material Flow Analysis as a tool to measure the international wood trade and its relation to local impacts. Studies would also be welcome that lead to a better understanding of differences between local indigenous communities, loggers and the State, with a focus on the concept of the incommensurability of these different actors’ values for the better analysis of these conflicts, especially if indigenous values are to be better taken into account by current decision-making procedures.

Finally, in the area of sustainable consumption and production, increased consumer awareness of the impacts of the wood they are buying is needed. Certification systems (like the FSC) for sustainable timber could be implemented in the form of a system of payment for environmental

services, whereby downstream users in Europe pay a premium to know that they are not damaging the environment or livelihoods of communities affected by logging in Cameroon. To this end, a study to demonstrate whether consumers would be willing to pay such a premium and how that would impact extraction models across the global South would be useful.

2.2.2. Participatory Forest Management in Mendha Lekha, India (CSE)

Issues at Stake

The village of Mendha Lekha, Maharashtra is a microcosm of tribal life that has managed to preserve its 18 km^2 forest over the years using an exemplary "self-rule" principle that has been central to their existence. Mendha achieved this feat through adherence to three pivotal principles: self study, self governance and participatory democracy (a consensus approach). The Gadchiroli district in which Mendha is situated is one of the most-forested districts in the country. It is predominantly tribal and poor, with high dependency on its natural resource base. However, with the appropriation of community forests by the state and the dwindling of the forest cover due to increased biotic pressures, the rights of tribals over their land have withered, furthering them towards poverty.

One exception to this rule has been Mendha, which rose against this practice back in the 1930s and initiated a struggle to assert control over its forest. Well known now for its declaration and maintenance of self-governance, the village worked its way around official policies to invest its social capital in watershed development and protection of the forest as well as its judicious use. In realization of the folly of separating tribals from the forests and the consequent conservation problems, the state introduced the Joint Forest Management (JFM) programme in the late 1980s. In the past such programmes have been characterised by a top-down approach, marginalising community say in the preservation and use of forests whilst grappling with issues of ownership and use.

Opportunities for Collaborative Research

The concept of GDP of the Poor was introduced in the TEEB report (The Economics of Ecosystems and Biodiversity, DGEnv and UNEP, final report 2010) and it is made operational in cases like Mendha Lekha. Similarly, conflicts on mining and dams in India, involve issues of adivasi rights to forests, and valuation of non-timber products and ecosystems services, that become easy to understand through the case of Mendha, which could also provide key insights into the nature of successful governance at the community level, and become a role model for implementation of official programmes like Joint Forest Management (JFM). Evaluation of the benefits and costs of the project could provide a platform to show the potential of community schemes managed in tandem with government that do not sacrifice livelihoods or cultural and environmental values.

An application of multi-criteria evaluation to the social, economic and cultural gains and processes in the village would also go a long way in carving out a methodology for future research and understanding of societal processes. The implementation and scaling up of successful forest maintenance by self-rule at the village level will also require data collection in order to build confidence in the effectiveness of this approach. At the same time, research focusing on understanding the institutions in place, and how or whether they could be replicated in other communities would be of great value.

2.3. Protected Areas Management

2.3.1. Local Communities and Management of Protected Areas in Serbia (Endemit)

Issues at Stake

Djerdap National Park (NP) in the eastern Carpathian region of Serbia is the country's largest National Park. The region is an important refugial habitat, extremely rich in biodiversity. At the same time it is home to considerable social and economical problems. Construction of a dam and largest hydropower plant on the Danube River and thereafter the designation of the area as a National park has had a strong influence on the natural and cultural heritage of the local population of this unique area, driving changes to the local community structure that are very likely related to impoverishment and depopulation of the region. In addition the locality has suffered further from the devastation of the economic crisis in Serbia.

If the Djerdap National Park is to be managed sustainably, this management must be developed in the way that supports the empowerment of the local community, incorporating active participation in decision making and management with the sustainable use of ecosystem services and further development of ethno-tourism. It is hoped that measures such as these would address problems with rural emigration and depopulation and simultaneously protect the environment of the National Park.

Opportunities for Collaborative Research

In developing an integrated social-ecological management system, it is key that the local community is integrated into the National Park (NP) management system. For this to happen, research is required to: raise the awareness of the NP administration of the importance of including local communities in NP management; promote the development of an ecosystem-based management system that treats humans as a part of the ecosystem; explore the best means of informing local people of these issues; and finally, to develop a strategy for facilitating communication between NP management and local communities in order to support / shape the best possible management practice for Djerdap (and other) National Park.

As part of these efforts, Endemit (the local CSO) could undertake a study to determine possible entry fees to the park that could be used to fund local economic development. The appropriate level of fees could be ascertained by using a variety of economic valuation methods such as the travel cost method, or a willingness to pay survey to find out the optimum level at which to fix the price, Fees could then be used for conservation, the improvement of park infrastructure such as bike paths or to fund training initiatives for employment of the local population to stem depopulation. A retrospective cost-benefit analysis of the dam (applying Krutilla's rule) could be useful for other CSOs fighting against dam construction.

2.3.2. Nautical Tourism in the Lastovo Islands Nature Park, Croatia (Sunce)

Issues at Stake

The Lastovo Islands Nature Park (NP) was one of the first designated protected areas in Croatia, established in 2006. The area has been able to preserve its natural and cultural heritage due to the fact that it is an isolated and distant archipelago that was a closed military zone until the 1990s. In the last two decades the Lastovo Islands NP has begun to develop its economy, which is primarily based on tourism, followed by fisheries and small-scale agriculture.

The number of tourists visiting the island is increasing each year, especially the number of nautical tourists attracted by its well-preserved nature, numerous coves and bays and good fish restaurants, however local infrastructure and tourist facilities are not well-developed and pressure on the environment is expected to increase significantly in coves and bays where new construction, including the installation of new mooring facilities is planned. The Lastovo Islands NP is currently in the process of developing physical and park management plans upon which to base future tourism development and management.

Opportunities for Collaborative Research

At this stage, an estimation of the number of tourists (in terms of carrying capacity or of not endangering resilience) for the Lastovo islands is urgently needed to inform the development of physical and park management plans. Civil society has an important role to play in such an assessment, not in leading research but more so in gathering data and carrying out lobbying activities in support of sustainable planning. This is due to the fact that knowledge of the virtues and practice of participative democracy is still relatively undeveloped in Croatian policymaking circles, so research carried out with CSO involvement is vulnerable to discrediting by vested interests such as those of developers, investors and other profit-seeking parties. Another approach would be to study the resilience of Lastovo, in order to set limits on the quantity of nautical tourists that can be supported by the local ecosystem without irreversible disruption, and to predict which parts are most vulnerable and therefore likely to give way first.

Also of interest to Sunce is the application of participatory research tools such as multi-criteria evaluation, visioning and scenarios to aid decision making on development options. These evaluations could be used as part of the consultation process for the development of protected area management plans. A desirable scenario for NP Lastovo Islands would for example, would be to have fewer people willing to pay more for services and entrance fees. However, people are only willing to pay up to a certain amount for conservation and/or services. Currently there is a much of dispute on the island over which services should be offered to tourists, whether they are willing to pay an entrance fee and how much, what they expect to receive for this money etc.

2.4. Corporate Accountability and Environmental Liability

2.4.1. Environmental Justice and Ecological Debt in Belgium: The UMICORE case (VODO)

Issues at Stake

The harbour city of Antwerp (Belgium) has a long history of expanding industrialisation with devastating effects on the environment and its inhabitants. Life expectancy in Antwerp is two years lower then the average for Flanders, itself a highly industrialised region. In the suburb of Hoboken, where UMICORE runs the world's biggest de-silvering plant, there is a direct link between pollution and health. After 122 years of emissions, the levels of lead, arsenic and cadmium in the soil increase with proximity to the factory, as does the level of lead in the blood of toddlers and infants. Cancers are significantly more frequent than the average for Antwerp. Lung cancers in particular, according to UMICORE's own investigations are those most likely to result from the plant's emissions, and the rates for such cancers are significantly higher than the average for Antwerp.

Since the early 1920s, locals had been actively asking for cleaner air, decontamination and compensation, yet it was not until 2004 that the company finally paid 77 million € for a clean-up operation of the area in closest proximity to the plant. Meanwhile, the company had been secretly paying compensation to farmers for fatally poisoned cows since the 1970s. UMICORE has now drastically reduced emissions and claims to have recognised its 'historic responsibility', despite having misinformed workers about the health risks of de-silvering, and denying all scientific evidence of ecological and health damage for decades.

Opportunities for Collaborative Research

This study has created space for the calculation of the historical environmental liabilities of companies in the more general context of the ecological debt of nations through their multi-national companies that operate in numerous countries. UMICORE for example, had had operations in the Congo that were not taken into account in this study. Such an endeavour would require cooperation amongst numerous local CSOs and universities where the company is active but could start with a company (a mining or electricity producing company) with branches in just a few European countries, to make it feasible. Cross-border research could then be carried out on the

ecological debts accumulated at different sites of one company. In the case of electricity generation, part of the debt would be carbon debt as well, calculated and expressed in terms of a local (site specific) debt, and a separate global carbon debt.

Further research is needed however to fine-tune the calculation of environmental liabilities, and to expand it to include other elements so that it could be used as the basis for legal action. The CEECEC team is well placed for instance to study the valuation of damages in the Chevron Texaco court case in Ecuador, and look into the teaching from such case for cases involving European companies. An analysis of how much money UMICORE would have needed to invest in order to avoid pollution from the moment the technology was available, and the subsequent external costs paid by the community as a result of them not doing so would give a clearer picture of the cost-shifting that many companies actively engage in, and what the true societal costs of not having stricter environmental norms are.

2.5. Transport Infrastructure

2.5.1. High Speed Transport Infrastructure (TAV) in Italy (A Sud)

Issues at Stake

The Susa Valley, situated between Maurienne, France, and Turin, Italy, has been urbanised by economic development which has disfigured the environment with the construction of infrastructures such as the Frejus highway, an international railway, and numerous dams and tunnels. The high speed Turin-Lyon train line (TAV) is planned at the intersection of 2 main axes connecting North, South, West and the East of Europe to complement the European railway network thus increasing the transport of passengers as well as goods. The West-East axis will be the key element of the so-called “Corridor n°5” that will initially connect Lisbon with Budapest, and eventually with Kiev, passing through the Susa Valley and crossing the Alps via a 50km tunnel to connect St. Jean-de-Maurienne (France) to Venaus (Italy).

In making this crossing, the TAV will create a multitude of environmental and health problems. Opponents to the tunnel argue that the level of acoustic pollution produced by a high speed train is similar to that of a landing air plane, and can lead to stress and insomnia. The avoidance of such health consequences would require living a minimum distance of 500 meters away from the high-speed railway, which for an area like the Susa Valley would require the forsaking of entire villages and much farmland. Furthermore, the required tunnels would be dug into rocks that research has shown contain uranium and asbestos that would be released into the atmosphere. Construction of the tunnel would also give rise to geo-technical and hydro-geological issues resulting from the large scale extraction of rock and potential alteration of underground watercourses that would cause flooding in both mountains and plains. Destruction of prairies and woods will also be necessary to

create space for the stocking of material extracted from the tunnels, as will construction of fences blocking the movement of wildlife.

Opportunities for Collaborative Research

No comprehensive Cost Benefit Analysis has been undertaken for this project despite a ruling in France that such an analysis should be done for any project of this magnitude. A cost-benefit analysis that takes into account both positive and negative externalities from the TAV, as well as putting a value on the environmental impacts and taking risks into account would be useful and also have a strong influence on policy-makers who best understand hard figures in money terms.

But the implementation of such projects is not always a yes or no decision but rather a process of negotiation where local communities need to have their concerns aired and addressed in a democratic fashion. One way of doing this would be to conduct a social, participatory Multi-criteria Assessment with local communities and other stakeholders where each could express their future vision of the territory.

2.5.2. Manta-Manaos Multi-modal Transport Infrastructure in Ecuador: Nature, Capital and Plunder (Accion Ecologica)

Issues at Stake

The Manta-Manaos project is a multimodal transport corridor: a mega-infrastructure project which aims to facilitate the flow of materials from Manaos, Brazil to Manta on the Ecuadorean Atlantic Coast. The corridor will unite Pacific Asia, the world´s fastest growing market, with the Atlantic, specifically Brazil, which is increasing its cultivation of soy and other grains with an eye on exports. As it passes through Ecuador, the corridor will have serious negative impacts upon local communities and ecosystems. These will be particularly significant for the indigenous communities and peasant farmers that live on the banks of the Napo River (one of the main tributaries of the Amazon River), which will be dredged to make it navigable. This is in the immediate neighbourhood of the Yasuni National Park. The corridor will also cross the Llanganates national park in the Ecuadorian highland and regions with delicate ecosystems on the Ecuadorian coast. The main project will entail the construction of infrastructure such as roads, hydro-ways, ports and airports, sweat shops (maquilas) and electricity lines.

The aim of the project is to integrate Ecuador further into the world economy as quickly as possible by accelerating the extraction of raw materials from the country for export to the markets of China and Brazil. This project and its promise of development is a priority for the Ecuadorean government. However, it will bring with it a range of economic, social and environmental impacts, increasing the burden of foreign debt and disturbing the ecological balance and the existing social web. The Manta-Manaos Corridor represents an extension of the neo-liberal economic model

whereby the exploitation of resources is prioritized above the well-being of communities. These communities meanwhile are denied the right to consultation over projects that affect them.

Opportunities for Collaborative Research

The IIRSA projects in South America are, according to critics, reinforcing the raw materials export policy that characterized the continent for long periods of its history and with greater intensity in the 1990s and early 2000s. The social and environmental costs of such infrastructure projects, particularly at the "commodity frontiers" opened up by new roads and waterways could be researched as examples of unpaid-for externalities (successful "cost shifting", as K.W. Kapp put it). Trends of material flows could also be researched. The transport infrastructure is an element of contention also in another of the case studies from Ecuador in the CEECEC project, copper mining in the Cordillera del Condor. So, expertise has been built up socio-environmental costs of transport in Amazonian territory that will be useful for future cooperative research, even if the Manta Manaos project is finally not carried out.

2.5.3. Transit Transport Charging in Slovenia and the Eurovignette Directive (Focus Association for Sustainable Development)

Issues at Stake

Joining the EU resulted in a 70 % increase in transit road cargo transport through Slovenia, with a significant increase in the number of trucks crossing daily from Italy and Austria through the Ravbarkomanda and Trojane passes en route to Hungary and further east (Russia, Ukraine etc) via the Slovenian border town of Dolga Vas, or to the south to Croatia and other Balkan states. The growth in transit cargo transport means that the taxpayers' money that was used to build Slovenian roads and highways has mainly funded the boom in cheap cargo transport, leaving Slovenia with high economic, social and environmental costs. Road maintenance for cargo transport for example, is far more expensive than for other vehicles: one cargo vehicle causes about 30 000 times more damage to a road than a personal car, yet until 2008, the road charge for trucks was just 4 times higher than for cars. Meanwhile, the Slovenian government has ambitious plans to upgrade the harbour in Koper, which would cause even more transit transport.

The European Commission's Eurovignette Directive offers a few possibilities for increasing road charges to address the costs of transport without creating an obstacle to the free flow of goods in the EU: it enables charges on regular roads, not only on highways, charges for environmentally sensitive areas (like the Alpine or Karstic regions), charges for environmentally degraded areas (like Ljubljana, due to the increased levels of air pollution) and charges for infrastructure that have over average construction costs (such as tunnels or bridges). How the Slovenian government can best take advantage of the Directive to stimulate rail transport is an important part of the country's economic debate.

Opportunities for Collaborative Research

In light of the drastic increase in road cargo transport transiting through Slovenia, a calculation of the carbon footprint and assessment of the related effects could be useful for raising public awareness and drawing the attention of policy makers to the social and environmental impacts of increases in road transport. Civil society could also play a major role in influencing the designation of roads and highways that can and cannot be used by the European transport sector based on planning restrictions defined by local participation and decision-making.

2.6. Mining / Mineral Extraction

2.6.1. Mineral Extraction and Conflict in Cordillera del Cóndor, Ecuador (Accion Ecologica)

Issues at Stake

Ecuador's economy is based on the extraction of natural resources, one of the most important of these being oil. Yet the extraction of minerals and fossil fuels causes a wide range of environmental impacts and releases large quantities of contaminants into the atmosphere and surrounding ecosystems. One site recently targeted for expansion of ore mining is the Condor mountain range – one of the richest biological regions in South America. Rising 1500 meters above sea level, the Condor mountain range is located in the south-eastern region of Ecuador on the border of Peru. This region´s complex geology, as well as its high humidity and proximity to the immense Amazonian rainforest generate unique ecological conditions for the production of enormous biological wealth. This region is also the home of Achuar and Shuar indigenous communities that make their living from agriculture, cattle, fishing and from the collection of timber and non-timber forest products.

Since the 1990s, government measures to settle the Amazon and the national frontiers and the arrival of gold seekers have increased the regional population, contributing to the intensification of local conflicts for land and resources. In 1995, this area was the scene of a short war between Ecuador and Peru. The government has granted numerous mining concessions for large scale gold and copper mining in the Condor mountain range. This has caused increasing unrest and raised concerns in local communities regarding the impacts of these activities.

Opportunities for Collaborative Research

This case study and the activists on its conflicts could benefit from further research in a number of ways. First, in terms of participatory research, social multicriteria methods could be used to improve decision-making mechanisms, improving the involvement of local communities, and including their interests and values. On this matter, studies that recognise and acknowledge the incommensurability of values at work are also needed to improve the understanding of indigenous perspectives, which for the most part are usually unheard. In this territory the Shuar communities

are in general opposing the project, but they are often divided. The application of Convention 169 of ILO is of interest here, and in many other regions in the world where so often indigenous territories overlap with mineral or fossil fuels extraction frontiers, and also increasingly with tree plantations for paper pulp or agro-fuels. In this territory there are also issues of research on international conflicts (between Ecuador and Peru), and on the role of conservationist organizations – what is the combination between the "cult of wilderness" and the local environmental justice movements?

Other more technical approaches are also needed: An ecosystem services valuation could be useful in terms of improving the understanding of the long-term high economic value of Cordillera del Condor in contrast to the short-term benefits yielded by the activity of mining. Material flow analysis could also help address the economic implications of continued copper exports by Ecuador (and other historically exporting nations), to make European consumers more aware of where their metals are sourced from and the devastating impacts of mineral extraction in the South.

2.7. Development Aid and Natural Disasters

2.7.1. Aid, Social Metabolism and Social Conflict in the Nicobar Islands (UNI UKL)

Issues at Stake

The Nicobar Islands are located 1,200 km off the east cost of India, part of a larger archipelago of 24 islands in the Bay of Bengal. The islands are not only home to outstanding terrestrial and marine bio-diversity, they are also inhabited by an indigenous community, the Nicobarese. Protected since 1956 by the Andaman and Nicobar Protection of Aboriginal Tribes Regulation, 65% of the total 42,068 residents of the Nicobar Islands are indigenous. Tribes traditionally lived in villages along the coast, sheltered behind mangroves or within bays. The economy was based on subsistence activities: mainly fishing, hunting and gathering. The copra (dehydrated coconut from which oil is extracted) they produced was exchanged for complementary products like rice, sugar or soap. Since the tsunami in 2004 the economic history and social metabolism of the Nicobar Islands has been drastically transformed. The loss of coconut trees brought the market economy to a standstill. Coastal ecosystems such as mangroves and coral reefs that communities had depended upon for food were destroyed. The increase in sea level by almost two metres resulted in the "sinking" of the islands, causing the disappearance of entire villages and most household property and rendering navigation and fishing insecure due to the deformation of the coastline.

Most of the rehabilitation work of the islands was state-controlled: communities received cash compensation, free supplies of food rations, electricity, water supply, housing and boats. This process has created dependency on external aid and given rise to complex sustainability problems and conflicts. There is a lack of interest on the part of islanders to engage in plantation / agricultural

work or entrepreneurship, and attempts to implement a cash-for-work scheme have failed. Increased exploitation of existing resources by non-Nicobarese is also on the rise now that islanders have cash deposits. Substantial changes in land use are taking place due to new infrastructure and the possible commencement of agricultural production. There has been a fundamental change in the metabolic profile of the island, from a subsistence, to an import-based economy, with an enormous increase in non-renewable energy use. In addition there have been significant impacts on the social structure of Trinket Island, including increased social stratification. These have contributed to the disintegration of the joint family system and exacerbated conflicts over money, land, and values.

Opportunities for Collaborative Research

Out of this case study, several opportunities for further research arise. First, there is a need to explore the institutional structures and framework conditions within which humanitarian aid operates if we are to better understand the drivers of complex disasters. Studies are also needed to determine how science can best contribute to the delivery of sustainable humanitarian aid. Another question points to what promising sustainable pathways could be when rural systems are integrated into the open systems market economy. Finally, there is the issue of how transdisciplinary research can support stakeholder involvement in seeking sustainable pathways.

Other pertinent questions arising out of this case study can and should be applied to other instances of disaster intervention:

1. What patterns and preconditions can be observed that can improve our understanding of the success of a system in terms of structure, dynamics, and processes?

2. Can these be replicated? How can science support sustainability transitions in other areas based on these insights?

3. What challenges do local economies face from higher-scale interventions and how can they be overcome?

2.8. Energy Production

2.8.1. Biofuel Production and Biodiversity Protection in the Tana Delta, Kenya (EAWL)

Issues at Stake

The Tana Delta in Kenya is one of Africa's most valuable wetlands. It is home to two dominant tribes, the Orma pastoralists and the Pokomo agriculturalists, both competing for control of water and land resources in the delta, sometimes in violent conflict. But the delta also holds much of Kenya's potential of irrigable land. In the Tana Delta backers of a plantation for sugar cane and ethanol production, face opposition from local pastoralist communities. Concern has also been

expresses by a small community of successful rice farmers, ecotourism enterprises and conservationists who believe the wetlands should be acknowledged as RAMSAR protected areas. There is also an element of property rights uncertainty to complicate matters.

The project is proposing a development based on energy and sugar supply and the delivery of 20, 000 jobs of unknown quality. Many drawbacks are anticipated including loss of biodiversity, traditional local production systems, mangroves, fisheries, local livelihoods and disruption of water balance. The likelihood of carbon released during the process of converting wetland into sugar cane plantations raises further questions about the feasibility of the project. In addition, since there is the possibility of the export of ethanol, this implies the export of water from this area.

Opportunities for Collaborative Research

Monetary valuation could be used and has been considered by a local CSO (the East Africa Wildlife Association) to calculate potential lost environmental services should plans for sugarcane and ethanol production go ahead. Moreover, an approach based on human appropriation of net primary production (HANPP), and an analysis of rights to the appropriation of primary production and related equity issues could help local communities to make a very strong case against the proposed plant. Understanding of the energy returned on energy input (EROI) of the sugar cane and ethanol production system could also be of use, since it is likely that the amount of energy in terms of materials and fuels to build and operate the plant would likely exceed the energy yielded by the bio-fuel that would be produced.

Studies of social metabolism and virtual water are also relevant in this case since some of the ethanol is likely to be exported, thus leading to the export of water from this ecologically valuable and sensitive area. From a political viewpoint investigation into the creation of an extractive reserve (along the lines proposed by Chico Mendes in Brazil in the 1980s) could be an appropriate response to local perspectives, which would grant local communities access to local resources.

2.8.2. Nuclear Power Production in Slovenia (and Croatia) (Focus Association for Sustainable Development)

Issues at Stake

About one third of Slovenia's electricity is produced by an existing nuclear power plant in Krško (NPP Krško), which is jointly owned by Slovenia and Croatia. The existing reactor is planned to be in operation until 2023, although there are already debates about prolonging its operation. Construction of a second reactor is planned to begin in 2013, which will use Pressurized Water Reactor (PWR) technology, and have a capacity of 1000 MW, with annual production of 7.5 - 8.5 TWh. Its construction is estimated to be completed in 2017 at a cost of 2 billion €, but this figure is viewed with a great deal of pessimism in light of experience with construction of the nuclear

reactor in Olkiluoto, Finland. In this case, after four years and thousands of defects and deficiencies, the reactor's 3 billion € price tag has climbed by at least 50 percent.

Another factor that makes it difficult to accurately predict the price of the new reactor in Slovenia is the unresolved issue of radioactive waste storage, which must be addressed in order to estimate its cost more accurately. Furthermore, although it is claimed that the new nuclear block is urgently needed in order to prevent black-outs in Slovenia in the future, the project developer GEN Energija, plans to sell roughly half of the produced electricity abroad, perhaps to Italy or Austria.

Opportunities for Collaborative Research

With the unclear costs of construction, unresolved waste storage problems, continuation of exposure to nuclear risks and the prospect of locking the country into dependency on increased energy use, some environmental NGOs see the planned construction of the second block as a highly problematic issue. A cost benefit analysis (CBA) could perhaps help to compare the nuclear alternative with the alternatives of saving energy and using renewables.

The nuclear power lobby furthermore is growing all over the world and in Slovenia it is the positive vision of science that dominates public opinion. It could therefore be useful to conduct public awareness raising activities with a focus on ethical issues of nuclear power, particularly in terms of the risks posed to existing and future populations. Such activities would require forums for participative deliberation, and scenario building could help to broaden the current discussion on the use of nuclear power. These exercises could of course be extended to current debates about prolonging the operation of the existing reactor. Issues of (lack of) long term liability of nuclear power companies are also relevant here.

2.8.3. Light Pollution in Slovenia (Dark Sky Slovenia)

Issues at Stake

Slovenia is the first country to have a comprehensive nation-wide law on light pollution. The introduction of the Decree on Limit Values due to Light Pollution of the Environment on August 30 2007 was motivated by concerns about the effects of the growth of outdoor lighting at rates analogous to those of other European countries. Beyond its inefficient use of energy, light pollution threatens a number of species, poses health and safety risks, and acts as an obstacle to the enjoyment of nocturnal nature and the sky, an important part of people's natural and cultural heritage. The period of negotiation of this law, but more so that of its implementation revealed a number of powerful lobbies and other obstacles threatening to weaken or even completely abolish the law.

These efforts - should they succeed - would represent a regretful step back in environmental protection, not only in Slovenia but also globally, as more countries may begin to legislate on light

pollution. With light travelling up to 300 km in distance, the issue is inherently international and thus requires concerted efforts for its reduction. The negotiation process of the legislative act unveiled disagreements over what constitutes 'ecological outdoor lighting', and at the same time provided an opportunity for crystallization of the best technical parameters. The law now justifies the choice of technical requirements and also specifies areas where further improvements are needed.

Opportunities for Collaborative Research

Dark-sky Slovenia, a local CSO has already proposed the development of an index that may be used as an internationally accepted standard to reduce light pollution. So the dual question that remains is 1) how to challenge the notion that economic growth necessitates more light and 2) how to convince the public and policymakers that more light is not necessarily good. In addressing this question, Herman Daly's concept of "uneconomic growth" could be used to demonstrate that although the economy may be growing, the production of excessive light does not increase the welfare of the human population - on the contrary, it impacts human health adversely, destroys biodiversity etc.. in many of the same ways that excessive car travel and meat consumption do, for example.

The issue of light pollution could also make valuable contributions to, and even headline, discussions about energy consumption, with a focus on reducing energy consumption through technological transformation in urban contexts. In this regard it could be a worthwhile endeavour to run an opinion poll on the issue, and to publicize the results in the press, in policy debates and through popular mobilizations as a means to uphold recent fought-for legislation. Opinions of a well selected poll sample might be more effective than running a cost benefit analysis on this matter, since there are so many unknowns associated with light impacts, but where the bill-paying electricity consumers certainly have a perception of the usefulness (e.g., to security, personal safety, etc.) of having appropriate lighting. The exercise would not be one or arguing either an anti or pro-position on lighting, but one of the assessment of cost-effective light focusing techniques that reduce their impact on the night sky. Finally, in order to multiply the positive effects of a light pollution law such as the Slovenian one in other countries, a model needs to be designed as a benchmark, drawing a line between a truly effective light pollution law that triggers reduction of light pollution and one that only carries such a label. Civil society has an important role to play in such efforts, especially in terms of assessing the effectiveness of light pollution legislation.

2.9. Watershed Protection

2.9.1. Local Governance and Environment Investments in Hiware Bazar, India (CSE)

Issues at Stake

Hiware Bazar is a village that has achieved success through investing in local ecology for economic good. The village followed an integrated model of development with water conservation as its core. The infrastructures for water harvesting were financed by the resources for local employment made available by a programme in Maharashtra that was a precedent for the current NREGA programme in rural India (providing 100 days of paid work per year and family in public investments).

Hiware Bazar won the National Water Award for its efforts in water conservation and raising village productivity levels. The village has been deemed exemplary in its approach to local environmental governance for several reasons: It uses water as the core of village development; It is community driven; its village-level resource planning is impeccable; It uses government programmes but with community at the driving seat; and, it has thought out its future plans to make the initiative sustainable. This case study examines the keys to the success of Hiware Bazar with a view to identifying the potential for replication across region and country.

Opportunities for Collaborative Research

The case of Hiware Bazaar focuses on the issue of environmental investments by using the subsidies for employment of rural labour. It is a successful case, symbolic of water management in Indian villages. Water is not used in this case for crops such as sugar cane, very intensive in its need for water, but for crops that are less demanding of water. There are collective rules, set up in the village. Thus, Hiware Bazaar illustrates an important theme in ecological economics: the evolution of property rights and management institutions in the present of environmental scarcity. Most of the districts in the country exhibit ecological and economic problems of varying degrees that can be addressed in a similar fashion. Hiware Bazaar is held up as an example of how to remedy the problem, which is not one of scarcity, but of managing resources so that infrastructure is capable of benefitting the poor. This case therefore raises questions of how to deepen democracy so that communities can be involved in natural resource management.

CSE (CEECEC partner in India) also points to a failure to understanding the real nature of employment in India, where ecological assets like water harvesting, soil erosion prevention and forests are the key to employment sources for rural people. Any attempt to create employment must focus on these sectors, but current policies for employment generation are often restricted to employment per se, completely ignoring the fact that generated employment opportunities need to be sustainable and allow the employed to move above the poverty line. A more qualitative

approach to employment generation is required if lasting, productive employment opportunities are to be generated.

2.10. Payment for Environmental Services

2.10.1. Payment for Ecosystem Services (PES) in India from the Bottom-Up (CSE)

Issues at Stake

In the Himalayas, in order to preserve a small dam, a downstream village decided to pay an upstream village to cease the grazing that causes soil erosion and the accumulation of silt. In economics, this is an example of "payment for environmental services" (PES). When payment compensates for the opportunity cost of lost income, PES is seen as a useful instrument for the preservation of nature. However, this method of valuing nature can also have its pitfalls.

Opportunities for Collaborative Research

PES is often controversial for CSOs. A real, bottom up case as that analysed by the CSE for CEECEC is a good introduction to the topic. PES would seem to require clear community rights over resources to succeed. CSE points to the example of central India where the government has not engaged with tribals to settle rights over large tracts of land classified as forest, with the result that conflict prevails in the region. In addition, economic valuation can be a useful tool but, this approach also creates difficulty in deciding what not to protect. This is because in the process of choosing to preserve certain services, there is the risk that those that are excluded might serve an important purpose in the future. Clearly, where governance structures and policies are not conducive to PES, valuation of and payments for ecosystem services is still contentious, leading many critics to observe that the large-scale adoption of PES schemes is too complicated to implement. Research should focus on the tension between, on the one hand, valuation and payment for environmental services (in order to protect nature and the so-called "GDP of the poor") and, on the other hand, the driving forces of rapid industrial and economic growth that though mining and infrastructure development leads to occupation of territories and destruction of biodiversity, causing displacement of people. PES is about efficient allocation of environmental services, the analysis of the driving forces in about the material scale of the economy (to use Herman Daly's useful distinction).

2.10.2. Mechanisms in Support of the Creation and Consolidation Of Protected Areas in Mato Grosso, Brazil: The Potential Of REDD And Legal Reserve Compensation (REBRAF)

Issues at Stake

The state of Mato Grosso is the principal contributor to Amazonian deforestation, a major source of global carbon emissions. It is also one of the world's largest producers of soybeans, cotton and beef, which contribute substantially to Brazil's overseas exports. Extensive cattle ranching on pastures planted on degraded lands is the primary use of land in the state, and is expanding rapidly as the price of beef has increased with growing world demand. Mato Grosso has enacted innovative licensing and monitoring procedures as a command-and-control mechanism against rampant deforestation, but agribusiness expansion has stimulated continued incursion into frontier areas, and only 32% of lands have been effectively licensed.

A recent proposal for a pact to reduce Amazon deforestation, formulated among environmental NGOs in consultation with regional stakeholders, has brought farming interests to the negotiating table, seeking compensation in return for efforts to avoid further deforestation. Part of the financing for such a measure is to be sought in global carbon markets under the Reduced Emissions from Deforestation and Forest Degradation (REDD) scheme.

Opportunities for Collaborative Research

Investigation of the underpinnings of the Deforestation Pact as it might be implemented in the Mato Grosso case, and examination of scenarios for targeting and participation of land users in the REDD scheme would help in estimating what it will cost and how much land might be brought in, and in considering who should pay for it. Opportunity cost to landowners (or occupants), could be taken as equivalent to the net revenues foregone over a given time period (or in perpetuity) for having withheld forestland from production. On this basis, it would be possible to identify hypothetically those land uses that might be attracted to such an alternative, provided the institutional bases for assessment, payment and monitoring of compliance are in place.

For how long such conservation easements would have to be paid, with what expectations in terms of monitoring, the identification of best practices, the assessment of intensified use of deforested areas, better management practices and market options for sustainable use, and what their actual impacts might be on deforestation all remain to be worked out and tested in practice. These results will depend significantly on the tenure context in which carbon pools are locked up, and who the managers of these forest resources are, to avert leakage of carbon. REDD is one of the hottest issues in climate change policy, and the money available for REDD will depend a lot on commitments to decreasing emissions in a post-Kyoto scenario. Research on REDD is therefore also research on different aspects of climate change. Research evolving out of CEECEC would therefore do well to focus on local examples of REDD in Brazilian Amazonia and elsewhere.