

ESPA Annual Science Conference 2015

Conference Abstracts



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Programme Outline—25th November 2015

Time	Large Pension Room	Bingham Room
9.45-10.45	<p>Plenary 1– Belinda Reyers</p> <p>Exploring and expanding the prospects of ecosystem services in sustainable development</p>	
11.15-11.40	<p>Talk 1– Aidan Keane</p> <p>Impacts of Tanzania’s wildlife management areas in household level wealth</p>	<p>Talk 11– Carlos Alberto Torres Vitolas</p> <p>Mixed-methods research and ES: Why do we need it? Where does it take us? What is missing?</p>
11.40-12.05	<p>Talk 2– Paulo ALD Nunes</p> <p>Success stories in mainstreaming Ecosystem Services into macro-economic policy and land use planning: evidence from Chile, Trinidad and Tobago, South Africa and Vietnam</p>	<p>Talk 12– Gisella S Cruz Garcia</p> <p>Local conceptualizations of wellbeing in relation to ecosystem services along the forest transition curve, with case studies from Colombia, Peru and Malawi</p>
12.05-12.30	<p>Talk 3– Fiona Marshall</p> <p>Recasting urban development initiatives through an ecosystem services and policy alleviation lens: the case of sustainable urban food systems in South Asia</p>	<p>Talk 13– Robert Nicholls</p> <p>Ecosystem services and livelihoods in coastal Bangladesh</p>
12.30-12.55	<p>Talk 4– Manoj Roy</p> <p>Relative significance of ecosystem services in daily struggles of poor urban people: insights from Dhaka and Dar es Salaam</p>	<p>Talk 14– Munsur Rahman</p> <p>Implications of biophysical trajectory for policy decision in the Ganges-Brahmaputra-Meghna Delta</p>
14.00-14.25	<p>Talk 5– Maafaka Ravelona</p> <p>The impacts of land uses change on hydrological ecosystem services: communicating the facts for sustainable land uses</p>	<p>Talk 15– Fidelia Ohemeng</p> <p>Ecosystems services and dis-services: health seeking behaviours of populations at risk bat-borne zoonotic disease</p>
14.25-14.50	<p>Talk 6– Alison Cameron</p> <p>Digging down to understand deforestation’s impacts on ecosystem services from soil</p>	<p>Talk 16– Bernard Bett</p> <p>Impacts of land use and biodiversity changes on the risk of Rift Valley Fever and other mosquito-borne diseases: findings from a case study in an arid/semi-arid area in Kenya</p>
14.50-15.15	<p>Talk 7– Bhopal Pandeya</p> <p>Integrating citizen science and policy support systems into water and land management practices for sustainable mountain development</p>	<p>Talk 17– Neil Dawson</p> <p>Linking ecosystem services and poverty through empirical studies of environmental justice: insights from rapidly changing lives and land-use among the forests of northern Lao PDR</p>
15.45-16.10	<p>Talk 8– Sarah Jones and Fabrice DeClerck</p> <p>Making ecosystem services count in the SDGs</p>	<p>Talk 18– Genevieve Patenaude</p> <p>Out of wood, out of the woods? Approaches to assess the impact of woodland to agriculture conversion on the rural poor or Mozambique</p>
16.10-16.35	<p>Talk 9 – Caroline Ochieng</p> <p>Are income benefits of biofuel production in sub-Saharan Africa offset by their environmental costs?</p>	<p>Talk 19– Pedro Zorrilla Miras</p> <p>Charcoal production, ecosystem services and wellbeing in Mozambique: searching for win-win scenarios in Mopane</p>
16.35-17.00	<p>Talk 10– Jeff Waage</p> <p>Governing the sustainable development goals—a key to their success</p>	<p>Talk 20– Colm Bowe</p> <p>Positive externalities, knowledge exchange and corporate farm extension services; lessons from a case study in Rajasthan</p>

Programme Outline—26th November 2015

Time	Large Pension Room
9.30-10.30	<p>Plenary 2– Giles Atkinson</p> <p>ESPA beyond the field: the view ‘to’ and ‘from’ national perspectives on the sustainability of development</p>
10.30-10.55	<p>Talk 21– Rick Stuart</p> <p>Planning for use and re-use of valuable data</p>
11.25-11.50	<p>Talk 22– Caroline Howe</p> <p>Ecosystem services for poverty alleviation: guiding principles and emerging generalisations for future re-research</p>
11.50-12.15	<p>Talk 23– Christo Fabricius</p> <p>Bridging agents, boundary objects and dialogues: entry points to heal fragmented peplescapes</p>
13.15-13.40	<p>Talk 24– Nigel Asquith</p> <p>The PES Action Lab: a living laboratory for research into Payments for Environmental Services</p>
13.40-14.05	<p>Talk 25– Mark Mulligan</p> <p>Can we build reliable metrics for mapping progress towards SDG targets?</p>
15.30-15.55	<p>Talk 26– Paula Novo</p> <p>Restoring common lands through enclosures in southern Ethiopia—impacts on livelihoods and distributional inequities</p>
15.55-16.20	<p>Talk 27– Paul van Gardingen</p> <p>ESPA– Past, present and future– looking beyond 2015 and the SDGs</p>

Wednesday, 25th November

Plenary 1 Belinda Reyers, Stockholm Resilience Centre

Exploring and expanding the prospects of ecosystem services in sustainable development



Talk 1 Aidan Keane, University of Edinburgh

Impacts of Tanzania's wildlife management areas in household level wealth



In many parts of the developing world, community-based conservation projects (CBC) shape the rules governing local people's ability to access, and benefit from, natural resources. Tanzania's Wildlife Management Areas (WMAs) are a prominent example. WMAs aim to promote wildlife conservation and benefit local communities through the creation of sustainable wildlife-based revenues. Since 2007 the WMA model has spread from the initial sixteen pilot sites and there are now 38 WMAs in various stages of development, representing a major influence on local livelihoods and land use. Here we report preliminary outcomes of a large scale, quasi-experimental impact evaluation carried out in six of the pilot WMAs and statistically selected control areas, incorporating data from ~15,000 households across 48 villages, from the northern rangelands to the southern miombo woodlands. Our findings suggest that there has generally been relatively little change in wealth ranking from 2007 to 2014, but WMAs have played an important role in driving change. In the North, poorer WMA households and female-headed households have done less well than equivalent control households, while richer households and those in leadership positions have benefitted from WMA membership. In the South, by contrast, WMA membership has generally had a positive effect. WMAs are at a turning point in their development, with government and donors deciding whether and how best to support them in the future. Our findings highlight the potential for WMAs to produce finely differentiated positive and negative outcomes, and offer wider lessons for CBC.

Talk 2 Paulo ALD Nunes, UNEP

Success stories in mainstreaming ecosystem services into macro-economic policy and land use planning: evidence from Chile, Trinidad and Tobago, South Africa and Vietnam

The four-year project for Ecosystem Services (ProEcoServ), the flagship project of the United Nations Environment Programme (UNEP), and funded by the Global Environment Facility (GEF), focused on the valuation and mainstreaming of ecosystem services into policy design, studied four pilot countries: South Africa, Trinidad and Tobago, Vietnam and Chile.



From Soil retention services worth \$622 million in Trinidad and Tobago to \$166 million in savings through an ecosystem service-based disaster risk approach in South Africa, the project's final report adds further weight to the body of evidence proving ecosystems are crucial to sustainable development UNEP Executive Director Achim Steiner said, "The true value of ecosystems is frequently misrepresented in markets and economic decision-making. But the real economies that underpin our societies are themselves fundamentally rooted in the natural world. While ecosystems provide multiple health, scientific and aesthetic benefits, we must enhance our capacity to also reflect their economic value to national and local communities. As we take up the challenge of the Global Goals, capturing the ecological and economic value of healthy ecosystems enables us to speak to all three dimensions of sustainable development, including social equity and livelihoods." Crucially, the project developed ecosystem assessment tools and products to be used by policymakers to assess the value of ecosystems and to integrate this value into investment decisions and macro-economic models.



Talk 3 Fiona Marshall, University of Sussex

Recasting urban development initiatives through an ecosystem services and policy alleviation lens: the case of sustainable urban food systems in South Asia

This research speaks to SDG 11: 'make cities and human settlements inclusive, safe resilient and sustainable'. We are concerned with how an enhanced understanding of peri-urban ecosystem services and poverty linkages might help in supporting processes of sustainable urbanization, and in particular in influencing/recasting existing urban development initiatives. Such initiatives would involve integrated planning across the urban/peri-urban continuum in a manner that enhances urban/peri-urban synergies for the health and well-being of citizens. We are involved in field research with peri-urban agricultural communities, spatio-temporal data analysis based on readily available satellite, census and other biophysical data, and policy process analysis. Our research provides new insights into the decline of ecosystem services and nature of ecosystem service – poverty interactions in complex, dynamic and uncertain peri-urban environments. This provides new theoretical insights and the basis for developing tools, approaches and a dialogue around the possibilities for 'ESPA aware' urban planning. An example of 'ESPA aware' urban planning would be a city region perspective that recognises the importance of peri-urban ecosystem services in supporting safe and reliable food production, food security (and associated poverty alleviation benefits) for urban and peri-urban populations. Whilst recognising that the power relations and politics associated with such decisions are complex, new priorities may emerge for planning initiatives through an ESPA lens – for example in preserving areas of land most suitable for agriculture, recognising associations between urban waste management and food production, and designing policies and plans to link urban food security with local environmental management. This lens also leads us to reconsider current land use initiatives aimed at achieving 'environmental benefits' - such as the planting of city forests. Such initiatives can be exclusionary and present some troubling trade-offs.

Talk 4 Manoj Roy, Lancaster University

Relative significance of ecosystem services in daily struggles of poor urban people: insights from Dhaka and Dar es Salaam

The paper argues that the significance of urban ecosystem services to low-income people is relative to a range of socio-political factors that mediate their everyday struggles in the city. It builds on the central proposition that poor people tend to prioritise their immediate over long-term needs/ challenges; as such they practice utilitarianism when accessing ecosystem services. In order to maximise utility of available ecosystem services, however, poor people need to possess all relevant entitlements especially those that are socially and politically endowed. As the creation of socio-political endowment involves social actors engaged in struggles for political power over time, urban poor's access to ecosystem services is likely to show great variations across different types of low-income settlements in a city. To examine this proposition we analyse a large volume of data being collected from eight low-income settlements in Dhaka and Dar es Salaam. We are at an early stage of developing an index (working title R-EcoPoor: **Relative Significance of Ecosystem Services to Poor Urban People**) to measure variance in urban poor's access to ecosystem services differentiated by type of low-income settlements. Initial findings show settlements with greater socio-political endowment have better access/ lower risk to ecosystem services/ disservices. The conclusion argues that, in an era of UN sustainable development goals, urban policies aimed at harnessing ecosystem services to enhance the wellbeing of poor urban people must promote relevant socio-political entitlements.





Talk 5 Maafaka Ravelona, University of Cambridge

The impacts of land uses change on hydrological ecosystem services: communicating the facts for sustainable land uses

Land degradation in the tropics is increasing due to land use changes and can result in negative impacts on the hydrological functioning of soils and therefore the local hydrological ecosystem services available. Calls for land rehabilitation through reforestation are becoming louder. However, planting trees can have both negative and positive hydrological impacts and the balance between these is not well understood: there are gaps in scientific knowledge, and also gaps in understanding among decision makers at all scales. In the Eastern rainforests of Madagascar we investigated the effects of different land uses on hydrological paths and stream flows. With participation of the local community, we measured the surface infiltration and overland flow in closed-canopy forest, actively replanted tree fallow, and degraded land. Infiltration rates are highest in closed canopy forest (median 724 [mm/hr]) and lowest in degraded land [105 [mm/hr]], while overland flow is greater in degraded land than closed canopy and reforestation. Local people involved in data collection have been very interested in the results and their understanding has helped communicate them locally. We invited managers and policy makers to the field and this was more effective at communicating results than presentations or reports. Applied research about ecosystem services can only be valuable if it is understood by people in a position to use the information (making local land use decisions or national policy decisions). We believe that directly involving local people as data collectors, and bringing decision makers to field sites is a good way to achieve this.

Talk 6 Alison Cameron, Queen's University Belfast

Digging down to understand deforestation's impacts on ecosystem services from soil

Slash and burn agriculture leads to a mosaic of land uses: remnant or regenerating forest, fallows, and degraded land. Land use is known to affect physical and biotic soil properties that are intimately linked and influence soil ecosystem services. Few studies have considered the multitudes of potential linkages between carbon storage, biodiversity and hydrological functions. For example, decreasing above and below ground biomass through ongoing slash and burn cycles reduces biodiversity and carbon storage, while reductions in biodiversity influence the hydrological functioning of soils as a large part of water flows through biologically induced pores. Our multi-disciplinary team of foresters, ecologists and hydrologists studied the effects of land use change in the Corridor Ankeniheny-Zahamena in eastern Madagascar on a full suite of soil properties. We test the hypothesis that soil properties (soil organic carbon content, rooting density, soil biodiversity and biomass, infiltration capacity) decrease with land degradation but that natural regrowth and active reforestation can reverse these trends. We studied four different land uses: (i) closed canopy forest, (ii) regrowth on fallow land, (iii) exhausted and severely degraded land, and (iv) recently reforested sites. We provide new information on the strength of linkages between different aspects of soil functioning and the strong influence of land use history. Given the importance of soil functioning to ecosystem services, and the relevance to the Sustainable Development goals on water and food security, poverty eradication, climate change and biodiversity conservation we suggest that this interdisciplinary collaboration represents the new frontier in soil science research.





Talk 7 Bhopal Pandeya, Imperial College London

Integrating citizen science and policy support systems into water and land management practices for sustainable mountain development

Mountainous region of the Himalayas host rich and diverse ecosystem services especially those derived from water and land resources. These support a large array of local livelihood activities. But due to remoteness and inaccessibility, most of the high mountainous area lacks essential data and information about the condition of those ecosystem services, as well as current pressures and future threats. The region undergoes rapid socio-economic transformation, and is particularly vulnerable to natural disasters, and climate change. Hydro-climatic and soil characteristics may not be well captured by contemporary scientific monitoring networks. As a result, local development activities may not be able to leverage the true potential of those ecosystem services. For example, a marginal change in water availability could have a significant impact on agricultural productivity. In such context, citizen science based participatory monitoring of hydrological variables, land use changes and resources management practices holds great potential to generate locally relevant data and knowledge for the better management of these natural capitals. Such approach could also enhance local communities' adaptive capability to cope with uncertainties (both nature and human induced impacts). Here, we present our latest advances in developing a conceptual framework, as well as tools and methods for integrated approach to participatory co-production of data and knowledge (i.e. citizen science) into water and land resources management. We show how it may be an effective strategy to generate actionable knowledge to support local decision-making for sustainable mountain development.

Talk 8 Sarah Jones and Fabrice DeClerck, Bioversity International CGIAR

Making ecosystem services count in the SDGs

The post-2015 Sustainable Development Goals set an ambitious global agenda for poverty alleviation, food and water security, and shifting towards sustainable production and consumption systems. When well planned and managed, natural resources and their ecosystem services play an important role in supporting agricultural systems and the livelihoods of the poor. However, the value of and trade-offs between different ecosystem service management strategies are often difficult to assess quickly and with sufficient depth to inform land use and management decisions. We present Mapping Ecosystem Services to Human well-being (MESH), a new ecosystem service assessment and mapping framework developed by Bioversity International, CGIAR, and the Natural Capital Project in support of a Science for Nature and People (SNAP) project on 'Making Ecosystems Count in the Sustainable Development Goals (SDGs)'. MESH is an integrative modelling toolkit that calculates ecosystem service production functions and maps ecosystem service provision under different landscape management scenarios, using a user-friendly interface. We are now working to extend MESH to demonstrate the links between ecosystem services and SDG targets. We demonstrate preliminary results from using MESH to compare impacts of alternative riparian land management scenarios in West Africa's Volta Basin on a suite of ecosystem services, and their associated SDG targets. Results show that targeted investments in sustainable agriculture in riparian areas can be a viable alternative to complete agricultural exclusion from these zones, presenting a promising approach for achieving combined social, economic and environmental goals.





Talk 9 Caroline Ochieng, SEI

Are income benefits of biofuel production in sub-Saharan Africa offset by their environmental costs?

Biofuel production has expanded significantly across Africa in the past decade in response to energy demand but also due to its perceived livelihood benefits. However, no detailed studies have been carried out to understand how and when biofuels can result in income benefits to the local communities, and the environmental costs that would be offset by these (if any) economic gains. Consequently, the true human wellbeing and poverty alleviation effects of biofuel expansion in Africa remains poorly understood. An ongoing study in Malawi, Mozambique and Swaziland aims to answer this key research and policy question. The hypotheses being tested in the study include, amongst others; i) That biofuel projects provide higher income opportunities than other agricultural activities; ii) That smallholder-based biofuel projects offer higher income and employment benefits than large-scale plantations and iii) That extra income from smallholder feedstock production increases the resilience of households to livelihood shocks. The study has utilized an ecosystem services approach to assess this complex relationship. Data has been gathered using questionnaires, in-depth interviews and focus group discussions involving individual farmers, farmers' associations, project implementers and policy makers. The data will be used to draw conclusions on the economic benefits and environmental costs of biofuels based on the type of feedstock (sugarcane or jatropha), production mode (irrigated or non-irrigated) and scale of production (small or large). Analysis of the findings is underway and initial results will be shared with stakeholders at the ESPA Science Conference.

Talk 10 Jeff Waage, London International Development Centre

Governing the sustainable development goals—a key to their success

While much attention has been paid to designing individual SDGs, designing the governance of these 17 interacting goals has been neglected. We report on an interdisciplinary research collaboration between experts in different SDG areas, which developed a framework to analyse the challenge of SDG interactions and governance. The SDGs can be organised into three groups linked to their intended outcomes. A set of “well-being” goals, including health and education, has a long history of global policy formulation and monitoring, predating the MDGs. A comparatively new set of “infrastructure” goals address essential functions necessary to deliver the wellbeing goals, including agriculture, water, energy, and urban systems. Three “environment” goals relate to natural resources and public goods in land, ocean and air, including biodiversity and climate change. Governance challenges for these groups of goals are different. The institutional structures for delivering wellbeing goals exist, and with inter-sectoral cooperation they can achieve clear synergies. Institutional delivery mechanisms for environment goals are poor, despite potential synergies. We argue that the infrastructure goals, with their strong impacts on both well-being and environmental outcomes, are the critical domain for designing SDG governance. These infrastructural goals are potentially conflicting, and decisions in these sectors are typically taken by powerful elites and technical experts. A potential combination of private interests, weak accountability mechanisms and lack of transparency may mean that infrastructure goals may be implemented without balancing natural environment and wellbeing goal outcomes. We suggest how a governance structure for these, and all SDGs, can best be built.





Talk 11 Carlos Torres Vitolas, University of Southampton

Mixed-methods research and ES: Why do we need it? Where does it take us? What is missing?

The empirical assessment of the relationship between poverty and ecosystem services (ES) constitutes a major methodological challenge. This type of enquiry needs to be interdisciplinary in nature, to account for different temporal and spatial scales, disaggregate beneficiaries at different levels (individual, households, communities, etc.), and to make explicit forms of uses of nature that may not be evident to actors (usually for quantification purposes). This presentation will discuss the methodological approach used by the ASSETS project to address these challenges. This project aimed at empirically identifying and assessing the (in) direct contributions of ecosystems to food security among poor rural communities. To this effect, ASSETS used a longitudinal mixed-methods approach by means of participatory rural appraisal methods, household surveys, and food diaries implemented along a 2-year period per study area where the project is based: Malawi, Colombia and Peru. We will discuss the conceptual underpinnings of this methodological approach, the observed strengths and weaknesses of the methods used, and the challenges for analytical integration of outputs from a social sciences perspective. Particular emphasis will be placed on how the anthropocentric nature of the concept of ecosystem services demand greater investments on actor-centred methodological approaches (focused on local knowledge, understandings, values, etc.) and their potential implications for producing rather clear-cut national or global recommendations for ES management. Future lines of enquiry for social-research methods will be presented.

Talk 12 Gisella S Cruz Garcia, CIAT

Local conceptualizations of wellbeing in relation to ecosystem services along the forest transition curve, with case studies from Colombia, Peru and Malawi

The ecosystem services approach is based on the importance of ecosystems for human wellbeing. Local rural communities make direct use of ecosystem services and make decisions about which ecosystem services they prioritize, based on their own perception of what ecosystem services are important for their own wellbeing. Although there is a growing amount of literature proposing different frameworks and indicators for analyzing wellbeing in relation to ecosystem services, ecosystem services research usually neglects the multiple interpretations and indicators that rural communities use to define their own level of wellbeing. It is important to understand how rural communities conceptualize and value ecosystem services given that community members themselves are the ones who make direct use of the services and make decisions about ecosystem service trade-offs. Here we present how local people, living in the forest-agriculture interface, conceptualize wellbeing in relation to ecosystem services, comparing rural communities from Colombia, Peru and Malawi with different degrees of deforestation and access to natural resources. We discuss local conceptualizations of wellbeing and analyze the multiple indicators of wellbeing that local people use to differentiate different socio-economic groups in relation to ecosystem services and livelihoods. Then we explain the differences in wellbeing conceptualizations and indicators across communities with varying degrees of deforestation and access to ecosystem services. Finally, we provide guidelines on how local conceptualizations of wellbeing can provide useful directions for future ecosystem services research, and ensure a positive social, economic and political impact on local livelihoods.





Talk 13 Robert Nicholls, University of Southampton

Ecosystem services and livelihoods in coastal Bangladesh

While overall, deltas account for only 1% of global land area, they are home to more than a half billion people making up ca. 7% of world population. For example, the coastal zone of Bangladesh has more than 1000 people/km². Livelihoods, food security and poverty in Bangladesh are strongly dependent on ecosystem services affected by several factors including climate variability and change, upstream river flow modifications, fish catches in the Bay of Bengal, and engineering interventions such as polders. The scarcity of fresh water, saline water intrusion and natural disasters (e.g. river flooding, cyclones and storm surges) have negative impacts on drinking water availability and crop irrigation potential. This limits land use choices and livelihood opportunities of the coastal population. Hydro-environmental changes can be especially detrimental for the well-being of the poorest households that are highly dependent on ecosystem services. The ESPA Deltas project aims to holistically examine the interaction between the coupled bio-physical environment and the livelihoods of these poor populations in coastal Bangladesh, including participatory approaches throughout the project. This includes a series of biophysical analyses of the coastal region and its surroundings (the catchments and the Bay of Bengal), policy and governance analysis and socio-demographic analysis, including an innovative household survey. Using these results we have developed a new integrated model (Delta Dynamic Integrated Emulator Model - ΔDIEM) that allows the long-term analysis of the possible changes in this system by linking projected changes in bio-physical processes (e.g. river flows, nutrients), with productivity (e.g. fish, rice), social processes (e.g. access, property rights, migration) and governance/management (e.g. fisheries, agriculture, water and land use management). This integrated approach is designed to provide Bangladeshi policy makers with science-based evidence of possible development trajectories within the coastal delta plain over timescales of years to many decades, including the likely robustness of different governance options on ecosystem services and poverty levels. The participatory aspects comprise an ongoing series of workshops with policy stakeholders including scenario development, examination of possible trajectories and consideration of policy responses. This paper will provide an overview of this process, the current results and its legacy.

Talk 14 Munsur Rahman, BUET

Implications of biophysical trajectory for policy decision in the Ganges-Brahmaputra-Meghna Delta

More than 40 million people of Bangladesh (around 25% of the total) live within the range of 100 km from the coast of the Bay of Bengal in the Ganges-Brahmaputra-Meghna (GBM) delta who are often poor and live with a high dependence on ecosystem services. The ecosystem resources in these areas have been experiencing multiple stresses created by flooding (fluvial, tidal and storm surges), estuarine/coastal morphological changes, salinization (surface water, ground water and soil), water logging which are in increasing trend in terms of magnitude, frequency and areal extent. The above stresses are being imposed from both climatic factors and anthropogenic interventions through alteration of water and sediment flow at the upstream and estuarine/marine processes (construction of polders) at the downstream. In the ESPA Deltas project, the physical processes of flooding, cyclonic storm surges, erosion-sedimentation, salinization and related issues under different climatic and anthropogenic scenarios have been explored and their relationships with ecosystem services in terms of the production from agriculture, fisheries and forestry (Sundarban mangrove) have been established in nine coastal districts. Number of models have been employed to explore the plausible changes of biophysical processes under three different climatic and socio-economic pathway scenarios (business as usual, less sustainable, more sustainable conditions driven by climate induced upstream and downstream drivers including the sea level rise scenario) developed using shared socio-economic pathway (SSP). Each of the component models have been calibrated and validated and used for the future projection of biophysical trajectories of the study area which would be useful for future strategic policy decision through an integrated modelling platform.





Talk 15 Fidelia Ohemeng, University of Ghana

Ecosystems services and dis-services: health seeking behaviours of populations at risk bat-borne zoonotic disease

The degree of interactions between humans and wild animals is escalating as a result of ecosystem changes that bring species of wild animals such as bats closer to human settlements. While the role of bats as providers of ecosystem services is well recognised, bats are also known to harbour several zoonotic pathogens. Over the past four decades, there has been an increase in the rate of zoonotic diseases. A swift response is often essential for dealing with such outbreaks, however, in many developing countries socio-cultural behaviours compound the inadequacy of healthcare systems to deal with such outbreaks. This paper explores how a population at risk of bat-borne zoonotic diseases perceive and experience fevers, and also their health seeking behaviours. Data were collected from three communities in Ghana that constantly interact with bats through in-depth interviews, focus group discussions, participatory mapping and a questionnaire surveys. The findings indicate the pervasiveness of fevers in the three communities. Health seeking behaviours for fevers were based on the perceived aetiology of the disease. Treatment for fevers consisted of both orthodox and traditional methods, but seeking treatment at a clinic or hospital was often delayed, especially for rural dwellers. Though there has been no reported case of disease spill-over from bats in Ghana as yet, these findings point to how at risk groups could respond in the event of a spill-over of a disease. The study recommends educational campaigns advocating behavioural changes among communities living close to bat roosts.

Talk 16 Bernard Bett, ILRI

Impacts of land use and biodiversity changes on the risk of Rift Valley fever and other mosquito-borne diseases: findings from a case study in an arid/semi-arid area in Kenya

We carried out a study in irrigated and pastoral areas in an arid/semi-arid region in Kenya to investigate linkages between land use and biodiversity changes and the risk of Rift Valley fever virus (RVFV) and other infectious diseases including West Nile virus (WNV) and dengue fever virus. The study tested the hypothesis that disease regulation as an ecosystem service is affected by changes in biodiversity, climate and land use, with differential impacts on peoples' health and wellbeing. Activities conducted included: ecological analyses to quantify changes in land use and their effects on ecosystem services; entomological surveys to characterise mosquito species by habitat and season; and livestock and human sampling to determine the prevalence of the pathogens identified above. Data collected were analysed using multiple models including ecological niche models to predict the distribution of the various mosquito species in the area and a stochastic partial differential equation (SPDE) model to predict the risk of these pathogens in space. Results show that irrigated areas have had a drastic decline in biodiversity and are infested with a large variety of mosquito species that are capable of transmitting multiple arboviruses. Outputs from the SPDE model suggest a significantly higher risk of WNV and dengue in irrigated areas than the non-irrigated. On the contrary, RVFV distribution was even across the areas. We show linkages between land use change, ecological and socio-economic processes that influence the distribution of these diseases in the area and identify interventions that could be used to alleviate their impacts.





Talk 17 Neil Dawson, University of East Anglia

Linking ecosystem services and poverty through empirical studies of environmental justice: insights from rapidly changing lives and land-use among the forests of northern Lao PDR

The circumstances under which trade-offs or synergies exist between conservation and human wellbeing are poorly understood. This presentation describes mixed-methods research around Nam Et Phou Louey (NEPL) National Protected Area in northern Laos, a rich, yet threatened montane tropical forest. It explores the conservation-wellbeing relationship through an environmental justice lens, considering changes in the landscape and governance of it through perspectives on social distribution, decision-making procedures and recognition of identities and values. We assessed wellbeing and perceptions of justice in ecosystem management among 100 households and supported social research with fine-scale mapping showing annual changes in land-use and ecosystem service availability. Around NEPL, rapid changes in livelihoods and economic welfare occurred simultaneously with rapid land-use change. Conventionally measured poverty rates fell 70% in 10 years, driven by progressive transformation from subsistence shifting rice cultivation to cash cropping maize. At the same time, protected area and land-use zone boundaries were established. These changes are leading to a complex set of outcomes in terms of ecosystem services, forest conservation and wellbeing. Despite improvements in material wellbeing, forest encroachment and claims on forest land were increasing. However this trade-off was not explained by material factors but rather changing aspirations and identities of a rural population, the confusing, top-down nature of governance and unrealised promises by conservation practitioners. The importance of procedural and recognition issues highlights the importance of in-depth social research to aid identification of opportunities for realising synergies. We discuss attempts to do so alongside communities and protected area managers around

Talk 18 Genevieve Patenaude, University of Edinburgh

Out of wood, out of the woods? Approaches to assess the impact of woodland to agriculture conversion on the rural poor or Mozambique

Poverty eradication figures prominently in the proposed sustainable development goals (SDGs). Our ACES project (<https://miomboaces.wordpress.com>) contributes to this by understanding what impact, land conversion from woodland to agriculture has on the livelihoods of rural people in Mozambique. In Mozambique, poverty is ubiquitous but particularly pronounced in rural areas: more than 70% of poor households live in rural areas, and only 60% of rural people have access to safe water. Here, we synthesise our project-wide, integrative approach for exploring this impact along 3 gradients of land use/cover change (each focussing on a different conversion process: woodland to charcoal in Gaza, to tobacco in Niassa and to soya in Zambezia). At each gradient, we sample 7-10 villages with similar biophysical characteristics so that we can relate those measurements to the village or households we survey. Baseline participatory mapping and GIS data is collected on the use and availability of ES and on village infrastructure. These, along with a households list created by village leaders, serve as the backbone for our two main strands of work: socio-economic and biophysical surveys. Households and village surveys are used to gather data on agriculture production, forest use, well-being, and commercial agriculture. We also conduct participatory rural appraisals: wealth rankings for understanding differentiating characteristics of poverty; calendars to understand seasonal changes in availability and use of ES; trend analysis to identify temporal changes in livelihoods & farming systems, in abundance and access to ES, and in adaptive responses to changing conditions. We finally conduct unit focus groups to understand the value chains of charcoal, tobacco and soya. Our biophysical surveys aim at understanding human influence on the C&N budgets of village areas: namely, where stores are, their fluxes, their uses, and their changes with changing land cover. Additional surveys include biodiversity assessments, agricultural and bird surveys. Biophysical measurements are linked to ecosystem services by assessing species usage. This diverse dataset feeds into 3 Bayesian Belief Networks (BBNs) which represent the 3 social ecological gradients. These, along with narratives, which explore alternative, plausible futures for rural Mozambique, are co-developed with communities of practice. Scenarios are then created from these BBNs, linking the qualitative narratives with GIS mapping outputs. We conclude by discussing how the process of developing scenarios with communities of practice is equally as important as the 'model products': it provides a platform to discuss and reflect on possible reforms, and on how to reach some of the SDGs for Mozambique.





Talk 19 Pedro Zorrilla Miras, University of Edinburgh

Charcoal production, ecosystem services and wellbeing in Mozambique: searching for win-win scenarios in Mopane woodland

We present a methodology for analysing the contribution of ecosystem services to poverty alleviation taking into account access to services, ES trade-offs, distributional impacts and human response options. Specifically, we have studied the Mabalane district in Mozambique, where charcoal is the main driver of land change and could be a way out of poverty. We analyse the consequences of forest degradation and the interventions available to transform charcoal production to a sustainable energy source. Addressing this situation as a complex social ecological system with simple analytical tools makes it difficult to integrate all the elements that play a role in the system. The novelty of our method lies on the combination of integrating holistic modelling and mapping tools using scenarios of future land use change, Bayesian belief networks and GIS. Using participatory methods we constructed a set of scenarios of future land use change, these were translated into a probabilistic model and finally into future land use/land cover maps and future ecosystem services map. We found that a combination of interventions is necessary to improve the benefits the villagers obtain from their forests and at the same time approach sustainable charcoal production. The methodology allows us to analyse the consequences that a set of interventions can have on land use change, ecosystem service availability and use, and on villagers' well-being. We conclude that improving institutional as well as technical capacity of inhabitants might be the most impactful interventions in the long term.

Talk 20 Colm Bowe, Liverpool John Moores University

Positive externalities, knowledge exchange and corporate farm extension services; lessons from a case study in Rajasthan

Despite much rhetoric about the 'greening business' agenda and various initiatives to promote the valuation of ecosystem services and natural capital, the corporate sector has been slow to integrate social and environmental factors into core business models. Our effort to narrow this gap focuses on the co-benefits and positive externalities that can be generated through knowledge exchange between a corporation and its suppliers. Using a case study of contract farming of malting barley in water scarce Rajasthan (India), we examine the extent to which best practice agronomic advice given by corporate farm extension workers can help small scale farmers to increase income, improve resource efficiency (water, fertiliser, energy) and reduce greenhouse gas emissions. Our findings suggest positive results for all these variables, when compared to the regional benchmark of non-participating farmers. Our valuation of the reduced exploitation of ground water (alone) exceeds the advisors' annual salaries, suggesting that under full social and environmental accounting, the extension services are not a cost factor, but a profit making unit of the company. We discuss our findings in relation to alternative approaches to Payments for Ecosystem Services. We suggest that ecosystem service valuation is neither inherently bad nor good; its value to society depends on how and to what purpose it is being used. So whilst we steer clear from valuation for the purpose of creating new types of commodities from nature, we do argue in favour of valuation for the purpose of better informing existing decision dilemmas (as in our study) within the private and public sector.



Thursday, 26th November

Plenary 2 Giles Atkinson, LSE

ESPA beyond the field: the view 'to' and 'from' national perspectives on the sustainability of development

Talk 21 Rick Stewart, EIDC

Planning for use and re-use of valuable data



Talk 22 Caroline Howe, University College London

Ecosystem services for poverty alleviation: guiding principles and emerging generalisations for future research



Since the publication of the Millennium Ecosystem Assessment in 2005 and the establishment of the Ecosystem Services for Poverty Alleviation programme in 2010, there has been an explosion of research surrounding ecosystem services (ES) and their relationship with human well-being. At the outset, ESPA researchers developed a research framework that provided a readily understood,

logical and consistent approach to enhance coherence across projects and permit the derivation of clear and generally applicable conclusions. We describe how the ESPA programme sought to conceptualise the links between ES and poverty alleviation and present a series of emerging generalisations drawn from the current evidence base from both ESPA and related research and provide a framework that may be used to guide future research. We highlight the fact that ES research must focus on the demand-side, and to tension supply-side analyses with demand. We find that ES are always co-produced by people and therefore there will always be inevitable trade-offs and therefore providing ES for poverty alleviation is about access and fairness. We still lack a broad understanding about the relationship between biodiversity and ES, their benefits and human well-being. There are thresholds and limits and consequently the human-environment system is inherently dynamic and this needs to be considered in ES analysis in order to preserve options for the future. Finally, valuation both in monetary and non-monetary terms is vital and therefore decision-making and governance needs to be at the heart of any ESPA-based research, as it is here that change will ultimately occur.

Talk 23 Christo Fabricius, Nelson Mandela Metropolitan University

Bridging agents, boundary objects and dialogues: entry points to heal fragmented peopescapes

Catchments are peopescapes, characterized by cross-scale feedbacks, short and direct linkages between people, landscapes, resources and institutions, and multi-way interactions between system components. Fragmented catchments are characterized by disrupted social and ecological processes stemming from inequality, historical separation between stakeholders, decision making in silos, and lack of communication. The challenge in sustainable catchment management is to repair or 'defragment' the severed social and ecological couplings. In a rapidly changing country such as South Africa, where, even two decades after democratic rule, social fractures run deep and ecological fragmentation is a reality, bridging historical divides, healing damaged peopescapes and finding common ground is a crucial but by no means trivial undertaking. With this challenge and conceptualization in mind we facilitated long term social-ecological repair in the Wilderness Rivers catchment in South Africa's Garden Route. The process was founded in the principles of reliable and transparent information gathering and sharing, trust building, dialogue, founded in the principles of evidence-based coaching; and co-creating a common future. This laid the foundation for a multi-stakeholder programme with most, but not all, stakeholders involved. In this paper we reflect on the design and emergence of the process, the unanticipated breakthroughs and obstacles, the benefits and disadvantages of the different strategies and techniques, and the contribution of all of this to the theories of learning, social-ecological restoration and resilience. The notion of social-ecological fragmentation and repair holds promise for future projects and programmes aimed at linking ecosystem services and poverty alleviation, with bridging agents and boundary objects playing crucial linking roles.





Talk 24 Nigel Asquith, Fundación Natura Bolivia

The PES Action Lab: a living laboratory for research into Payments for Environmental Services

In 2003, in the Bolivian village of Los Negros, six downstream irrigators negotiated a ground-breaking deal with their upstream counterparts. “For every 25 acres of forest you conserve for a year,” Andrés Rojas told Serafín Carasco, “we will give you a beehive and training on how to produce honey.”

And so the first Reciprocal Watershed Agreement (RWA) was struck. The

impacts of RWA are simple - upstream farmers get a broader range of livelihood activities, forests and water sources are protected, and downstream users receive improved water supplies. After seven years of small-scale experimentation, we initiated an applied research program (NE/I00436X/1) to assess how the RWA concept could be scaled-up. Thanks to the lessons learned in this project, by the end of 2014, more than 3,500 upstream farmers were receiving compensation payments from 85,000 downstream water users to protect more than 370,000 acres of forest, and local authorities had created a new UNESCO Biosphere Reserve. Follow up research with Bangor University is identifying the intrinsic and extrinsic motivations of participating farmers. Meanwhile, project NE/L001470/1, has catalysed the creation of a new 254,000 acre municipal protected area, bordered by 54,000 acres of RWA. Both ESPA research projects have shed new light on how to maximise the environmental- and poverty reduction- efficiency of incentive based conservation programmes. With a database of 4000 families, 130 community forests and 1.8 million acres of Biosphere Reserve, local authorities are creating a “living laboratory” for research into the impact of payments for environmental services schemes.

Talk 25 Mark Mulligan, King’s College London

Can we build reliable metrics for mapping progress toward SDG targets?

The relationship between good management of ecosystem services and sustainable development is relatively clear. The relationship with the current SDG goals and targets is much less so. Many of the SD goals have tenuous links with ecosystem services and very few of the SD targets can be readily interpreted through an ecosystem service lens. Even for water, for which provision of quantity, quality and regulation are important ecosystem services that benefit all, the SDG targets do not always clearly relate better to ecosystem service management than they do to domestic water treatment and sanitation. In this talk I will examine the availability of data globally for mapping SDG-relevant ecosystem services and providing robust metrics of state and change in the SD targets in response to SD targeted interventions. How do ecosystem services contribute to sustainable development through an SDG lens or a WAVES accounting lens? Are the data that we have sufficient to map these baselines around the world. What kinds of metrics work best? What metrics can be used to assess change against the baselines in response to background scenarios of climate and land use change or foreground (sustainable) development interventions? I use the Water-World and Co\$ting Nature suite of ecosystem services models, further developed in the ESPA P4GES and CGIAR Water Land and Ecosystem projects to examine measurable metrics for SDGs 1,3,6,7,11 and 15 that relate with ecosystem services and their management.. With examples from Madagascar and the Volta I highlight the progress, challenges and opportunities for providing national scale metrics for the SDGs and understanding how best to manage ecosystem services towards sustainable development.



Talk 26 Paula Novo, The James Hutton Institute

Restoring common lands through enclosures in southern Ethiopia - impacts on livelihoods and distributional inequities

Soil degradation poses a serious threat to the livelihoods of many farmers in tropical regions. In southern Ethiopia, one of the methods used to combat soil degradation is enclosure of common land. The enclosed areas are often planted with trees and provide a range of ecosystem services, including timber and non-timber products, to the local population in addition to reducing soil erosion and degradation. At the same time, however, enclosure curtails traditional uses of these areas such as grazing. In order for enclosures to be effective and contribute to the livelihood security of the farmers, the balance of benefits and dis-benefits needs to be positive, not only at the scale of the community but also at the scale of the individual farmers. Here we report on focus groups and surveys carried out between May 2014 and January 2015 in three communities in Halaba, southern Ethiopia, on benefits and dis-benefits of enclosure areas. While enclosures are generally seen as beneficial for biodiversity, soils and water regulation, the work shows that benefits and dis-benefits are unequally distributed. Households nearer to the enclosed areas thus suffer more from dis-benefits such as crop raids from wild animals sheltering in the restored areas. In addition, households' wealth status affects their access to benefits with richer households in a better position to appropriate benefits such as timber and to mitigate dis-benefits such as loss of grazing success. We discuss potential options more equal distribution of benefits and dis-benefits from soil restoration projects.



Talk 27 Paul van Gardingen, ESPA Director

ESPA - Past, present and future - looking beyond 2015 and the SDGs

