



Socio-Ecological Systems: environment, development and sustainability

**One-day Postgraduate Research Conference 7th April 2016.
Room 347, 16 Taviton St, University College London WC1H 0BW.**

Session 1

Mobility and access during extreme drought: impacts of political and social constraints on pastoralist communities in Laikipia, Kenya.

Claudia Amphlett, University College London

Pastoralist communities operate in arid and semi-arid lands (ASALs) in East Africa and have successfully used a range of strategies which allow them to exploit an unpredictable climate and manage climate risk, more than many such strategies commonly centre on mobility. Pastoralists live with high degrees of risk and uncertainty with livestock mobility especially adopted during drought periods. This is because mobility provides an important means to reduce livestock vulnerability to drought, limit the negative ecological effects of livestock grazing, while also increasing the number of livestock that can sustainably graze an area. The distribution of livestock in space and time can be interpreted in terms of the model of the ideal free distribution (IFD): The number of livestock supported in an area varies with the level of resources found there. IFD is based on the assumption that resource consumers have unrestricted access to resources. However, there are concerns about maintaining mobility owing to a number of reasons including: 1) expansion of cultivated areas; 2) loss of livestock corridors; 3) privatization of land; 4) increase in fences on properties; 5) growing social conflict and insecurity that undermine this theory. Understanding how pastoralists adapt and respond to changes in climate is important to identify and interpret adaptive capacity to future changes in climate, and to predict the likely resulting pathways of pastoral systems.

This study used a mixed methods approach using a range of quantitative and qualitative techniques to explore pastoralist mobility and access during the 2009 extreme drought in Laikipia, Kenya. Households (n=195) were interviewed across three study sites on where they accessed water and pasture and whether wealth or area influenced household decision making.

Forest histories and nuclear futures: mapping value and landscape change in southern Tanzania.

Stephanie Postar, Oxford University

Tanzania is preparing for its first uranium mine, to be located within the UNESCO World Heritage Site Selous Game Reserve, considered the last, largest wilderness area in sub-Saharan Africa and one of the most important habitats for elephants. Facing the ravages of the most recent spike in elephant poaching, the Selous dangles on the list of Heritage Sites in Danger. In the face of seemingly competing regimes of natural resource management – conservation, poaching, and mining – how are actors positioning themselves at the brink of what may be a period of great change in the area?

This study of expectations and navigational strategies in a complex environment is grounded in ethnographic fieldwork and natural resource mapping. Building on the well-studied economic, environmental, and social impacts of mines, I theoretically examine the relevance of value(s) in the creation and management of expectations framed by historical context. Hidden human histories create friction with colonial archives as well as some current narratives in the concept of the Selous Game Reserve being an untamed, untouched wilderness. Elders recounted evictions from their homes, now within protected areas, as part of Tanzanian Ujamaa socialism and collectivization. Earlier, the British Colonial Closer Settlement Scheme, an intervention ostensibly aimed at limiting African Sleeping Sickness, similarly moved people from areas within the Selous Game Reserve into larger settlements farther from forests. These forced movements of people—and resulting depopulations of areas—may also have impacted forest conditions and wildlife populations, perhaps helping to create the wilderness area that UNESCO deemed of outstanding universal value as a World Heritage Site. This study seeks to untangle the threads of competing histories and heritage, along with values, often expressed through expectations of hope and risk, that speak to why there is such strong domestic support for uranium mining from a protected area where conservation is the most important local economic driver along with small-scale agriculture and poaching.

Overfishing or over reacting? Management of fisheries in the Western Border of the Pantanal wetland, Brazil.

Rafael Morais Chiaravalloti, University College London

Small-scale commercial fishermen in the Pantanal wetland, Brazil, have been accused by policy makers and tourist operators of overfishing and a severe recent decrease in local fishing tourism. As a consequence, today, commercial fishermen in the Pantanal can only use line and hook to sustain their livelihood; and those who decided to continue gather bait may only do so in the southern region of the biome. The overfishing narrative is not a new argument nor unique for the Pantanal wetland. It is common for changes in the fish stocks to be immediately assumed to result from problems due to local fishing effort. This paper aimed to study small-scale commercial fishermen in the Pantanal and the decline in local tourism. It uses a multivariate regression to understand the main drivers of tourists' decline and one year of extensive participant observation and mapping to understand local fishermen natural resource use. For the period analysed (1994 – 2013), although

there is no evidence to deny or prove overfishing, 88,3% of the decline in tourism was driven by changes in fishing rules, not fish availability. In other words, based on the flood pulse concept, during the period analysed, the number of tourists were not linked with the quantity of fish available in the system. This finding challenges the rhetoric that number of tourists is linked with local people's fishing effort, because the number of tourists changed regardless of each year's flood size and therefore the quantity of fish. Moreover, fishermen move their zones of use according to the emergence of drawdown areas. This rotational fishing system allows them to match their fishing sites with areas where the fish are migrating. Such mobile systems have been hailed as a first sign of sustainable management. Ideally mobile reserve use helps to not exhaust natural resources, and allows different populations to recolonize the areas that have been used. Moreover each settlement has its own territory, which creates a clear notion of predictability as to the number of people involved and as to who controls the use of specific spots. It is interesting to note that this gives a common property resource management regime with region-specific features. Equally important to guarantee sustainability of natural resources in the Pantanal are the biophysical changes in resource access. The loss of connectivity among water bodies or simply the closing of bays and river channel entrances by floating mats can turn these areas into natural exploitable refuges for aquatic species; protecting the whole floodplain from overfishing. This paper presents the intimate connection between local people and the Pantanal, and deconstructs the local overfishing narrative.

Session 2

Adaptation in Central Thailand.

Nuttavikhom Phanthuwongpakdee, King's College London & National University of Singapore

Despite enormous investments in flood disaster prevention and mitigation, in addition to supports from various public sector and private institutions, Thailand has continued to face escalating vulnerability during these few years. The 2011 Mega-Flood has served as a wake-up call to jolt us into coming to terms with the reality that there has been something amiss with the domination of social modernity and technocratic management. The event exemplifies the larger disparities going on throughout the country. Instead of the dominant approach, it is essential to consider the narratives that have been overlooked in order to find the elements that are responsible for the uneven vulnerability to flood hazard, along with seeking a range of adaptation choices.

Through the bifocal-conceptual lens of political ecology and pragmatism, this thesis aims at capturing qualitatively the complexity of flood hazard and the expansion of the range of adaptation choice in Thailand. By examining the perception of risk and the processes of adaptation within the local Thai context, it presents findings from fieldwork conducted in three areas (suburban, desakota and rural) in Central Thailand. The fieldwork was conducted from April to October 2013 and data collection methods include documentation analysis, semi-structured interviews, focus group interviews, and direct observation. This research helps define pathways to an expanded range of choice for flood management in Thailand.

Empirical data suggest that although the residents and local officials view flooding as an unwanted common occurrence, changes in people's lifestyles to thrive in a modern society have transformed how they perceived flooding. Depending on the areas, elements such as climate change and political conflict have, in addition, deteriorated local flood response mechanisms. In its attempts to deal with flooding, even after the 2011 Mega-Flood, the government has been inclined towards resorting to structural measures and has been favouring policies meant to generate wealth for counterweighing losses. Social, economic, political, historical, and cultural aspects have mostly been ignored. Participants, on the other hand, integrate these elements into their responses and tend to perceive an extensive array of choices. These findings propose that amid the changing landscape, the locals are not passive. They have been utilising many strategies to help them adapt to floods. However, several socio-cultural factors impede them from expressing their views and force them to adopt limited strategies.

To assist adaptation, the Thai government has to comprehend the material and discursive elements that shape local flood experiences. This can be done through public participation. Certainly, by talking to the participants, it became apparent that to increase the range of adaptation choices and to fortify local resilience, it is important to encourage preparedness and risk awareness, promote traditional knowledge, enhance the role of religion and strengthen the role of local government.

A critical assessment of governance of urban ecosystem services in developing countries: A case study of Kibera informal settlement Nairobi, Kenya.

Dennis Mailu, Reading University

Increasingly, the linkages between the role of ecosystem services and the complexity of the relationship between human well-being and poverty are being addressed in the literature. Yet, research on the role and cultural value of ecosystem services in poor urban areas has been limited to date. This novel work, in contrast, focuses on the under explored role of ecosystem services, the institutions that mediate these services, and the cultural values that are placed on ecosystem services by poor informal settlements in developing countries.

Water poses the largest problem in Africa's largest urban slum, Kibera, located in Nairobi, Kenya. The communities there rely heavily on hawked water drawn from piped water and a borehole to meet their water needs. Historical and socio-political factors have led to improper urban planning, resulting in extensive environmental pollution and drainage problems. In this context, the connection between poverty and ecosystem services is evident, and it is emerging that they exacerbate each other. This study critically examines the meanings and value of water among people in two villages in Kibera, and explores the assumptions underpinning the institutions that mediate these values. This study is informed by (n= 37) community interviews, (n= 25) key governance actor interviews, (n=10) focus groups, and documents and participant observations conducted in Nairobi and Kibera at two stages in November–January 2014 and December 2014–February 2015.

The research identifies that it will be important to understand water as an ecosystem service in a poor urban context, especially due to the fact that ecosystem services are not yet fully mainstreamed into developmental thinking and its capacity as a conduit to transformation. The

research concludes that the role of culture, especially on identity and sense of place, will inform important cross-scale governance interactions involving non- state actors, including non-governmental organizations (NGOs), transnational environmental organizations, intergovernmental and multilateral organizations, and local communities in order to aid and improve adaptive strategies towards resilient futures.

A Legal Framework for Petroleum Host Community Participation in The Niger Delta.

Debbie Kobani, PhD Candidate, Aberystwyth University

Nigeria is the second largest producer of oil in Africa and the 11th largest in the world. It is therefore unsurprising that Nigeria's oil has consistently accounted for a great proportion of the country's export earnings. However, although petroleum resources sustain the Nigerian economy, its oil wealth has brought appalling hardship to the citizenry, especially to the people in the oil producing communities of the Niger Delta, where the bulk of the country's petroleum resources are found.

The industrial activities associated with gaining access to petroleum have been connected with substantial environmental degradation, pollution and social crises, posing a potential threat to Niger Delta's sustainable development. Prior to the discovery of oil in Nigeria, the Niger Delta had long supported subsistence farming and fishing. To date however, the intense and continuous search for and exploration of oil in this area has had a phenomenal impact on the lives and environment of the people.

Oil spills and gas flaring for example, have destroyed aquatic lives, contaminated drinking water, left fishermen and farmers jobless, and resulted in severe threats to public health. Inhabitants within these communities have protested against such environmental degradation and pollution, but the Nigerian government has repressed them. Some youths of these areas have pitched against the oil companies by shutting down oil installations, destroying oil facilities, kidnapping expatriates and employees of oil companies and asking for payment of ransom from multinationals.

While there may be many causes of the conflict and agitation in the Niger Delta of Nigeria, the main cause is the historical failure of governance at all levels, corruption and biased policies that disregard the affected local communities from participating in shaping the rules and decisions that govern their lives. This presentation aims to highlight the need for host community participation in Nigeria and considers the relevant international and domestic laws.

Session 3

Paradoxes of ratification: The impact of the Nagoya Protocol on Brazilian biodiversity policies.

Flavia Donadelli, London School of Economics

To many observers, the adoption of the Nagoya Protocol was expected to enhance the ownership rights of traditional and indigenous communities, which had only been vaguely addressed in the Convention on Biodiversity. In Brazil, however, the ratification process of the protocol has motivated reforms which move in the opposite direction. Recent changes in law are likely to diminish the self-

determination rights of local communities with regard to their biological resources and traditional knowledge. This paper attempts to explain the paradoxical effects of the international agreement by the interplay of international and domestic factors. It is argued that the implementation of the Nagoya Protocol in industrialized countries triggers a reorientation of governmental priorities in Brazil, which in turn leads to a rearrangement of institutional competencies and changing patterns of access modalities for societal actors. Ultimately, the ratification of the Nagoya Protocol bears unintended consequences which eventually undermine some of its original goals. Our case study illustrates that international agreements may impact domestic public policies even before (if ever) they are ratified. The mere existence of new international context conditions may weaken the rights of those who were expected to benefit most from the international wording.

The (un)sustainable production of bioethanol in the Cerrado: from habitat to gas emissions.

Jéssica Fonseca da Silva, University of Cambridge

The Brazilian savannahs, known as the Cerrado, are the richest savannahs in the Neotropics. They are under threat from the expansion of agriculture and cattle ranching: half of the land has been already converted. Despite this increasing encroachment, plant distribution remains still poorly understood. Amongst other commodities, sugarcane-based bioethanol is spreading through this region. I have been studying the main factors that determine the species distribution and diversity of woody plants as well as the consequences of the recent land use changes and management in crop systems, specifically the effect of sugarcane.

I used Maxent modelling to model the distribution of 50 woody species, using a dataset not currently available in global databases. I then calculated the percentage of the suitable areas that has been lost to sugarcane fields and other land covers using ArcGIS and R tools. I found that soil type had the strongest effect on plant occurrence and richness, alongside climatic variables, such as temperature and potential evapotranspiration. Cane fields overlapped little with species distribution ranges. However, the combined anthropogenic land cover can conflict with up to 70% of the potential habitat of some species. Moreover, I compared in situ nitrous oxide (N₂O) fluxes among fertilized, non-fertilized sugarcane fields and native vegetation. I also explored the combined effect of irrigation and fertilization in modulating N₂O emissions using static chamber sampling and gas chromatography. I found out that emissions can be up to three times higher in some treatments than in others, and 10 times higher than those in the native savannahs. Furthermore, I have measured wet plus dry nitrogen deposition near crop fields in comparison to cerrado areas, using collectors that were emptied periodically for a year. There is on average three times more deposition of N ions near sugarcane crops than near cerrado remnants.

Overall, although sugarcane is not a direct threat to biodiversity in terms of land use change, it is causing dangerous changes to the nitrogen biogeochemistry. I show that, by taking a different approach to fertilization, farmers can mitigate this effect without much reduction in yield. This study highlights the need for further research on woody plant distribution in the Cerrado and for greater conservation efforts on highly diverse areas; It also demonstrates the necessity of a better approach to fertilizer management on sugarcane fields: this is crucial to assure a sustainable ethanol production in this biodiversity hotspot.

Offsetting Climate Change, an Agricultural Policy Collaboration.

Linda Thompson, Aberystwyth University

Climate change is becoming a more urgent and dramatic consequence of anthropogenic development, that despite improving many people's lives, has left in its wake an ever-expanding abuse of the Earth's natural resources. The infinite need for economic growth and production still dominates human relation discussions, but climate change, though primarily environmental in nature, has far reaching consequences for all spheres of existence. The sustainability of fundamental natural resources is threatened; access to adequate food and food security is threatened and; access to water is threatened, amongst others. Agriculture, and thereby human health and survival too, is threatened.

With such drastic repercussions, it is unsurprising that climate change is a major agenda item within the UN and governments worldwide have agreed to reduce greenhouse gas emissions. One pertinent example is that of the Welsh Government who have demonstrated considerable commitments to reducing greenhouse gas emissions towards tackling the challenges of change climate; and unlike other targets, Wales has specifically included agriculture in their efforts.

Nonetheless, mitigation and adaption opportunities for agriculture are currently limited with few "effective interventions to reduce emissions in this sector"¹. Yet, "agriculture[al] businesses [can] take a lead in reducing emissions"² because "farmers have the potential to make an important contribution to mitigating climate change by providing rural services in their role as land managers"³. Being positioned between the environment and society, farmers hold vital experience and knowledge on the environment and also on economics. They are business people who have a profound investment in the sustainability of the environment, but who are also contributing to high amounts of greenhouse gas emissions; and yet, the sector's mitigation potential is equally as significant. Regrettably, changing agricultural practices and adapting to climate change will come with a cost. "In most cases, such changes are not made without economic incentives"⁴, but one such incentive, compatible with wider climate change targets, is carbon offsetting.

Taking a mixed-method empirical approach, this research identified carbon offsetting as a current initiative. Surveys and in-depth semi-structured interviews with Ceredigion farmers and key industry stakeholders were used to seek agricultural opinions concerning climate change, sustainable development, carbon offsetting and obligations towards reducing emissions. The research concluded carbon offsetting could be a viable mitigation option for the agricultural sector, which in addition to reducing emissions, could also provide farms with the ability to cost effectively adapt their practices and/ or lessen the farm's carbon footprint. However, it also concluded the carbon market would be

¹ Welsh Government. (2010). Climate Change Strategy for Wales Delivery Plan for Emission reduction October 2010, p 68

² Welsh Government. (2010). Climate Change Strategy for Wales Delivery Plan for Emission reduction October 2010, p 68

³ Copa Coge. (2013). The Future of the CAP after 2013

⁴ Foucherot, C. and Ballassen, V. (2011). Carbon Offset Projects in the Agricultural Sector, p 2

unable to support agricultural investment and the voluntary carbon market would require additional safety measures before participation could be effectively implemented.

Session 4

Do cultural taboos conserve wildlife?

Sahil Nijhawan, University College London

Several contesting claims have been made about the role of indigenous communities in wildlife conservation. One school of thought suggests that indigenous people are innate conservationists that regulate natural resource use through culture. The opposing viewpoint provides empirical evidence to show that indigenous people extract resources according to predictions of the optimal foraging theory. Although cases of local conservation behaviour have been documented, the focus has now shifted from labeling indigenous people as guardians or exploiters to identifying socio-cultural and political factors leading to local conservation within the broader context. This study empirically tests the effectiveness of cultural norms, especially hunting taboos, in regulating wild meat consumption in an animic Eastern Himalayan community called Idu Mishmi. Idus harvest large-bodied animals under a strict system of taboos linked to the notion of cosmic retribution. Monthly surveys were conducted with a representative sample of 90 households from January to September 2014 to collect information on wild meat consumption, hunting and observance of taboos. These variables were modelled as a function of socio-economic parameters such as wealth, education, ethnicity, religion and season using a mixed-effects framework. Results show that rich outsiders and the wealthiest amongst the Idus consumed considerably more game meat than other sections of the society. Observance of taboos was stricter in Idus of lower wealth classes and with lower levels of education. Though the taboo applies to anyone that consumes game meat, it is much stricter and longer for the hunter. Wealthier Idus frequently bought meat from the less wealthy thereby using wealth to transfer the cosmological burden of taboos over to the poor. These results combined with long-term qualitative data show that in this particular case, where a large section of the population observes hunting taboos strictly, cultural restrictions do have an impact in regulating large game hunting. However, they are less effective when the society is linked to market economy as is the case with wealthier Idus. This research contributes to the scholarship on complex dimensions of human-nature relations and the position of indigenous people in nature conservation.

What's good for the goose, isn't good for the farmer: Strategic decision making in conservation conflict.

Chris R J Pollard, University of Stirling

Conservation conflicts arising from competing views of biodiversity management are recognised as increasing in scope and scale. These disagreements can negatively impact economic development, food security, energy production, education and health as well as ecological conservation efforts themselves. Research into conservation conflict currently lacks systematic methods for description

and analysis. Game theory can be used to address this gap, investigating the factors that affect strategic decisions made by those in a conflicted social ecological system. An ongoing example of conservation conflict occurs on the Orkney Islands, Scotland, where the population of resident greylag geese (*Anser anser*) has dramatically increased over the past 30 years, from hundreds to over 23,000. The geese feed on high value arable crops, causing considerable damage on farms across the islands. Impacts of the damage have radiated out through farmers themselves to farming groups, conservation organisations, wildfowl shooters, land managers and government. The resulting conflict has the potential to sour relationships between and amongst stakeholder groups, decreasing cooperation on both goose management and other biodiversity projects. Twenty three semi-structured interviews were conducted with stakeholders selected using snowball sampling. Data was collected into a game theoretical framework comprising seven criteria based on common-pool resource investigation tools. How stakeholders perceive the roles and interactions present in goose management on the Orkney Islands is illustrated using network analysis diagrams. Comparison of these perceptions is made with the structure of the Local Goose Management Group (LGMG) and within a sub-set of stakeholders. Interviewees cumulatively identified all of the member organisations of the LGMG and many other stakeholders. One organisation not on the LGMG (an environmental NGO) was perceived to be amongst the major players in goose management on Orkney and the impact of this organisation was generally seen as more negative than that of other stakeholder groups. A sub-set of stakeholders (farmers) displayed heterogeneity in their perceptions of who was involved in goose management on Orkney, with no two farmers listing the same combination of stakeholders and no stakeholder being named by all farmers. The perceptions held by stakeholders are expected to influence their strategic decision making and subsequently the direction of the conflict itself.

Environmental justice and the conflict surrounding carnivore policy in Norway.

Kim S. Jacobsen, Oxford University

Human-wildlife conflict is increasingly being recognised as containing strong elements of social conflict that can only be solved through understanding the perceptions and beliefs of the stakeholders involved. This paper investigates the perceptions of justice regarding the carnivore conflict in Norway among sheep farmers, environmentalists and indigenous reindeer herders. Q methodological factor analysis revealed three distinct viewpoints on carnivores and the Norwegian carnivore policy, constituting two nearly polar opposite factions. The widest disagreement was over what constitutes environmental risks and environmental goods and how they should be distributed, indicating that fundamental differences in values and perceptions underlie the intractability of this conflict. The use of David Schlosberg's framework of environmental justice identified the importance of recognising identity and community, not just as a means to achieve successful conflict alleviation but, crucially, as a good in itself. This is an aspect of conflict alleviation that has not been widely appreciated so far within the literature on human-wildlife conflict within the field of conservation.