

Please complete and send back to a.dalton@uea.ac.uk by
15th November 2012. Thank you!

Principal Investigator

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Discipline	Conservation Science		
Role in team	PI		

Project team

Total number of people involved	Academics	8
	Non-academics	6
Of these, how many are	Natural scientists	6
	Social scientists	5
	Economists	3

Project title (<120 Characters)

Capturing differentiated experience of change to ensure pro-poor ecosystem service interventions are fit for purpose

Project objectives

- 1) Developing locally meaningful **definitions, measurements and real-time communication** of ecological, well-being and behavioural change using innovative methods, before and during policy interventions. We plan to draw on citizen science approaches and on methods permitting **real-time monitoring and communication of changes**, and use these novel methods to give a voice to the poor.
- 2) Developing a research agenda for the real-time **comparison of anticipated and actual change** in natural resources and in socially differentiated wellbeing caused by externally imposed change (social, environmental or policy-linked), and in different social, economic, ecological, institutional and political contexts.
- 3) **Building a platform** through which researchers and practitioners can design and implement effective pro-poor policies and research programmes, learn lessons and share results.

Summary

Please provide a **one page** plain language summary of your project, aimed at a non-specialist audience. Please address the following:

- what is your project about?
- briefly state your key findings
- why are these important?
- what have you produced that other people or organisations might find useful: tools/models etc?
- who (what type of organisations) should be interested in your tools etc?

External and policy-driven change in social-ecological systems affects individual wellbeing (IWB), determining the impact of policy interventions. If interveners are to implement robust policies driving sustainable pro-poor change, they need to understand the consequences and heterogeneities of IWB. This requires a more differentiated approach to societal wellbeing that better reflects the position of the poorest - those most at risk from the consequences of mis-measurement and loss of ecosystem services.

Our project aimed to move the research agenda forward through: (i) engaging local people in defining, monitoring and measuring changes in wellbeing and the interactions between ES and IWB, using locally meaningful metrics and citizen science monitoring; (ii) planning a research programme of empirical exploration of differentiated experiences of environmental, socio-economic and intervention-led change; (iii) ensuring that differentiated experience of change is integrated into the wider research agenda, leading to more sustainable pro-poor interventions.

Under (i) our key findings came from two activities; an experimental study in Guyana, in which VNN researcher Ben Palmer Fry compared local and external conceptions of wellbeing, and a technical workshop in which we brought together local people affected by conservation interventions, practitioners implementing these interventions and researchers from a range of different disciplines who have different understandings of what wellbeing is.

The experiment suggested that local people and the external researcher had a good degree of overlap in the key components of wellbeing which they felt were important to measure, and that their rankings of people's wellbeing were relatively consistent. However there were interesting differences; local conceptions were perhaps unexpectedly income-based, though also including aspects of religious observance that were not in the external questionnaire. Our workshop suggested that the framework developed by the ESRC research group on Wellbeing in Developing Countries (WeD; www.welldev.org.uk) was very appropriate for use in environmental interventions as well, and that one of the key issues is ensuring that local voices are properly heard by people at different scales (particularly government and external NGOs), and that their perspectives are genuinely listened to by these more powerful actors.

Under (ii) we planned and submitted a large scale 3 year research programme to a major funder (the UK government's Ecosystem Services for Poverty Alleviation initiative), entitled "Transforming ESPA interventions through collaborative action-based learning". This proposal is currently in the final round of selection for funding. Under (iii) we reached out to a wider audience through our website and VNN publicity, an online report of our technical workshop, three journal papers in preparation/submission, and particularly through an open workshop discussing how to ensure that local voices are heard in the discussion of the wellbeing effects of interventions.

Our perspective and ideas, as disseminated in this range of ways, are important because it is now becoming standard practice for people carrying out environmental interventions (governments, international NGOs) to monitor the wellbeing of the people affected in order to evaluate the impact of their activities. However wellbeing is a multi-dimensional concept, and in some cases the illbeing effects of external interventions are just as pertinent.

Our project's activities not only highlight the complexities and pitfalls of using wellbeing as a framework for understanding the effects of interventions, but also give ideas about the way forward - in particular recognising power imbalances and the importance of genuinely including local voices and local understandings of wellbeing. Our outputs also suggest how to balance the need for an externally valid understanding of wellbeing (which is comparable and repeatable) with locally relevant

conceptions of wellbeing change, that are not necessarily transferable but reflect how people are actually experiencing interventions and their effects on society and nature.

Your project and the Valuing Nature Network

Please provide up to **four pages** of detail regarding the following:

1. Your insights into which of the four VNN Key Challenges (Appendix A) you addressed, according to your proposal
2. How you have evolved the overall VNN conceptual framework (content of boxes and flows between) (see Appendix B)
3. Your thoughts on the future agenda for VNN research (following on from initial ideas in April's meeting)
4. Your recommendations regarding mechanisms to maintain and grow the network

1. The key challenges (2 pages)

This project addressed challenges 1 and 4 of the VNN call (incorporating complexity into valuation, and integrating valuation information into governance and implementation). The challenge of valuing nature includes the complexity inherent in the relationship between environmental change and human wellbeing. As yet, the complex and differentiated nature of human-environment interactions, and the impact on people of external environmental interventions, are not well integrated into mainstream thinking on environmental valuation. Our project therefore focussed on a) **understanding human wellbeing** as it relates to the environment and particularly to environmental interventions (challenge 1); b) taking ideas from other disciplines and from experience on **how to measure wellbeing** in a meaningful way (challenge 1); and c) considering **how to use these insights** in a way that enhances the effectiveness of environmental interventions (or mitigate their negative effects) from the perspective of the poor and marginalised, taking institutional and social complexities into account (challenge 4).

Understanding wellbeing

People's livelihoods, and their way of life, are inextricably linked to the natural environment. Various individuals, disciplines, institutions, and research projects have developed distinct definitions of wellbeing to serve a range of contexts and purposes (Sen 1985; Dasgupta 2001; Ryan and Deci 2001; MEA 2005; Gough and McGregor 2007; nef 2009; MacKerron 2011). Amongst these there exists both considerable overlap and unique perspectives. These approaches differ in terms of their initial assumptions regarding the degree of objectivity and subjectivity, the relevance of etic (externally assessed) versus emic (from within the culture) accounts, emphasis on individualism versus relatedness, and analysis of quantitative versus qualitative information. Such differences may be the result of disciplinary traditions, as explored by Bevan (2007), or derive from the different stakeholder perspectives of those using wellbeing as a measure of change.

The WeD framework identifies three dimensions of wellbeing: (i) when your needs are met; (ii) when you can act meaningfully to pursue your goals; (iii) when you are able to enjoy a satisfactory quality of life (Gough and McGregor 2007). Wellbeing therefore entails not only objective circumstances, but also the individual's subjective interpretation of them, both of which are considered within the context of society and culture. Furthermore, because this socio-cultural context is continuously evolving, so too must our conception of wellbeing. Material gains and losses can precipitate fundamental reconstructions of identity, both for individuals and for societies as a whole (McGregor 2007). Wellbeing is a relational and social concept, and individuals within the same society will have differentiated experiences of it. Consideration of nuances due to, e.g. class, gender, or livelihood, is essential to ensure that wellbeing of marginalised groups is highlighted. Apparent cases of no net increase in wellbeing at the societal level can be better understood in the context of differentiated experience by disaggregating wellbeing as experienced by particular groups or individuals (Daw et al. 2011).

We concluded that the WeD framework for understanding wellbeing is a robust and useful approach, which should be widely adopted.

Measuring wellbeing

A definition of wellbeing is paramount if we wish to understand and measure it. However, as it is shaped by ever-changing aspirations and social interactions the concept has fluidity. It will be most appropriate to work towards facilitating local communities to produce their own definition of wellbeing that is meaningful to them, rather than trying to apply a generalised definition that does not fit local context. Illbeing is as important as wellbeing, and so there must be the opportunity for people to express negative views. Some interventions, e.g. relocation before dam construction, may completely destroy communities, changing social structure and therefore aspirations and wellbeing. In such situations, the local concept of wellbeing will be completely changed after the intervention, rendering

comparisons with the pre-intervention state meaningless.

The shifting nature of wellbeing makes establishing a baseline difficult. Cohort studies are useful in other disciplines. However, the issues of relevance to local people in twenty years' time are likely to be very different to the current topics of interest, making long-term comparisons challenging. The effects of an intervention on wellbeing are not instantaneous. Response to shocks, e.g. market collapse, natural disasters, is measured over generations rather than years. By this time, local conceptions of wellbeing will also have changed. Statistical comparisons between communities may be inappropriate, as the comparisons that people themselves make are likely to be with communities surrounding them, which may not be the most suitable communities chosen by statistical comparison techniques e.g. matching (Clements et al. in press).

Several strategies have been identified for developing cross-cultural studies of quality of life and human wellbeing (nef 2012; Schmidt and Bullinger 2007). The happy planet index (nef 2012) entails the development of a universal measure, identically applied to all cultures. While such an approach may well succeed in simplifying comparisons, what it loses in flexibility, cultural sensitivity, and contextual relevance renders it of little use for examining many of the core components and differentiated experiences of individual and shared wellbeing. Particularly in diverse groups, this loss of understanding may be unacceptable. An alternative approach is to develop a unique measure specifically tailored to each community of interest. However, the latter fails where the former succeeds; such assessments may not be comparable, severely limiting their use for cross-cultural and national scale research. Thus, a sensible strategy might entail a universally applicable framework with the flexibility to include contextually specific components. The framework provides a comparable structure to the analysis while specific components that more meaningfully capture local nuances can be included. The WeD framework has the potential to meet this need.

Information at a community level provides context to the individual's concept of wellbeing but doesn't replace it. Where there is a change in the status quo, some individuals will be better placed to take advantage of it to improve their wellbeing (Daw et al. 2011). "The poor", not a homogeneous group, represent individuals who are often the intended beneficiaries of interventions, but also those least likely to be able to benefit from changes, and so their wellbeing is most important to consider. It can be difficult to capture the effects of interventions on the wellbeing of the poor, as most interventions, e.g. local participation in resource management, are likely to be more accessible to more visible individuals, who may well be wealthier members of the community (Lewis 2012). If the wellbeing of participants is measured, this is not necessarily a reliable indicator of the effects of the intervention on the most marginalised members of a community.

We concluded that it is unlikely that a standardised tool can be developed to adequately account for wellbeing in all cases. The WeD framework helps to structure the consideration of wellbeing in conservation, allowing the identification of those aspects of wellbeing which will be addressed by an intervention and how. Considering the differentiated experiences of wellbeing within a society can give valuable information about the choices people make and the decisions they face.

Using the insights gained to improve interventions

Improving the wellbeing of people who use ecosystem services can be a means to the end of achieving an environmental objective, or it can be an outcome of ecosystem service interventions in its own right. Either way, the measurement of improved wellbeing can be used as part of evaluation of the effectiveness of environmental interventions.

Government, communities, interveners and individuals can all have very different ideas of what wellbeing means. The approach taken to measure wellbeing, and the metrics used, depend on the audience for which the data are destined, and what will be counted as evidence in each case. A deep qualitative understanding of the context of wellbeing within a community is an essential precursor to creating an intervention, but many donors require externally valid measures which can be quantitatively compared between sites and projects. A locally appropriate way of measuring wellbeing will not easily draw comparisons at a wider scale. Internationally developed frameworks can be ill-fitted for local use.

Both quantitative and qualitative data will be essential for wellbeing studies; quantitative to express how much a person has or aspires to have, and qualitative to provide the description of the state of the quantity, i.e. to provide the context. During evaluations, comparisons should be made between external assessments of changes in wellbeing and local perceptions of intervention effects.

A good grasp of the context of wellbeing in a community can aid the understanding of behaviour, particularly in relation to resource use at an individual and community level. Selection of locally appropriate incentives for changes in behaviour requires detailed qualitative knowledge to reduce the difference between absolute benefits provided and local perceptions of an intervention. Incentives must operate within short, quick feedback loops; as wellbeing improves, people's aspirations will change, and static incentives may no longer be attractive.

Myriad factors other than conservation interventions can impact wellbeing. Honest presentation of the benefits and potential drawbacks of a proposed intervention or study of wellbeing (allowing free and prior informed consent) will limit the risk of raising false hopes within the community.

We concluded that the evaluation of wellbeing broadly defined (as opposed, for example, to a more standard monetary approach) enables interveners better to prioritise listening to local voices, and can empower marginalised groups of people to contribute towards solutions allowing them to live sustainably alongside nature.

2. Conceptual framework (1 page)

Our project's insights would suggest that:

The two boxes for wellbeing (collective and individual) is too simplistic a representation of wellbeing. Wellbeing is a fundamentally relational and social concept, and individuals within the same society (even the same individuals at different life stages) will have differentiated experiences. The division into two boxes may not be the best representation, and it may be better to have one box with the different dimensions of wellbeing listed within it [e.g. as per the WeD framework: (i) needs are met; (ii) able to act meaningfully to pursue goals; (iii) enjoying a satisfactory quality of life; (iv) within a shared social context].

Wellbeing is represented as being a function only of goods. Our project clearly suggests that this is deeply simplistic, representing just the factors which underpin a part of component (i) above. For example wellbeing is a function of the social and institutional context. You could extend the blue rectangle to encompass wellbeing as a step towards acknowledging this?

The green arrows for implementation should also feed directly into wellbeing, representing the direct effects of social context on wellbeing, rather than only indirectly through the provision of goods.

The valuation box is also a bit simplistic in representing the components of wellbeing which we value as economic, health and shared social values; instead it would be worth thinking in terms of how one would value the WeD dimensions above.

It might be worth considering too by whom the decisions are made. Our project highlighted the mutability of definitions of wellbeing, and of the relationship between wellbeing and decision-making depending on who the actors are, and what their perspectives and agendas are. A key insight is that the power to implement decisions is often strongly biased away from the local people whose wellbeing is affected by them. Therefore the issue of who is valuing wellbeing change, and who is making decisions based on these values, is fundamental to understanding both how implementation drives change in ES, and how that feeds through into changed wellbeing.

3. Future agenda (half a page)

Future efforts will need a multi-disciplinary, complex systems approach to understanding and measuring wellbeing. Funding and research priorities need to change to allow equal focus on gathering qualitative and quantitative data to tell both sides of a complex story. Local participation in understanding and measuring wellbeing is vital.

We need to use case studies to collect instances of when approaches to understanding, measuring and evaluating change in wellbeing have or have not worked, to allow identification of common themes and to identify commonalities and context-specific components of the framework and tools. These case studies should be conducted at different timescales in order to improve our understanding of the dynamics of the relationships between change in people's conceptions of wellbeing, in their wellbeing itself, and environmental change. We need to understand the balance between subjective and objective

components of wellbeing, and their determinants, in different situations, and to understand how external and internal conceptions of wellbeing relate in time and space. Collating this information would allow practitioners to choose a selection of approaches most likely to be suited to their situation which could then be trialled in the local context.

We need to be more aware that definitions of wellbeing are driven, at least in part, by the perspectives of those who wish to use it as a measure of progress. One particularly neglected aspect to this is the fact that concepts of wellbeing tend to be externally developed, and therefore etic in quality; emic accounts of wellbeing-ecosystems service relationships are much less prevalent in the literature.

4. Maintaining and growing the network (half a page)

We benefitted enormously from our mission of reaching out to other disciplines which were not originally within the VNN network. We had extremely constructive inputs from people working to operationalise concepts of wellbeing in development and in health. These linkages helped us to realise that there is a large amount of relevant research which is readily translatable into environmental contexts. The participant list for our technical workshop would be a useful starting point for expanding the VNN network to include other voices.

Another important aspect of the project was explicitly reaching out to local people and incorporating their voices into our deliberations. Our workshops had representatives from the Pastoralist Women's Council in Tanzania, from a Cambodian ecological consultancy (CENTDOR) and from the Makushi Research Unit in Guyana. From our perspective a key component of taking a wellbeing approach to VNN issues is to ensure that local voices are heard at other scales, and not drowned out by dominant voices (e.g. from national government and international NGOs). This requires active reaching out to ensure that their perspectives are integrated from the start.

Specific project details

Please provide brief details (**100 words** for each question) to address the following:

Progress

*Did the research proceed as expected and on time? YES
If NO give details.*

*Was there any significant change in the research compared with the original proposal? NO
If YES give reasons for changes.*

*Were there any circumstances that aided or impeded research progress? NO
If YES explain how the work was affected and how any problems were overcome or opportunities exploited.*

Publications

Dissemination of results.

List the following types of output: papers (both published and in press) and reports directly arising from the research; conference proceedings; book chapters; etc.

Three papers

These papers are in final draft, and will be submitted to journals before the end of the VNN project.

i) A review of different conceptions and frameworks for understanding wellbeing, aimed at people interested in using wellbeing in environmental research:

Agarwala, M., et al. *Assessing the relationship between human wellbeing and ecosystem services: A review of frameworks.*

ii) An opinion piece aimed at a conservation and environmental audience, that explains the issues involved in using wellbeing as an indicator of conservation success:

Palmer-Fry, B., et al. *Practical trade-offs in monitoring change in local people's wellbeing under environmental interventions.*

This paper is at a slightly earlier stage (manuscript still in draft form) but will also be submitted before the end of the VNN project:

iii) A position piece considering the issues and future agenda for wellbeing research in relation to environmental interventions:

Washington, H., et al. *Why conservationists need to understand wellbeing.*

Workshop report

This is the report of our technical workshop, held on 17th-18th September, which is available online at <http://www.valuing-nature.net/wellbeing/outputs>:

Understanding and monitoring the effects of environmental interventions on wellbeing: Learning from other perspectives and from experience.

Presentations

All the powerpoint slides from the technical workshop are available at the VNN website, <http://www.valuing-nature.net/wellbeing/outputs>

The powerpoint slides from the final workshop are at: <http://www.valuing-nature.net/wellbeing/final-event> and at <http://www.zsl.org/science/events/conservation-and-human-wellbeing,650,EV.html>

The talks are also available for web-based listening, at <http://www.zsl.org/science/events/conservation-and-human-wellbeing,650,EV.html>.

Research proposals

One of our key objectives was to develop a research agenda for future work on the topic of our VNN project, and we did this through the joint development of a consortium research proposal which we submitted to the UK government's ESPA call. The call had 3 stages and the proposal is through to the final stage (11 proposals under consideration for 5 grants of £2 million each). The outcome will be

known by the end of March 2013. If this proposal is unsuccessful, the VNN project's legacy will still remain, with a highly developed research agenda available for other funding agencies, and collaborative links made between team members. A number of research proposals have directly resulted from the VNN collaboration, including:

UCL, WCS and Imperial College: Proposal submitted to ESRC-DFID poverty alleviation call (successful), on 'Measuring complex outcomes of environment and development interventions'.

Durrell and Imperial College: Proposal submitted to UK government's Darwin Initiative for work measuring wellbeing impacts of Durrell's conservation work in Madagascar. PhD student funding already secured.

Results and outputs

*Have any significant datasets been generated from this research? NO
If YES give details.*

*Were there any circumstances that aided or impeded research progress? NO
If YES explain how the work was affected and how any problems were overcome or opportunities exploited.*

Results exploitation and knowledge transfer

*Who do you think are the main users of this research?
Include any that apply: industry (please specify which sector); policymakers and regulators (e.g. Defra, Environment Agency), NGOs (e.g. RSPB, conservation bodies; other academics).*

Industry: a) Companies which exploit natural resources in developing countries. e.g. timber, oil palm, ecotourism, fisheries. Those who attended our workshops were: Tullow Oil plc, HOK International, Interface.

b) Ecological consultancies: Those who attended our meetings were: IIED, Mokoro ltd, Synchronicity Earth, The Ecology Consultancy, CENTDOR (Cambodia), MRAG.

Policy-makers and regulators: DEFRA, DFID, World Bank (workshop attendee), CBD

NGOs: International and in-country conservation and environment/development NGOs.
NGOs who attended our meetings are: WCS, WWF-International, WWF-UK, FFI, Farm Africa, Durrell Wildlife Conservation Trust, ZSL, Birdlife International, Survival International, Pastoralist Women's Council (Tanzania), International Initiative for Impact Evaluation, Iwokrama International Centre (Guyana), RBG Kew, Natural History Museum.

Academics: Working in the fields of environment, conservation, economics, development, anthropology, health, business.

Our workshop attendees came from: Imperial College (Life Sciences), UCL (anthropology and Institute for Global Health), LSE (Geography & Environment), Sussex (Institute for Development Studies), Oxford (perinatal health unit and OUCE), Cambridge (Zoology), Copenhagen, UEA (Economics), Northumbria, Bangor, Kent (DICE), Exeter, Kings, Leeds, Royal Veterinary College, York, Staffordshire, Royal Holloway, Brighton, London School of Hygiene and Tropical Medicine, St Andrews.

*Have any potential beneficiaries and/or users of the research outputs (in particular non-academic research users, such as private or public sector organisations) been involved at any stage in the research activity and/or been informed of the research outputs and achievements?
If YES give details.*

Yes - see above for the list of beneficiary organisations attending our workshops. Our core team included the NGOs Farm Africa, ZSL and the Wildlife Conservation Society. The open workshop attracted 148 attendees from a wide range of backgrounds. Others have viewed our material online and through social media.

*Has the research led to any further collaborations with potential users or other academics?
If YES give details.*

Yes. We have initiated new bilateral collaborations within our core team, including submission of grant proposals. We have also included Durrell Wildlife Conservation Trust into our major consortium grant.

Science in society

Has an opportunity arisen to promote the public understanding of the scientific results from this research?

Give details of work/activity undertaken

Yes, we did this through our open workshop, which had a very high proportion of student attendance (107 students). We have also made our talks available online through the ZSL website, which has a very high proportion of general public users.

Interdisciplinary working

To what extent did the project enable new working relationships a) between different academic disciplines and b) with non-academics?

Please give details

a) The project core team included anthropologists, economists and conservation scientists. It enabled us to extend and deepen our relationships and come to new understandings about each other's perspectives and methods. Through our workshops we also developed interesting new relationships particularly with health professionals and with development researchers, in particular Maggie Redshaw (Oxford University PeriNatal Epidemiology Unit), Allister McGregor (Institute for Development Studies) and Philippa Bevan (Mokoro Ltd).

b) We developed through our core team new close relationships between academics and the development NGO Farm Africa and conservation NGOs WCS and ZSL. We also initiated new research links between the core team and conservation NGO Durrell Wildlife Conservation Trust.

What were the main challenges of working as a team consisting of people from different disciplines/sectors?

Please give details

Our project highlighted the very different perspectives and conceptions of wellbeing within different disciplines; exploring and reconciling these differences was one aim of the project. These fundamental differences led to very different points of view on how best to measure wellbeing, whether using quantitative measures such as income or more qualitative approaches such as participatory institutional analysis. For example, at our first core team meeting we spent around an hour discussing whether it was appropriate to use the term 'metric' or whether a term such as 'understandings' would be better. The two ends of the spectrum were broadly represented by economists and anthropologists.

We also had interesting differences in perspective in the project between those who took an instrumental view of wellbeing as an indicator of conservation success and those who felt that understanding human wellbeing and the effects of interventions on people's lives was an important goal in its own right (these views were represented by the conservation NGOs and by researchers from the more development/anthropological end of the spectrum).

What methods did you use to successfully address these challenges?

Please give details and also include any recommendations for future VNN research.

The main approach we took to addressing these challenges was to recognise and value the different approaches and perspectives, and to embrace diversity rather than attempt to decide which approaches were 'right'. The previous work by WeD was a very useful framework for doing this, and we were

lucky that Allister McGregor, who led WeD, and other colleagues, were so open to engaging with us. They had themselves encountered these same issues of interdisciplinarity, and so their framework and ideas were already moulded by the need to understand complexities and to move towards an approach that was rigorous, operationalisable and could accommodate different approaches to wellbeing.

It also helped that we were a small team, and that we included two students as key participants, one of whom came from the economics/conceptual end and the other came from conservation science/local voices perspective. The mixture of two or three core group meetings spaced throughout the project, where we could debate our ideas as a small group, an intensive 2 day technical workshop in the middle of the project with a group of about 20 people from a range of perspectives, and a large open workshop at the end of the project worked very well as a way of ensuring perspectives could be aired and ideas develop. This structure allowed both close ties to develop and looser networking opportunities to be taken. Finally, working together to develop a concrete research proposal was a good way of concentrating minds, because this involved an actual commitment to particular methodologies and approaches, rather than a more passive engagement through attendance alone, which could have meant that people were able to avoid addressing disagreements by disengaging with the project.

By the end of the project, we had achieved a remarkable degree of consensus and mutual understanding, and it was clear that we had travelled a long way from the initial meetings.

Anything else?

If there are any other outcomes from your project that have not been captured above, or if you have any further comments, please add them here

Brief summary of project activities

We held two workshops. The first one was a technical workshop bringing together experts in wellbeing research from a range of different disciplines (including health, development, conservation and economics) to discuss commonalities and differences in their approach to wellbeing research. The second aimed to reach out to a wide audience, with a particular focus on people carrying out environmental interventions, to highlight the conceptual and practical challenges in implementing wellbeing monitoring, and approaches to operationalising the concept of wellbeing so as to improve interventions.

We have also written two papers which are about to be submitted to peer-reviewed journals. One of these is an examination of how different disciplines and frameworks view wellbeing, and the lessons of previous research for conceptualising the effects of environmental interventions on local people, led by an economist from the LSE. The other is about how wellbeing is actually operationalised within environmental interventions, and the effects of different stakeholder perspectives and power imbalances on how people actually use the term, led by a conservation scientist from Imperial College. We also produced a report of the technical workshop and a set of abstracts and video recordings of the open workshop, both of which are online. We are preparing a short position paper based on the technical workshop report, which will also be submitted to a journal.

In the field, we tested our ideas with an experimental approach to understanding the wellbeing effects of conservation interventions in Guyana, which involved comparing local and external conceptions of wellbeing. Finally, we worked as a core team to produce a research agenda for the future, which is currently in the final round of consideration for funding by the UK government's ESPA programme. If successful, this will enable our network to put into practice the ideas we have discussed during the VNN project.

Appendix A
The four Key Challenges

1. How can the **complexity of socio-ecological systems** be incorporated into valuations of biodiversity, ecosystem services and natural resource use?
2. How can **stock sustainability** be incorporated within valuations of biodiversity, ecosystem services and natural resource use?
3. How can issues of **scale** be incorporated within valuations of biodiversity, ecosystem services and natural resource use?
4. How do we integrate natural and social science information on values for biodiversity, ecosystem services and natural resources into governance and so improve **decision-making** and implementation?

Appendix B

The conceptual framework

