

ECOSYSTEM SERVICES FOR POVERTY ALLEVIATION PROGRAMME MEMORANDUM

Section 1: Summary	2
Section 2: Programme Details.....	4
2.1 Project description.....	4
2.1.1 <i>What problems does the project address?</i>	4
2.1.2 <i>Objectives</i>	6
2.1.3 <i>What will money be spent on?</i>	9
2.1.4 <i>Who will it influence?</i>	9
2.1.5 <i>Who will it benefit?</i>	10
2.2.1 <i>Background</i>	11
2.2.1.1 <i>How did we get involved?</i>	11
2.2.2.2 <i>Relevance</i>	12
2.2.2 <i>Approach</i>	14
2.2.3 <i>Economic Appraisal</i>	19
2.2.4 <i>Social Appraisal</i>	21
2.2.5 <i>Institutional Appraisal</i>	22
2.2.6 <i>Environmental Appraisal</i>	23
2.2.7 <i>Lessons and evaluation</i>	24
Section 3: Implementation.....	26
3.1 Governance and Management Arrangements.....	26
3.2 Funding	28
3.3 Monitoring and Reporting.....	28
Annex 1: Draft Logframe	30
Annex 2: Themes	40
Annex 3: ESPA Guiding Principles	44

Section 1: Summary

The Ecosystem Services for Poverty Alleviation (ESPA) research programme aims to deliver high quality and cutting-edge research that will improve our understanding of ecosystems in terms of the services they provide for poverty reduction and inclusive growth processes. It will provide the evidence and tools to enable decision makers and end users to manage ecosystems sustainably and in a way that contributes to poverty reduction.

Ecosystems are being degraded at a significant rate. The recent Millennium Ecosystem Assessment concluded that 60% of ecosystem services studied are severely degraded or being used unsustainably. This has significant consequences for development. The poorest and most vulnerable groups, especially those living in rural areas, tend to be most directly dependent on ecosystem services. Poor people are also less able to access substitutes to services provided by ecosystems. Additionally ecosystem services provide a direct source of wealth for developing countries, such as through forest and fisheries products, as well as their underpinning of key economic sectors such as agriculture.

The need for the type of knowledge ESPA will generate is increasingly urgent. Impacts arising from exogenous change, such as climate change and economic volatility, are accelerating ecosystem deterioration and presenting much more acute policy and management challenges. Such changes have the potential to initiate large-scale ecosystem collapse and irreversible change. ESPA will look at how to address these impacts, and will also conduct research to better inform international efforts to deal with these changes.

ESPA will be delivered through a novel partnership bringing together DFID, the Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC). This partnership brings development policy and science communities together, and is a unique opportunity to build a strong link between the natural, social and economic sciences and international development.

The programme will be delivered through a number of projects, selected through rigorous competitive call processes. There will be a range of projects under ESPA, including large inter-disciplinary consortia programmes and smaller specific and targeted pieces of work. ESPA will also provide catalyst grants to enable Southern partners to develop high quality proposals and partnerships.

The projects will be carried out by collaborations of researchers from north and south, including UK-based scientists supported by NERC and ESRC. Resources will be available to coordinate and integrate the work, and foster a global community, through cross-cutting activities.

The programme will fund a Directorate to support the programme. In addition to managing the research portfolio on behalf of the Programme Executive Board (DFID, NERC, ESRC), the Directorate will manage a cross-portfolio programme covering knowledge sharing, research into use, monitoring and evaluation and capacity building.

DFID will provide a total of £27 million to fund ESPA (2009 – 2017), NERC £10 million and the ESRC £3.5 million (2009 – 2017). The total budget for ESPA is £40.5 million.

Section 2: Programme Details

2.1 Project description

2.1.1 What problems does the project address?

Ecosystems provide a range of services which are important to us all (Box 1), but our intrinsic dependency on ecosystem services has been largely misunderstood, undervalued and ignored by decision-makers. This has resulted in practices that have led to consistent declines in ecosystem services' delivery: 60% of the world's ecosystem services are being degraded or used unsustainably¹. This deterioration is affecting growth and development progress, and will continue to do so into the future. Despite this, we struggle to know how to deal with it.

ESPA seeks to generate the evidence on ecosystem services, their full value and links to sustainable poverty reduction so as to equip end users and decision makers with the knowledge on how to manage them better.

Box 1: What are ecosystems and ecosystem services, and why are they so important?

An ecosystem can be considered as a unit within which a collection of organisms interact with each other and their physical and chemical environment. The resulting natural processes establish a series of complex ecological balances. Ecosystems operate at a wide range of scales, from long term global systems, e.g. an ocean, to short term, localised and more temporary systems, e.g. freshwater pools.

Ecosystem services are the processes that underpin the benefits people obtain from ecosystems². For instance, water purification is an ecosystem service that provides clean water to people. Ecosystem services are extensive and diverse. They result from interactions between organisms and their physical habitats within an ecosystem. The Millennium Ecosystem Assessment grouped ecosystem services into the following categories:

- Provisioning services are the products obtained from ecosystems, including food, fibre, fuel, genetic resources, biochemicals, natural medicines, pharmaceuticals and freshwater;
- Regulating services are the benefits provided by the regulation of ecosystem processes, such as air quality regulation, climate regulation, cycling and movement of nutrients and soil formation and regeneration, flood and drought mitigation, erosion control, prevention against disease and pest and disease attack by regulating disease carrying organisms;
- Supporting services are those that are necessary for the production of other ecosystem services. They differ from provisioning, regulating, and cultural services in that their impacts on people are often indirect or occur over a very long time, whereas changes in the other categories have relatively direct and short-term impacts on people. These services include: soil formation, photosynthesis, primary production, nutrient cycling and water cycling.
- Cultural services are the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences, including: cultural diversity, spiritual and religious values, knowledge systems, educational values, inspiration, aesthetic values, sense of place, social relations, cultural heritage, recreation and tourism.

¹ As identified by the Millennium Ecosystem Assessment is a state of the art scientific appraisal, carried out between 2001 – 2005 focused on the linkages between ecosystems and human well-being, and, in particular on ecosystem services. It involved 1360 experts worldwide. See www.millenniumassessment.org/.

² Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.

Some of the poorest and most vulnerable groups, especially those living in rural areas, are most directly dependent on ecosystem services and therefore most vulnerable to sudden changes in ecosystems service provision and to poor ecosystems management. Poor people are also less able to access substitutes to services provided by ecosystems. For instance, poor farmers in the developing world continue to rely on natural pest control services due to their inability to access pesticides or pest resistant crop varieties.

The poor are also the most vulnerable to ecosystem changes that leave them exposed to natural and human disasters such as drought, famine and floods. This vulnerability is exacerbated by the fact that the poor also frequently live in areas that are already degraded or threatened, of low productivity (e.g. drylands), high vulnerability (e.g. flood prone areas and some coastal zones), and lack the institutional and financial buffers that could help them manage stresses and shocks. These increasing pressures have heightened the risk of civil unrest, conflict, displacement and migration.

Whilst there is some growing momentum around ‘sustainable’, ‘green’ and ‘inclusive’ growth, decision makers have continued to promote policies and processes that have brought about massive ecosystem changes and often with little benefit for the poor. This is frequently because ecosystems services are subject to market failures. For example, unlike other economic goods, ecosystem services are considered ‘free’ and costs and benefits associated with their exploitation are therefore not fully valued or captured by market mechanisms. Secondly, when treated as common property, with poorly defined property rights they are often subject to unsustainable exploitation. This is true at the global, national and local level and often when external governance regimes are imposed³.

Ecosystem changes may be the result of both underlying indirect drivers (such as economic or socio-political), or, direct impacts (such as logging, agriculture or mining). These are captured in the Table 1 below.

Table 1: Drivers of change in ecosystems (adapted from the Millennium Ecosystem Assessment Conceptual Framework)

Indirect Drivers of Change	Direct Drivers of Change
<ul style="list-style-type: none"> • Demographic • Economic • Sociopolitical • Science and Technology • Cultural and religious 	<ul style="list-style-type: none"> • Changes in local land use and cover • Species introduction or removal • Technology adaptation and use • External inputs • Harvest and resource consumption • Climate Change • Natural, physical and biological drivers

Ecosystem changes may have improved the lives of many, e.g. through generating wealth from exploiting timber resources or land clearance for

³ Elinor Ostrum (“Economic governance: the organization of cooperation: Royal Swedish Academy of Sciences)

agriculture, but they have also undermined the delivery of other key ecosystem services, impacting negatively on the lives of others - including through increasing insecurity and chronic poverty. Undermining ecosystem services in this imbalanced way could also lead to lost opportunities for poverty reduction that are based on delivering new forms of value from ecosystem services. Nonetheless, it is evident that the inter-relationship between human activity and ecosystems is complex, and the causal effects between poverty and ecosystems sustainability are often difficult to discern and require more investigation.

Impacts arising from exogenous change, such as climate change and economic volatility, are accelerating ecosystem deterioration and presenting much more acute policy and management challenges. Such changes have the potential to initiate large-scale ecosystem collapse and irreversible change. For example, warmer temperatures have triggered widespread glacial retreat with resulting effects on downstream water supply in some areas. In coastal systems, high temperatures and CO₂ concentrations have affected coral reef productivity thus local fisheries. Many ecosystems, such as forests⁴, will not be able to adapt fast enough and existing management systems may no longer be suited to the new conditions. We urgently need to understand how to develop policies and mechanisms with sufficient capability to deal with large scale change, increasing uncertainty and new forms of risk, especially as it affects the poor.

ESPA has been designed to deliver the evidence needed to equip decision makers and end users to address the ecosystem management challenges outlined above. More specifically, ESPA aims to address the following key knowledge gaps on:

- drivers of ecosystem degradation: internal and external, physical and politico-economical;
- ecosystem functions and dynamics, particularly in relation to critical thresholds and irreversible change;
- the full value (in a multistakeholder perspective) of ecosystem services;
- drivers of sustainability, identifying positive incentives for sustainable management of ecosystems services for poverty reduction.

The problems ESPA will attempt to address require a truly interdisciplinary approach; this has been a major constraint in the past. ESPA will make special efforts to develop and support interdisciplinary approaches and results-focused research capacity.

2.1.2 Objectives

ESPA's specific goal, purpose and outputs are detailed in Box 2 below. ESPA will deliver high quality and cutting-edge research that will improve our understanding of how to link ecosystem services more effectively into poverty

⁴ <http://www.forestadaptation2008.net/>

reduction, environmentally sustainable and inclusive growth. Crucially, ESPA will build the knowledge base and tools to help decision makers manage the difficult trade-offs that currently exist between ecosystem services and development. It will also help evaluate the impacts that different interventions have on ecosystem services and livelihoods.

ESPA is different in its approach, because it considers ecosystems and poverty to be dynamic and multi-dimensional. It recognises that interactions between nature and people, and the resulting feedbacks, are dynamic, location and time specific, occur at different scales, and respond to a multitude of different drivers. ESPA will therefore stimulate research into ecosystem dynamics, how they relate to the poor, and how to influence governance processes, through a better understanding of the political economy, and help reinforce sustainable poverty reduction, environmentally sustainable and inclusive growth.

ESPA will generate evidence to increase our understanding on some of the following overarching questions:

- What is the role of ecosystem services in providing safety nets and diversifying livelihood options for the poor and vulnerable? How can these ecosystem services be managed to increase the resilience of these groups, bring about new or alternative sustainable livelihood opportunities, and reduce their exposure to stresses and shocks?
- What is the contribution of sustainably managed ecosystem services to national wealth (and related poverty reduction benefits) and key economic sectors? Can we better manage ecosystems to deliver sustainable, green and inclusive growth, capturing the full range of ecosystem services values?
- Which ecosystems and ecosystem services are at greatest risk of reaching their environmental limits and tipping points, including those that might trip into irreversible change and cause large scale livelihood and development losses, such as through the destruction and loss of a valuable fishery?
- What opportunities might ecosystem services provide for pathways out of poverty, including from emerging large-scale sustainable (green) growth opportunities, e.g. markets for carbon sequestration?
- How do impacts arising from exogenous change affect the provision of ecosystem services for poverty reduction? How do declines in ecosystem services increase vulnerability and reduce resilience to exogenous changes?
- How does the political economy and governance context drive decision making about the use and management of ecosystem services at different levels? How can we institutionalise and incentivise better decision-making on ecosystem services for poverty reduction, while

building responsive policies and programmes to meet the ‘voice and accountability’ demands of the poor?

Box 2: ESPA Goal, Purpose and Outputs

The goal is ‘sustainably managed ecosystems contributing to poverty reduction and inclusive growth in developing countries’.

The purpose is ‘To positively influence end users and decision makers through the generation of cutting edge evidence on ecosystem services, their full value, and links to sustainable poverty reduction’.

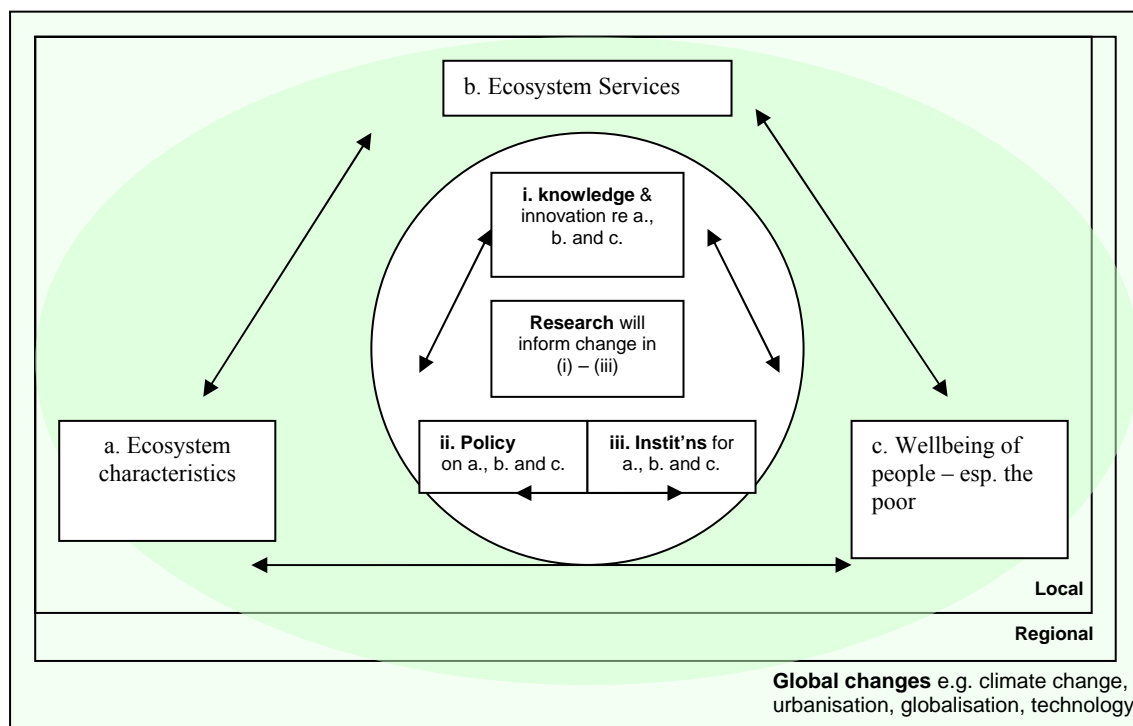
The outputs are:

1. A strong research and evidence base on the interface between ecosystem services, their dynamics and management, human use and pathways to sustainable poverty reduction;
2. Innovative, interdisciplinary research and methodologies, delivering tools and approaches that enable the simulation and prediction of socio-ecological responses to multiple drivers;
3. High uptake of research outputs and synthesis by early and on-going engagement and communication with policy makers, practitioners and decision makers;
4. Enhanced capacity of southern researchers to conduct, lead and use/communicate high quality ESPA-type interdisciplinary research, including through effective north-south and south-south research partnerships.

ESPA will be delivered through a novel partnership that brings together DFID, the Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC). This partnership brings development policy and science communities together, and is a unique opportunity to build a strong link between the natural, social and economic sciences and international development, enabling researchers from different disciplines to come together and work in an interdisciplinary manner, with a strong research into use and capacity building focus. This partnership will deliver research that is both scientifically excellent and developmentally relevant.

ESPA aims to encourage positive changes in (i) science, knowledge and innovation systems; (ii) policy and politics; and, (iii) institutions and markets. It will work to improve constructive links between (i), (ii) and (iii) so that these systems are more responsive to changing realities. ESPA will actively engage constituencies involved in the area of both science and governance. And, given the interdependency and range of scales at which both ecosystems and socio-economic and political systems work, it suggests the need to work at different levels and scales. ESPA recognises that political economy issues (for example, the assignment and enforcement of property rights) are important considerations, and impact on the efficiency and equitability of the outcome. Without due consideration of these factors, the improved understanding of fundamental processes ESPA will generate are unlikely to yield the expected benefit. As summarised in Figure 1 below:

Figure 1: Context of ESPA Research



2.1.3 What will money be spent on?

For this scheme, DFID will provide a total of £27 million, NERC £10 million and the ESRC £3.5 million.

The programme will be delivered through a number of projects, selected through rigorous competitive call processes (see section 3.2). Some monies will be set aside for very specific and targeted pieces of work that might be articulated throughout the lifetime of the programme. The total number of projects will be dependent on the total resources over the lifetime of the programme. The projects will be carried out by collaborations of researchers from the north and south, including UK-based scientists supported by NERC and ESRC. Resources will also be available to coordinate and integrate the work, and foster a global community, through the cross-cutting activities.

The programme will also fund a Directorate to support the programme. In addition to managing the research portfolio on behalf of the Programme Executive Board (DFID, NERC, ESRC), the Directorate will also support communications, monitoring & evaluation, capacity building and some targeted research activities.

2.1.4 Who will it influence?

It is vital that all ESPA research is able to demonstrate strongly its developmental impact. This may be through generating knowledge that benefits poor women and men directly. ESPA is more likely, however, to generate findings that are more applicable at a higher level, i.e. for policy and decision-making that can benefit the poor and/or contribute to sustainable and inclusive growth at a wider scale.

ESPA research is more likely therefore to engage and influence intermediaries, such as:

- **governments:** ESPA might assist with developing the evidence, knowledge, tools and simulation models, needed to ensure that the poor benefit from new policies and incentives, such as markets for environmental services;
- **regional organisations:** ESPA might also work to develop the necessary evidence needed to more effectively govern transboundary ecosystem services without negative impacts on the poor;
- **NGOs:** ESPA outputs could provide the information needed by NGOs to advocate for positive change in ecosystem management for the poor;
- **international policy makers:** ESPA evidence on how to manage trade offs between ecosystems services, climate change impacts and poverty reduction might feed into a wide variety of policy processes, such as the UNCBD, UNFCCC, and those addressing food security, health and trade;
- **private sector:** ESPA could build on advances made by the private sector around ecosystem service markets and investigate how to create enabling frameworks that also benefit the poor.

2.1.5 Who will it benefit?

Whilst working more to deliver knowledge at an intermediary level, the primary beneficiaries of ESPA are poor and socially excluded people dependent upon ecosystems services living in developing countries. ESPA investments will seek to address the challenges faced by poor groups in developing countries, such as indigenous peoples, poor subsistence farmers or those dependent on small-scale inland/coastal fisheries, pastoralists, the urban poor and people living in degraded ecosystems, who are also most directly dependent on ecosystem services for their sustenance. ESPA also recognises that some of the most vulnerable groups — women, children, the elderly and disabled — will be hardest hit by the effects of ecosystem service decline, such as the increased incidence of flooding after large scale deforestation.

In terms of maximising impact on target beneficiaries, all seven Research Councils have been exploring the impact of research and have already changed the application process to reflect the importance of maximising

impact⁵. In particular, all proposals must now include an impact plan. This plan will detail who benefits (beyond academia), exactly how they will benefit and what will be done to ensure that they have the opportunity to benefit from this research. The ESPA programme benefits from this cross-council learning. Particularly for strategic research programmes, the advice given to both peer reviewers and panel members emphasises that research findings must have a clear path to real utility for policy and practitioners in the field. For applicants to ESPA, it will be a requirement that all proposals submitted set out the potential impact of research on end users, the poor and poverty reduction in an explicit impact plan. The participation of end users in research design is an essential part of this and past experience (e.g. the DFID/ESRC scheme) and confirms that stakeholder involvement can help improve the likelihood of projects having impacts in their immediate contexts.

The clear articulation of target beneficiaries will be vital to the success of ESPA. For example, values for services are likely to differ at the local, national and global level according to societal preferences. Best practice on the valuation of ecosystem services highlight that ‘values’ should be guided by perception of the beneficiaries⁶ highlighting the importance of country specific and local knowledge.

2.2 Programme Appraisal

2.2.1 Background

2.2.1.1 How did we get involved?

The DFID Research Strategy 2008-2013 commits DFID to ‘*use different methods of funding to join up national, regional and global research efforts, so that they are more relevant to what matters most to developing countries and to achieve a bigger impact on poverty reduction.*’ The DFID Research Strategy sets out plans specifically to explore work with UK Research Councils as a delivery mechanism. In response to the strategy requirements, DFID approached NERC and ESRC and initiated discussions on possible areas of mutual research interest.

Similarly, NERC and ESRC welcomed the opportunity to discuss with DFID how mutual collaboration would put all of our organisations in a stronger position to respond to HMT Challenge 5: “Increasing pressures on natural resources and global climate from rapid economic and population growth in the developing world and sustained demand for fossil fuels in advanced economies.”

⁵ <http://www.nerc.ac.uk/funding/application/documents/impact-plan-guidance.pdf> and www.esrcsocietytoday.ac.uk/esrcexpectations and <http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/innovation/expectationssei.pdf>

⁶ The Economics of Ecosystems and Biodiversity - European Communities 2008.

A joint mapping of areas of overlapping research interests established that Ecosystem Services for Poverty Alleviation represented a particularly fruitful intersection of our respective priorities.

2.2.2.2 Relevance

ESPA takes up many of the research challenges articulated in the Millennium Ecosystem Assessment⁷. Given that the MA was primarily an assessment, it did not generate new primary knowledge, but highlighted that many uncertainties on how to manage ecosystems still exist and exposed the challenges, strengths and gaps in the underlying science. ESPA aims to take up and address many of these challenges and gaps on how to better manage the ecosystem services and human well-being, and is the first well-resourced opportunity to do so.

Box 3: Some of the widely articulated research gaps and challenges

- new knowledge of how to establish the governance mechanisms, and how to deal with the political economy of ecosystems, their values and their management at wider scales, so as to help secure the large-scale sustainable management of the full range of ecosystem services in the context of poverty reduction and inclusive growth – socio-economic research has only tended to focus on the management in-situ of provisioning services⁸;
- reliable data and information on the all-important dynamics and interactions between social, economic and ecological issues as they relate to ecosystem services, such as the better quantification of trade offs - the primary research on ecosystem services that does exist remains highly fragmented and rarely deals with developing country ecosystems⁹;
- more emphasis on under-researched ecosystems;
- better understanding of the impacts of exogenous changes, economic and social, and including climate change, on critical aspects of ecosystem function and how these affect the resilience of ecosystem service provision – much existing research-based knowledge is no longer appropriate or relevant to the new and rapidly changing conditions¹⁰;
- improving our understanding of thresholds of massive persistent changes in social-ecological systems, i.e. how much pressure we can exert before a system trips into non-linear and catastrophic change and the consequences upon the poor of reaching and moving beyond these thresholds.

The MA has triggered emergence of a range of other processes relevant to ESPA. These include The Economics of Ecosystems and Biodiversity

⁷ www.millenniumassessment.org

⁸ Researching the links between growth and renewable natural resources: Final Scoping Study Report, January 2009, IMM Ltd.

⁹ A quantitative analysis of more than 6400 environmental sciences papers published 1993-2003, only 13% of the papers are based on research in the dry sub-tropical and tropical zones, although these eco-climatic zones account for more than half the world's land area. Karlsson, S. *et al.* 2007. Understanding the North-South knowledge divide and its implications for policy: a quantitative analysis of the generation of scientific knowledge in the environmental sciences. *Environmental Science and Policy* 10(7): 668-684.

¹⁰ Researching the links between growth and renewable natural resources: Final Scoping Study Report, January 2009, IMM Ltd.

(TEEB)¹¹, which is supported by the EC, German Environment Ministry and UK Defra. TEEB, in a recent climate issues update¹², claimed that investing in restoration and maintenance of the Earth's multi-trillion dollar ecosystems can have a key role in countering climate change and climate-proofing vulnerable economies. ESPA can help deliver the knowledge and evidence to help make this happen. Discussions on whether to establish an Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)¹³, to facilitate translation of emerging scientific knowledge into specific policy action at the appropriate levels, are relevant to ESPA. ESPA will also make a valuable contribution to the UNEP MA follow up process. UNEP's World Conservation Monitoring Centre (WCMC) gap analysis on strengthening the science-policy interface on biodiversity and ecosystem services¹⁴, prepared for the IPBES discussions, is highly relevant to ESPA, as it identifies numerous science-policy challenges and identifies where these could be strengthened¹⁵.

In designing ESPA, the inherent complexity of the relationships within and between ecosystems and ecosystem services, and human, social and economic parameters, at different time and spatial scales, has become very apparent. This complexity, reinforced by disconnects between natural, social, political, economic and development sciences, as well as between policy and science communities, has also meant that we have been slow to understand how to approach research in this area that delivers the necessary impact. ESPA is therefore determined to support highly interdisciplinary approaches. This view is shared by leading experts who observe that, in spite of the wide influence brought about by the MA, "our ability to draw general conclusions remains limited by focus on discipline-bound sectors of the full social-ecological system" (PNAS, 2009) ¹⁶.

The 2007 UK House of Commons Environmental Audit Committee report on the MA¹⁷ certainly raised the profile of ecosystem services within the UK government, and ESPA is in part a response to the issues raised in this report. More recently, DFID has made specific commitments in the White

¹¹ TEEB is a major international initiative to draw attention to the global economic benefits of biodiversity, to highlight the growing costs of biodiversity loss and ecosystem degradation, and to draw together expertise from the fields of science, economics and policy to enable practical actions moving forward.

<http://ec.europa.eu/environment/nature/biodiversity/economics/>

¹² <http://www.teebweb.org/InformationMaterial/TEEBUpdates/tabid/1137/language/en-US/Default.aspx>

¹³ <http://ipbes.net/en/index.asp>

¹⁴ http://ipbes.net/Documents/UNEP_GC_25_INF_30.pdf

¹⁵ Key actions needed to strengthen the science base of existing science-policy interfaces include: i) improve coordination among them by providing a common science platform ii) provide a better coordinating mechanism linking local, national, regional and global processes iii) strengthen the independence and scientific credibility of scientific outputs iv) improve the policy effectiveness of assessment findings and results v) strengthen the capacity of countries in all aspects of the science-policy interface.

¹⁶ www.pnas.org : a powerful journal of the network of influential and experienced ecosystems experts in the USA

¹⁷ <http://www.publications.parliament.uk/pa/cm200607/cmselect/cmenvaud/848/84802.htm>

Paper IV18 to 'help countries value natural capital, and plan for low carbon, climate resilient and environmental sustainable growth' that benefits people in poverty; ESPA outputs will feed into this initiative. ESPA will also contribute to developing sustainable approaches to achieving the Millennium Development Goals and will directly address the Treasury's Policy Challenge 5.

In the UK context, ESPA is a flagship initiative for Living With Environmental Change (LWEC). LWEC is an interdisciplinary research and policy partnership programme aimed at increasing resilience to—and reducing the costs of—environmental change by addressing the associated pressures on natural resources, ecosystem services, economic growth and social progress. NERC, DFID and ESRC are all partners in LWEC. Through LWEC, NERC is committed to addressing the problems of those most at risk from environmental change through international collaboration. Another important feature of LWEC is that it takes a collaborative approach to research involving 'joint fact finding' between stakeholders. This approach should be particularly useful when trying to match research council and DFID needs and approaches.

The political space for dealing with such issues is certainly beginning to open up further in the UK, as well as in other developed and developing countries. Whilst politicians are currently very focused upon carbon, their growing awareness of the need to tackle climate change should also provide an entry point, upon which ESPA can capitalise, to widen the debate on ecosystem services more generally¹⁹. Indeed it presents an important opportunity to address other important ecosystem issues currently over-shadowed by the focus on climate change.

2.2.2 Approach

The programme will work mainly in four regions of the world that experience significant challenges in managing their ecosystem services in the context of poverty reduction. The regions identified are South Asia, China, sub-Saharan Africa, and the Amazon basin and its Andean catchments, and ESPA will seek to encourage cross-regional collaboration.

Research projects will be identified mainly through a series of competitive calls and other mechanisms as appropriate (see section 3.2). A range of project types and sizes will be supported, in order to achieve projects that are interdisciplinary, allow a range of regions and issues to be covered, including cross-region investigation, provide opportunities for developing country participation and leadership, through north – south and south – south

¹⁸ DFID (2009) Eliminating World Poverty: Building Our Common Future.

¹⁹ <http://news.bbc.co.uk/1/hi/sci/tech/8223611.stm>

partnerships, and to balance the risk portfolio. Project types in ESPA will include:

- **Partnership and Project Development Catalyst Grants** – up to £50k, to support consortia formation, building north-south and south-south research partnerships, and proposal writing in the early stages of the programme.
- **Programme Framework Grants** – up to £250k, to develop new methodologies and concepts for the programme to test, and maintain momentum by providing early opportunities for groups already formed through the ESPA design and capacity building phases.
- **Research consortium grants** – in the region of £0.5m to £5m awarded through a series of three calls, to deliver the majority of ESPA research. Large projects will deliver the broad spectrum of interdisciplinarity that ESPA needs. They will allow a range of issues and regions to be covered within a coherent programme of work, including delivering on deliver on ESPA's capacity building and policy uptake aims. They will enable quality north-south and south-south partnerships in a significant research effort, attract the best high-profile researchers and institutions internationally, and present opportunities to leverage co-funding from regional donors.
- **Forum activities** – smaller activities focussing on cross-cutting and integrating ESPA research, getting research into use and capacity building. A multi-stakeholder forum comprising the ESPA research community, users of the research, and wider networks will help to identify and participate in the activities.

The first call will be guided by six research themes (see Box 3 and Annex 5). The themes attempt to encompass some of the research and capacity-building needs, and provide highlights and examples of the researchable issues. They are not an exclusive list of the sorts of work that ESPA would be looking to fund.

In addition, the individual themes should not be viewed as separate, independent or stand-alone projects, but rather as a description of the research landscape that ESPA aspires to address during the first call. It is envisioned that applicants will respond by creating projects that cut across and combine elements of some or all the themes, and equally cut across and combine projects across the ESPA regions.

The scope of later calls will be agreed after issuing the first suite of programmes. These calls will be targeted and aim to fill strategic areas not covered by the first call and to respond to high priority issues emerging since the design of ESPA.

The research will use place-based case studies to integrate across scales, and the research will be supported by cross-cutting integrative activity that will

aim to add value and support at a programme level, by focussing on communication, consensus building and capacity support.

ESPA will also link up with other DFID, NERC and ESRC investments. For DFID, other research (such as the CGIAR) as well as other regional and country programmes, for NERC, initiatives like the Changing Water Cycle programme and for ESRC, initiatives like the STEPS centre. All partners will ensure that relevant links are pursued where necessary.

Box 4: ESPA themes

The themes will act as a guide to the PEB in putting together the first call for proposals which will be asked to address the identified thematic areas, as well as interactions between them, and the regions, and will also welcome applications which challenge existing policy or practice assumptions.

1. Impact of climate variability and change on the water cycle, ecosystem services and water security
2. Ecosystem services, disease ecology and human well-being
3. Forests, land use change and ecosystem services
4. Biodiversity and ecosystem services—ensuring a sustainable flow of goods and services to enhance human well-being
5. Strengthening the management of coastal ecosystems to support sustained ecosystem service delivery for reduced poverty and vulnerability in coastal zones
6. The political economy of sustainable ecosystem services for poverty reduction and sustainable growth.

Discussions in the ESPA Programme Advisory Committee (PAC)²⁰, Programme Management Group (PMG)²¹ and consultations with leading experts (January 2009 workshop) identified some fundamentals that must characterise ESPA-funded research. These include:

Inter- and multidisciplinary research: ESPA will offer a new framework and a new platform for inter- and multidisciplinary work. This will entail building on disciplinary strengths and effective linking through and across different disciplines. ESPA believes that interdisciplinarity, combined with the delivery of high quality science that has developmental impact, is key to tackling the complex set of problems connecting ecosystem services and poverty reduction; for instance: science that can help us understand how and why ecosystems are becoming degraded, with what impacts, and how to reverse this; environmental economics to better value the services and assess cost-benefit ratios; and, political economy to ascertain what institutional changes need to be put in place for sustainable ecosystem management to benefit the poor.

A systems-based approach: in terms of science, knowledge and innovation ESPA will promote a systems-based approach to understanding ecosystem

²⁰ The PAC comprised of eight leading experts in this field, see <http://www.nerc.ac.uk/research/programmes/espa/management.asp>. The PAC ceased its involvement in ESPA design in March 2009.

²¹ Programme Management Group comprising DFID, NERC & ESRC plus Defra in an *ex-officio* role see <http://www.nerc.ac.uk/research/programmes/espa/management.asp>

services for poverty reduction. This will require research and analysis of the complex inter-linkages between the biophysical and human components of ecosystems and their services as a whole to ensure that policy recommendations that emerge are founded on a full and complete understanding, across different scales, of the ecosystem, the services it provides and the human dimension.

A focus on poverty: much work into ecosystem services to date has focussed upon protection of ecosystems as an end point in its own right. ESPA's focus will be to deliver research outputs which help support the contribution that sustainable management of ecosystems makes to poverty reduction, environmentally sustainable and inclusive growth.

Linking research to policy: ESPA will also strengthen understanding on how to better apply and use the knowledge and evidence, and ensure that it delivers positive change, and positive impacts for ecosystems and the poor. This will include developing tools and techniques that allow scientific research to be understood and applied by policy and decision makers. Such approaches may include modelling, scenario planning and valuation. Whilst ESPA research outputs will certainly address the challenge of feeding into existing policy processes in developing countries, such as National Poverty Reduction Strategies, through a better understanding of political economy and political ecology. ESPA will also encourage outputs which innovate in the field of policy development, and attempt to address policy uptake challenges, so as to promote more sustainable management of ecosystems and services for the poor.

Supportive of learning and flexibility: Because efforts to link the research fields of ecosystem service and poverty are relatively new, we can expect ESPA to generate new findings that differ significantly from – or at least add significantly to – those from other initiatives, including ESPA's initial situation analyses. In addition, both ecosystem services and poor people are subject to dynamics, including shocks in economic and environmental systems. The programme therefore will keep its framework and focus under review, and to link all its stakeholders in a continuous learning process.

Strengthening capacity in southern research institutions: Strengthening the capacity of research institutions in the south to provide leadership and cutting edge research into ecosystem services in developing countries will be an important objective of ESPA, given the low participation of southern researchers on these issues in the past. The research will be conducted within the developing world: through south – south research partnerships, as well as south – north research partnerships.

On the basis of ESPA's approach articulated above, a number of 'Guiding Principles' have been developed for researchers to use when preparing their research proposals and, if successful, when implementing them (see Annex 6). These principles are intended to guide ESPA research rather than restrict it and should assist in ensuring a comprehensive and holistic approach to

ESPA research that meets ESPA's objectives. It is also likely that these principles will be translated into selection criteria.

ESPA will require a judicious mix of fundamental research combined with strong communication support and innovation in knowledge management to achieve its bridge-building objectives. Some key elements of ESPA communications and knowledge management might include the following:

- communications (website, knowledge exchange);
- convening different constituencies (global and/or regional ESPA fora);
- consensus-building (in formulating regional or thematic policy options);
- capacity-building (of researchers, communicators and policy-makers – as well as poor groups themselves to help them participate) and other components that will help to put 'research into use', and to 'inform research about use';
- understanding and overcoming the barriers to the uptake of science research outputs in policy making.

Why are we doing it this way?

ESPA objectives and approach to implementation is the result of a two year (£1.5m) scoping phase, managed by the PMG and advised by the PAC, involved the commissioning of 4 regional and 2 thematic analyses²². These were produced by research consortia, led by institutions from the region where the research was to be conducted, and in partnership with northern institutions. A key requirement for the analysis work was the involvement of authoritative and influential constituencies engaged in the generation and/or communication of knowledge, in order to maximise the opportunities of exerting influence on policy makers.

Box 5: Designing ESPA – the situational analyses

Analytical studies

Four regional analyses (China, South Asia, the Amazon- Andes and sub-Saharan Africa) and two thematic analyses (marine and coastal regions and the urban-rural continuum) were commissioned in 2007. The regions and themes were identified by an expert Programme Advisory Committee (PAC) as those in which the quality and/or quantity of ecosystem services are at risk and threaten to reverse progress in poverty reduction.

The analyses²³ were undertaken by six consortia comprising researchers from both developing and developed countries. The research consortia were required to summarise existing knowledge and gaps on the links between ecosystems, ecosystem services (ESs), growth and poverty; identify and describe the drivers of change for ecosystems and poverty; assess the knowledge and information needs of communities and decision-makers; and determine the challenges and research priorities for promoting the use of ESs to support poverty reduction and economic growth. They were also required to collaborate extensively with national governments, civil society and relevant stakeholders and, in so doing, to raise

²² <http://www.nerc.ac.uk/research/programmes/espa/resources.asp>

²³ The full reports for each of the analyses can be found at www.nerc.ac.uk/research/programmes/espa/resources.asp

awareness of ESs and develop capacity in Southern institutions.

Synthesis of the analyses identified common issues across each of the studies including the high dependence of the poor (relative to other groups) upon ecosystem services (ESs) especially around land and water; degradation of ESs in all regions; concerns that climate change will profoundly impact upon the delivery of ESs of benefit to the poor; weak policy and institutional frameworks for managing ESs; limited awareness and understanding by decision-makers of the importance of ecosystems in supporting growth and poverty reduction; fragmentation of ecosystem research into either natural sciences or socio-economic with limited integration; generally limited research on ESs in developing countries and a tendency to focus solely on provisioning services; and failure to communicate key ESs research messages.

The PAC (Programme Advisory Committee) and PMG (Programme management Group), drawing in expert advice as needed, worked with the analyses to design the ESPA programme including identifying the themes, which were discussed during a joint workshops held in London in September 2007 and in Cape Town in June 2008. Key findings emerging from the situational analyses built into the ESPA programme include the need to: promote inter-disciplinary research; ensure a strong focus on the political-economy and end-users of ESPA outputs; balance research across the different types of ecosystems services; promote a systems-based approach reflecting temporal and spatial dimensions; build upon existing ecosystems research and processes; and create a framework for knowledge management, lesson learning and communication across regions.

Themes represent common findings from across the situational analyses as well as the intersection of research priorities across DFID, NERC and ESRC. Criteria that were considered during the themes' selection process: potential for scientific breakthrough, potential for impact in delivering poverty reduction and economic growth, opportunities for working at multiple scales and feasibility of the research agendas.

The approach and themes emerging from the scoping phase were then subjected to scrutiny and revision at a workshop of academics and experts (e.g. IUCN, UNEP, WWF) chaired by Sir Gordon Conway in January 2009. Participants tested the validity of the proposed research themes, outcomes and key outputs and recommended revision as appropriate.

2.2.3 Economic Appraisal

The contention of DFID's Research Strategy is that returns to research depend critically on the production of new knowledge and getting this knowledge into use by developing country governments. Drawing on DFID's research strategy and learning from DFID research management²⁴ as well as the literature on best practice for publicly-funded research (noting in particular the importance of institutional setting for the different types of research) we

²⁴ DFID's 2008-2013 Research Strategy is based on an in-depth performance review of funding arrangements as well as extensive consultation. It emphasises the creation of new policy knowledge, the use of evidence to inform decision making, generation and use of new technologies and strengthening the capability of developing countries to do and use research.

develop criteria for assessing the most appropriate programme design. The criteria to be met are that the research programme:

- brings together high quality Northern and Southern researchers from across natural, social and economic research backgrounds to generate and exchange credible and relevant knowledge on ecosystem services, their full value, and links to sustainable poverty reduction in an interdisciplinary manner.
- Provides independent high quality international research and analysis that is developmentally relevant, respected and linked into relevant policy and decision-making processes.
- Delivers a research programme that is open to international competition.
- Supports the development of effective North and South and South – South research partnerships that build and strengthen both Northern and Southern research communities’ capacity and networks

The economic appraisal assesses two options – the Research Programme Consortium and the ESPA model. These two models have been selected on the basis that they are both robust, able to deliver higher-end academic research as well as research into use activities. The appraisal then assesses these two models against their potential for delivering the research programme based on four criteria. The table below summarises the findings from this analysis.

	RPC Model ²⁵	ESPA Model ²⁶
Brings together high quality Northern and Southern researchers from across natural, social and economic research backgrounds to generate and exchange credible and relevant knowledge on ecosystem services, their full value, and links to sustainable poverty reduction in an interdisciplinary manner	Medium to high	Medium to high
Provides independent high quality international research and analysis that is developmentally relevant, respected and linked into relevant policy and decision-making processes	Medium to low	Medium to high
Delivers a research programme that is open to international competition	Low to medium	Medium to high
Supports the development of effective North and South and South – South research partnerships that build and strengthen both Northern and Southern research communities’ capacity and networks	High	Medium

²⁵ DFID run a competitive bid to contract a consortium of researchers

²⁶ DFID enters into a research partnership with 2 UK research councils: NERC and ESRC

The ESPA model is the preferred option according to the criteria. A simple linear scoring (i.e. Low = 1 Medium = 2 High = 3) would support this conclusion. In addition the low-medium score for competition and quality is a concern for the RPC approach and would suggest that the ESPA model is likely to give a higher economic return. This is explored more fully in full Economic Appraisal in Annex 7. By partnering with NERC and ESRC, the ESPA programme leverages an additional £13m of resources as well as tapping into the world leading research communities, increasing the likely impact of DFID funds.

Lastly the analysis identified design recommendations for the ESPA programme which need to be taken into account for programme design. These are:

- Programme governance structure and research selection criteria for research are critical if the programme is to deliver its poverty objectives, research uptake objectives, and southern partnership and capacity building objectives
- Governance structure needs to give equal weighting to three funding institutions, with efforts made to ensure developing country representation
- Selection criteria for research funding should clearly spell out poverty requirements, uptake and capacity building objectives. Partnership with Southern researchers should be seen as mandatory with evidence given of southern partners driving the research agenda. Programmes will also need to demonstrate how they will achieve equitable partnerships with southern researchers including s-s partnerships.

2.2.4 Social Appraisal

The dependence of the poorest and most vulnerable groups of people on ecosystems services, especially but not exclusively those living in rural areas, make them most vulnerable to degradation of ecosystems. The poor also usually lack the institutional and financial buffers that could help them manage any livelihood threats that arise from ecosystem deterioration. Further investigation of the potential for informal social institutions and networks to militate against such threats, and the potential for improved local ecosystem management, is important.

There is a need to improve the evidence base on how ecosystems can be managed sustainably for pro-poor development, including the active participation of poor women and men. Experience shows that poor people have rarely benefited from interventions to manage ecosystems, and may be further impoverished and excluded by such efforts. More understanding of the interaction between intergenerational poverty cycles, poor management of ecosystems and weak legal and governance frameworks is required to improve ecosystems management and poverty reduction efforts. Research is required to investigate the opportunities for poor people to gain more equitable access to ecosystem services and to explore the opportunities for,

and challenges to, their stewardship over ecosystems in particular contexts. Such information could contribute to improved sustainable ecosystems management and poverty reduction. A thorough understanding of the social dimensions of ecosystems exploitation and management is essential for the design of sustainable ecosystems programmes and policies.

The challenge for ESPA will be to explore the multidimensional nature of poverty and social exclusion vis-à-vis ecosystems services and the impact of ecosystems degradation, investigating factors that support or undermine the social, political, economic and cultural capital that access to ecosystems brings, or lack of access precludes. This will be facilitated by thorough poverty, gender and social exclusion analyses that investigate multidimensional factors of poverty in a holistic rather than piecemeal fashion, including analysis of power and politics at local, national and international levels.

The use of disaggregated socio-economic and geospatial data in the research will also help to facilitate such analysis. Spatial data is crucial to investigating the transboundary nature of many ecosystems with implications for cross-border governance, security, sustainability (of ecosystems and livelihoods) and poverty amongst a wide cross-section of stakeholders.

Attention will be paid to gender differentials and excluded groups who are particularly vulnerable to ecosystems services degradation and/or poor management of ecosystems services, such as indigenous peoples, poor subsistence farmers, poor women, men and children in rural and urban areas, pastoralists in vulnerable areas and so on.

Research will include investigating indigenous and traditional knowledge, considering how to bridge the gap between scientific and local knowledge to enhance ecosystems management systems and influence social policy and human rights approaches to ecosystems management.

The challenge for ESPA will be to identify the constraints and opportunities that can facilitate pro-poor objectives.

2.2.5 Institutional Appraisal

ESPA emerges from wide ranging processes of consultations and studies that involved many stakeholders and experts both in the UK and in ESPA's target regions. It therefore draws its legitimacy and validity from this wide stakeholder participation and involvement and is designed to continue with a high level of engagement and interaction.

From an institutional perspective, the key challenge is for ESPA to maintain and strengthen the right networks that will help facilitate the channelling of its outputs and outcomes into various international, regional and national development and poverty reduction interventions.

ESPA has been designed as a component of the UK initiative, Living With Environment Change (LWEC). LWEC is an interdisciplinary research and policy partnership programme aimed at increasing resilience to - and reducing the costs of - environmental change by addressing the associated pressures on natural resources, ecosystem services, economic growth and social progress. LWEC will provide a means of linking to other relevant research programmes.

Environment and development are areas fraught with complexity, and we lack an understanding of how to create the right institutional forms to better manage ecosystems sustainably while achieving poverty reduction. Governance is central to the issues ESPA is trying to tackle, helping understand questions of access and control. ESPA presents a unique opportunity to provide the evidence that can help convince politicians and decision-makers that action now is essential. ESPA has a huge opportunity to inform and provide the necessary evidence for key political discourses and various public debates at all levels of society on ecosystem services.

The coalition of ESRC and NERC will prove crucial in bringing in the environmental, social, economic and political dimensions. DFID provides the development framework to keep the programme focused on research for poverty alleviation. The management arrangements equally combine the robust NERC administrative capacity and out-sourced technical capacity. The responsibility to keep focused and sensitive to developing country needs rests with the Programme Executive Board (PEB), the Directorate and the Programme Advisory Committee.

ESPA thus has the international legitimacy, the political platform, the institutional linkages and design features to deliver on its mandate. The interdisciplinary construction of its research agenda and the robust management arrangements are consistent with the challenges placed before it.

2.2.6 Environmental Appraisal

The ESPA programme has the potential to deliver a large positive environmental impact, given that it is being designed to address one of the major questions underpinning environmental management: *how to ensure that ecosystems can be managed sustainably and in a way that contributes to poverty reduction and growth in developing countries.*

In order to maximise this potential positive impact, ESPA should seek to:

- apply a systems approach that fully integrates human dimensions: long term solutions to ecosystem degradation will only be possible if ESPA research fully takes into account the human element of ecosystem function and management;

- build on wealth of ecosystem relevant research available: ESPA should seek to increase the impact of former valuable research by bringing it into a more holistic approach involving both natural and socio-economic disciplines;
- focus on critical thresholds and priority regions with high poverty/ environmental dependency/opportunities;
- connect to international and regional environment/development processes and fora to maximise the impact and relevance of ESPA.

There is limited risk of negative environmental impacts associated with the ESPA research. However, the research undertaken by ESPA, as well as that of the Directorate, is likely to entail travel. Participants should be advised that the carbon footprint of all travel supported by ESPA should be minimised or offset voluntarily, where possible. All documents, reports and paper outputs of research studies funded by ESPA should be printed on paper made from sustainably managed forests and/or recycled paper. Any research programmes that will involve direct interactions with highly sensitive ecosystems or the biodiversity should include an impact assessment to minimise risk of harm.

2.2.7 Lessons and evaluation

In developing this programme, we have sought to learn lessons from other DFID, NERC and ESRC research programmes. These include the DFID/ESRC joint research scheme, implementation of DFID's Renewable Natural Resources Research Strategy (1995-2005) and CCAA programmes, the ESRC/NERC/BBSRC Rural Economy and Land Use programme (RELU) and NERC's Quantifying and Understanding the Earth SysTem (QUEST).

The design phase of the ESPA programme, as well as the capacity-building activities undertaken to date, have also built considerable expertise amongst the partners. Full details of these lessons can be found at Annex 8. The key lessons that will be applied to ESPA are in five main areas:

1. Maximising Developing country participation:

- Modified JeS system will be applied to ESPA, so that developing country applicants only have to undergo the full recognition process if successful. Dedicated resources will be made available to assist developing countries.
- Catalyst grants will be made available to support promising developing country proposals.
- Targeted and timely publicising of ESPA to developing country networks will be undertaken by the ESPA directorate.

2. Enabling North-South and South- South partnerships

- Sufficient time between calls and deadlines, and subsequent calls will be built into the ESPA timetable to allow partnerships to be developed.
- Quality of partnerships will be a key criteria for selection and evaluation

- ESPA will pay 100% of the direct research costs to developing country institutes.

3. Maximising Development Impact

- Impact will be a key criteria for selection and evaluation of proposals; all proposals will need to include an impact plan.
- Specific ESPA guidance will be issued on the Impact Plans.
- Impact is a major part of ESPA's M&E framework and an independent impact evaluation will be undertaken.

4. Enabling Innovative Interdisciplinary Research

- ESPA guidance to researchers will explicitly request and articulate what is meant by interdisciplinary approaches and teams in calls.
- Catalyst grants and facilitation by the Directorate will support the formation of interdisciplinary teams.

5. Programme Management

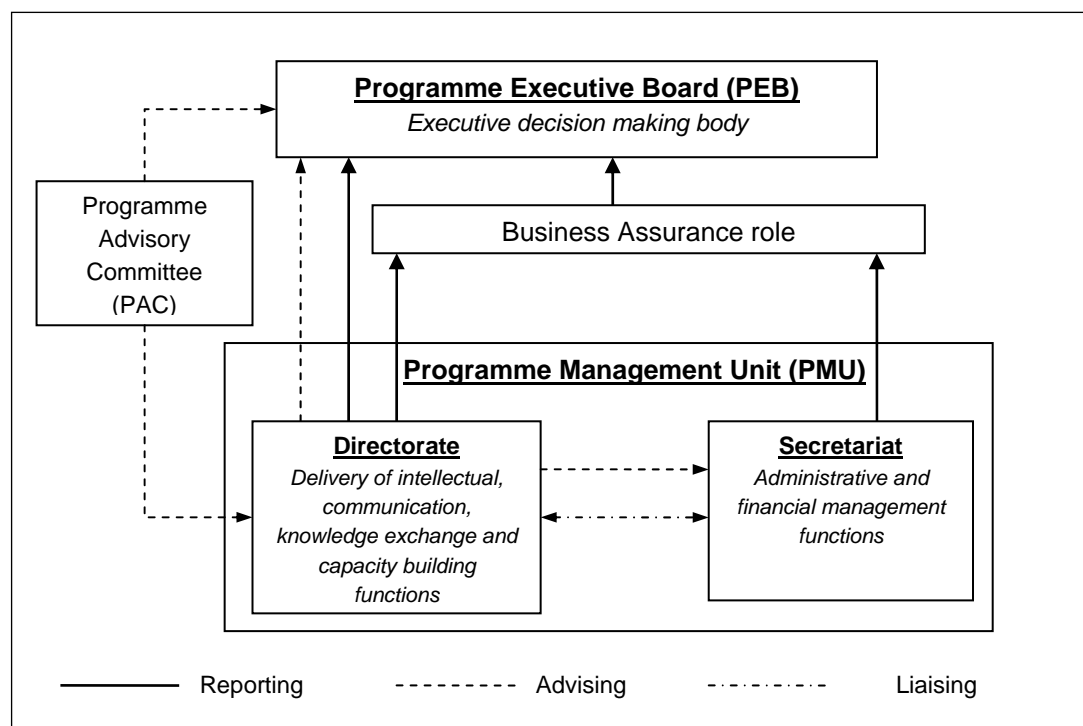
- Well planned external evaluations will be built into ESPA and budgeted for.
- A director and team to provide intellectual vision in integrating and synthesising programme outputs is crucial to maximise the value and impact of the research.

Section 3: Implementation

3.1 Governance and Management Arrangements

ESPA will be jointly funded by DFID, NERC and ESRC. NERC will provide the administrative and financial management, equivalent to 1 FTE baseline support, rising during intensive periods of work such as during calls, which will be paid from the total allocation, and additional in-kind support for transactional funding and finance processes. A Memorandum of Understanding will be agreed between DFID and NERC to facilitate the disbursement of funds.

Figure 2: ESPA Governance Structure



3.1.1 Strategic Direction

A Programme Executive Board will be established consisting of the 3 funding partners. This will be the programme’s executive decision making authority and all funding partners’ interests will be fully represented. The PEB sets and drives the strategic direction of ESPA; its members will be senior staff with executive (decision-making) authority for their organisations.

An independent PEB Chair will be appointed to work to specific TORs. This is in order to achieve the following objectives:

- 1) provide independent and impartial guidance to ensure ESPA fulfils its mandate;
- 2) help facilitate partners to steer ESPA's strategic direction with minimal conflict of interest;

- 3) provide solid and consistent ESPA institutional memory against staff turnover in partner organisations.

A Chair will be appointed with expertise in ecosystem services and poverty alleviation, as well as appropriate management expertise. This will enable the three funding partners to represent their organisation's perspective without conflict of interest and bring together these different areas of strength in an effective partnership. The Chair will be selected by mutual consent of the Partners.

3.1.2 Implementation

ESPA will be implemented by the Programme Management Unit. This will consist of an ESPA Secretariat, housed within NERC, and an ESPA Directorate (to be contracted and housed externally). The Secretariat will provide the administrative and financial management functions, based on NERC's well established and tested systems. Dedicated resources will be put in place by the Secretariat and in the Directorate's budget to ensure adequate support is available to assist southern institutes in the application and grant issuing process.

The Directorate will be an outsourced body that will manage the ESPA programme, driving the intellectual, communications, knowledge management and capacity building functions of ESPA. Outsourcing enables ESPA to contract the best institution to host these functions, which NERC does not have in house.

A Director will be appointed to establish and manage the Directorate. The Director will be an individual with expertise in delivering high quality research with development impact. Apart from the area of direct financial management, the Director will operate as the de facto overall head of ESPA, undertaking the analysis and synthesis of ESPA documentation to prepare concise and purpose-led reports to the PEB. This will enable the PEB to operate effectively, given that its members will be full time employees elsewhere. The Director will be complemented by others holding relevant expertise, such as management, communications, capacity building, research into use etc.

NERC will manage a tender process for the Director on behalf of the PEB, based on TOR and selection criteria agreed by the PEB and will contract the Directorate. The Director will be in post by May 2010 and the contract will complete in 2016/2017. Throughout the lifetime of ESPA, the Directorate will deliver integrative, synthesis and knowledge exchange outputs, but these will be the particular focus of the directorate activity from 2014 when results from the research projects start to emerge.

The NERC Secretariat will provide financial and call-related information to the Directorate, as required. In matters of ESPA implementation, the Director interprets the decisions of the PEB and works with the Secretariat to deliver them.

NERC, as holders of the Directorate contract, providers of the Secretariat and providers of financial management on behalf of the partners, will assume an assurance role, to a) ensure the Directorate is meeting the terms of the contract, b) the Secretariat is meeting its objectives and c) budgets and risks are being adequately managed within NERC. This role will sit outside the Secretariat and will report to the PEB primarily by exception. This reporting route is not in conflict with the direction that the PEB will give the Director.

In order to provide strategic and independent, high quality advice on the implementation of ESPA, a Programme Advisory Committee (PAC) will be established by the Director, and agreed by the PEB. The PEB will participate in PAC meetings and will be entitled to put requests for advice to the PAC. If independent advice is required, prior to the establishment of the PAC, interim measures will be taken.

3.2 Funding

DFID will contribute £27m to ESPA (in addition to the £3m already committed to the design phase and the capacity building call). NERC is contributing £10m (including £0.2m already spent on the 2008 capacity building call) and ESRC will contribute £3.5m. In addition, NERC will provide programme management transactional activities (e.g. grants handling, financial management, and procurement services) as an in-kind contribution to the partnership.

3.3 Monitoring and Reporting

DFID will monitor ESPA against the logical framework. The logical framework follows new DFID guidance and provides an operational m&e framework for monitoring both delivery and impact of the programme. In addition, NERC will monitor the programme through its Strategic Management Tool (SMT).

An ESPA monitoring framework will be developed based on the logframe (i.e. monitoring progress against purpose and outputs), delivery of activities and monitoring of impact plans. It will build on existing NERC processes, and will ensure ongoing lesson learning, including from the call process and ongoing impact evaluation. In order to maximise the relevance and potential impact of the research upon poor people, it will be expected that ESPA research projects disaggregate socio-economic data, including by sex and other variables such as age, ethnicity, race, disability, spatial factors and so on.

The Directorate will lead on developing and maintaining the framework, in conjunction with the Secretariat and based on PEB oversight and agreement. The PEB will decide on frequency and format of reporting, although award holders will be expected to make, at a minimum, annual submissions to the NERC Research Outputs Database. The Secretariat will provide financial data, including quarterly financial reports to the PEB, as well as data on applications received, rejected and awarded.

External mid-term reviews and impact evaluations will be factored in at appropriate times.

Annex 1: Draft Logframe

PROJECT TITLE						
GOAL	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	Assumptions
Sustainably managed ecosystems contributing to poverty reduction and inclusive growth in developing countries	Human Development Index					
		Source				
		http://hdrstats.undp.org/en/indicators/74.html				
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	
	MDG 7: Target 7a: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources					
		Source				
		The MDG Monitor : www.mdgmonitor.org/goal7.cfm				
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	
	MDG 7: Target 7b Status and trends of the components of biological diversity					
		Source				
		Indicators for the 2010 biodiversity target: www.cbd.int/2010-target/framework/indicators.shtml				

PURPOSE	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	Assumptions
To positively influence end users and decision makers through the generation of cutting edge evidence on ecosystem services, their full value, and links to sustainable poverty reduction.	ESPA research findings evident in policy dialogues, decision making fora and networks				2013, a majority of targeted users are using research outputs	Policy makers produce policy based on high quality evidence.
		Source				End users and decision makers are interested and engaged in ESPA
		End user survey of policy makers, practitioners and decision makers in target countries, ROD (high level including Hadley centre, DFID Country Assistance plans etc)				
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	External pressures and interests

	Aggregate research outputs index covers evidence base on ecosystems services, their full value and links to sustainable poverty reduction in developing countries					do not prevent end users and decision makers from taking up and using ESPA evidence
		Source				
		Aggregate research outputs index ²⁷ (including the composite publications index covering core research areas including other outputs e.g. participation by south, capacity building, interdisciplinarity)				
INPUTS (£)	DFID (£)	Govt (£)	Other (£)	Total (£)	DFID SHARE (%)	
INPUTS (HR)	DFID (FTEs)					

OUTPUT 1	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	Assumptions
A strong research and evidence base on the interface between ecosystem services, their dynamics and management, human use and pathways to sustainable poverty reduction	Research portfolio generating evidence to strengthen our understanding of the interface between ecosystems and human use & pathways to sustainable poverty reduction by investigating <ul style="list-style-type: none"> Ecosystem function and dynamics, provision and value of services, and management; the political economy 	Source				
		Composite publications index				
						<ol style="list-style-type: none"> We will find sufficient ecosystem services that deliver sustainable poverty reduction EPSPA can draw on a sufficiently large research community to work on these issues Timescale for research is sufficiently long to see results

²⁷ Comprised of: ESPA directorate’s database, NERC research outputs database (link the two databases – pull out from NERC’s database to create bespoke for ESPA directorate and then finally potential to link to science impacts database – need to demonstrate real impact and interaction e.g. note of meeting with Minster not just journal paper)

	<p>of ecosystem services and use</p> <ul style="list-style-type: none"> • and exogenous change impacts <p>in water, forests, health, coasts and biodiversity</p>				
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year
	Application of a systems approach ²⁸ throughout ESPA research	Initial evaluation in 2011 after first call finds evidence of systems approaches and produces lessons for later calls	Proportion of working achieving a good or excellent score is > 80% by 2013		
	Source				
	Independent formative evaluation of application of a systems approach ²⁹ throughout ESPA research Independent evaluation of representative research consortia Aggregate research outputs (e.g. journal articles with high impact factors)				
IMPACT WEIGHTING	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year
	Evidence generated identifies pathways to sustainable poverty reduction encompassing: <ul style="list-style-type: none"> • Growth • Sustainable livelihoods • Governance 	100%			100%
	Source				
	Survey of approved research proposals and impact plans, annual reports and publications (Data disaggregated by groups of poor)				
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year

²⁸ As defined in the Programme Memorandum. Baseline and ESPA systems approach will need to be established

²⁹ As defined in the Programme Memorandum. Baseline and ESPA systems approach will need to be established

45%	Priority emerging gaps identified and filled	0 2010/11 ³⁰					
		Source					RISK RATING
		Assessment of 1 st call scope					Low
INPUTS (£)	DFID (£)	Govt (£)	Other (£)	Total (£)	DFID SHARE (%)		
INPUTS (HR)	DFID (FTEs)						

³⁰ To be assessed following first call and assessment

OUTPUT 2	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	Assumptions		
Innovative , interdisciplinary research and methodologies, delivering tools and approaches that enable the simulation and prediction of socio-ecological responses to multiple drivers	Interdisciplinary research methodology and practice delivering ESPA evidence base	Initial evaluation in 2011 after first call finds evidence of good interdisciplinary working and produces lessons for later calls	Proportion of working achieving a good or excellent score is > 80% by 2013			That interdisciplinary research capacity exists and we can generate		
	Source							
	Independent formative evaluation of representative research consortia at the start, middle and end of programme, undertaken in collaboration with the LWEC research fellow documenting interdisciplinary working.							
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year			
	Citations and co-authorship across disciplines: social, economic, natural and developmental							
	Source							
	Publications, citations, Google Scholar							
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year			
	Innovative methodologies emerge and used by others							
	Source							
Citations, research outputs database								
IMPACT WEIGHTING	Indicator	Baseline	Milestone 1	Milestone 2	Target (date)			
20%	Publications in high impact journals					RISK RATING Mod		
Source								
Aggregate database								
INPUTS (£)	DFID (£)	Govt (£)	Other (£)	Total (£)	DFID SHARE (%)			
INPUTS (HR)	DFID (FTEs)							

OUTPUT 3	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	Assumptions
High uptake of research outputs and their synthesis by early and on-going engagement and communication with policy makers, practitioners and decision makers	Improved awareness of ESPA generated evidence to improve policy on ecosystem management that significantly benefits the poor					Policy makers, practitioners and decision makers willing to use evidence presented Researchers are willing to partner with third sector organisations including think-tanks and NGOs Targeted users can attribute the research they use to ESPA Policy maker priorities and needs inform the research and produce outputs that are relevant to users
		Source				
	End user survey and Director’s assessment to measure awareness and use of ESPA outputs (survey of project end users as specified in impact plans before start, mid-point and at end, including providing an example, use the impact plans)					
Improved access to ESPA generated evidence to improve policy on ecosystem management that significantly benefits the poor	Improved access to ESPA generated evidence to improve policy on ecosystem management that significantly benefits the poor	2010, zero				Targeted users can attribute the research they use to ESPA Policy maker priorities and needs inform the research and produce outputs that are relevant to users
		Source				
	End user survey and Director’s assessment to measure awareness and use of ESPA outputs (survey of project end users as specified in impact plans before start, mid-point and at end, including providing an example, use the impact plans)					
IMPACT WEIGHTING	Indicator	Baseline	Milestone 1	Milestone 2	Target (date)	
20%	Coverage in local & global infomedia across the programme	2010, zero	2013, coverage matches average achieved by DFID RIU projects at yr 3		2015 coverage matches average achieved by DFID RIU projects at yr 5	There are good pathways into use for research RISK RATING Mod
		Source				
	Project reporting (media coverage of their activities and outputs)					
Demand driven research evident through early and ongoing engagement with end users	Demand driven research evident through early and ongoing engagement with end users	2009, zero				
		Source				
	Project reports, impact plans, end user survey MTR					
INPUTS (£)	DFID (£)	Govt (£)	Other (£)	Total (£)	DFID SHARE (%)	
INPUTS (HR)	DFID (FTEs)					

OUTPUT 4	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year	Assumptions	
Enhanced capacity of southern researchers to conduct, lead and use/ communicate high quality ESPA-type interdisciplinary research, including through effective north-south and south-south research partnerships	Number of southern authored and co-authored interdisciplinary publications, papers presented at key meetings, and conferences, participation in high level meetings	2009, N?	2012 + 10%?		2015 + 20%?	Sufficient number of southern researchers to draw on	
		Source					
		PMG agree key meetings and establish baseline DFID/ESRC/NERC monitoring of relevant meetings					
	Indicator	Baseline + year	Milestone 1	Milestone 2	Target + year		
	Proportion of successful southern bids to ESPA, who have attended workshops and received specific support	2010, X%	2010, X+Δ%	2010, Y%	2015, Z%		
		Source					
		Annual research project reports					
	Indicator	Baseline	Milestone 1	Milestone 2	Target (date)		
	Number of successful southern led bids						
		Source					
	Project application database						
Indicator	Baseline	Milestone 1	Milestone 2	Target (date)			
Proportion of Southern applications to ESPA							
	Source						
	Project applications database						
IMPACT WEIGHTING	Indicator	Baseline	Milestone 1	Milestone 2	Target (date)		
15%	Southern applications to other donors to do ESPA type research					RISK RATING	
		Source				Low	
		Project reports					

	Indicator	Baseline	Milestone 1	Milestone 2	Target (date)		
	Quality of partnership						
INPUTS (£)	Source						
	Verification of Proposal application/ reports (set out roles and responsibilities, demonstrate equitable and fair balanced, added value of partnership) and on-going monitoring						
	DFID (£)	Govt (£)	Other (£)	Total (£)	DFID SHARE (%)		
INPUTS (HR)	DFID (FTEs)						

Annex 2: Themes

Water

Impacts of climate variability and change on the water cycle, ecosystem services and water security

Major risks and uncertainties surround the extent to which climate variability and change could modify the water cycle in regions relevant to ESPA. For example, changing patterns of rainfall, snow and ice melt, could affect transfers of water through soils and ecosystems and hence river flows and groundwater recharge.

Outcome:

Increased water security for developing countries in the context of environmental and climate change. This means ensuring sufficient quality and quantity of water for health, productive uses and ecosystems, while minimising water-related risks to people, environments and economies.

Outputs:

- a) Methods and tools for handling tradeoffs thereby enabling effective management of multifunctional landscapes (i.e. that deliver on the widest range of ecosystem services) with a focus on ensuring water security and sustainable access.
- b) Evidence base on the vulnerability of surface and groundwater systems to multiple drivers of change, such as climate, land-cover, socio-economic and technological pressures. Priorities include understanding how the retreat of glaciers in the Amazon/Andes region, or changes in monsoonal variability in South Asia might affect downstream water flows and dependent livelihoods. Likewise, how changes in the availability of groundwater affect people and ecosystems in sub-Saharan Africa.
- c) Strengthened capacity in risk assessment of key drivers and diagnostics to improve regional probabilistic forecasting of water cycle elements, including extreme events (i.e. droughts and floods) and their links to human health.
- d) Evidence of the vulnerability and resilience of ecosystem services to hydrological variability and change as well as opportunities for adaptation to maintain or enhance human well being.

Health

Ecosystem services, disease ecology and human well-being

Infectious disease disproportionately affects the poor; and, in a vicious circle, tends to keep poor people in poverty. Other groups around the world (e.g. Gates Foundation, others) have explored various ways of reducing the burden of specific infectious diseases. ESPA research will focus on how ecosystem dynamics and services, and their environmental and socio-economic drivers (e.g. climate change, land use, production and settlement patterns) regulate the emergence, spread, transmission dynamics and vulnerability to clusters of infectious and non-communicable³¹ diseases in specific settings, and how these interactions may be managed to reduce the burden that they impose upon the poor.

Outcome:

³¹ Loss of ecosystems services can also affect non-communicable diseases such as cardiovascular disease, obesity, asthma and mental health through degraded soil, air and water quality

In the context of environmental change, poor people and their livelihoods are less affected by the burdens of disease, whether these are human, animal or plant diseases.

Outputs:

- a) Systems understanding of how ecosystem service dynamics over multiple spatial and temporal scales, including shocks and stresses related to climate change, affect the emergence, re-emergence and spread of existing human, animal and plant infectious diseases, including zoonoses.
- b) Systems understanding of how changes in ecosystem services and their interaction with other key factors (urbanisation, economic and environmental changes) can impact on non-communicable disease.
- b) Multi-level understanding of the vulnerabilities to particular clusters of infectious diseases, and the additional burdens of non-communicable diseases generated by social, economic and cultural inequalities under pressure of environmental change/shocks/stresses.
- c) Novel, multi-level, ecosystem-based biological, social, economic and cultural interventions for disease regulation and control, and, identified means through which these can work for the poor. (*For example, integrated vector management; land use modifications; biodiversity-oriented strategies*)
- d) Policy approaches that respond effectively to the cross sectoral, dynamic and uncertain character of social-ecological-disease interactions.

Forests

Forests, Land Use Change and Ecosystem Services

In addition to direct provisioning services, such as timber and fuel, forests provide a host of regulating, supporting and cultural services which tend to be poorly understood and under valued. ESPA research will aim to look at ways and means of better integrating the range of forest ecosystem services into poverty reduction, sustainable and inclusive growth.

Outcome:

Enhanced contribution of forest ecosystem services to poor peoples' livelihoods and sustainable and inclusive growth processes in the context of environmental and climate change.

Outputs:

- a) Better understanding of how the poor can derive enhanced livelihoods from the range of forest ecosystem services in the context of sustainable and inclusive growth. In particular researching those regulating and supporting services that are poorly documented at present, e.g. carbon cycles and sequestration, but which play a critical role in supporting sustainable development at various scales.
- b) Effective and viable (including innovative) mechanisms that can capture benefits from forest ecosystem services including for the poor.
- c) Better understanding of the value of ecosystem services derived from forests, potential trade-offs between different ecosystem services and relevant stakeholder groups, now and in the future, and how to place these processes in the wider political economy.
- d) Identification and evaluation of the opportunities that forest ecosystem services provide governments for alternative development scenarios, including for adaptation, which would also benefit the poor.

- e) Evaluation of the risks and consequences for the poor of land-use change, climate change and other environmental change in forests and the identification of strategies for active management of forests and forest landscapes to improve the well-being of the poor.

Biodiversity

Biodiversity and ecosystem services - ensuring a sustainable flow of goods and services to enhance human well-being

Biodiversity underpins the delivery of many ecosystem services and informed ecosystem management will provide both improved livelihoods and new development opportunities. Yet our understanding of the links between biodiversity and ecosystem services, poverty reduction and growth processes remain weak. ESPA will aim to narrow this gap in understanding.

Outcome:

Good biodiversity and ecosystem management improves the delivery of ecosystem services, enhancing poor peoples' livelihoods and increasing their resilience to climate and environmental change and natural disasters.

Outputs:

- Practical knowledge on key ecosystem services for poverty reduction and sustainable growth and how biodiversity supports them, including locally relevant information on the social, economic and ecological processes that lead to changes in biodiversity and how this in turn impacts on ecosystem services.
- New information on the effects of alternative land-use on biodiversity-dependent ecosystem services, such as soil formation, pollutant breakdown, water regulation, nutrient cycling and natural hazard mitigation, particularly in the context of environmental and climate change, including improved understanding of relevant tipping points, thresholds, irreversibilities and cross-scale effects.
- New information on how poor communities perceive the benefits and costs of biodiversity to their livelihoods and how this translates to their attitudes and behaviour related to biodiversity management.
- A better understanding of how to manage biodiversity and ecosystem structure and processes to enhance the capacity of the poor for adaptation and resilience to climate change and other social, economic and environmental changes.
- Identification of larger scale biodiversity and ecosystem management approaches that can mitigate the impacts of global change on loss of ecosystem services: e.g. through enhancing carbon sequestration, improving water management, and reducing incidence of natural hazards and shocks.

Coastal

Strengthening the management of coastal ecosystems to support sustained ecosystem service delivery for reduced poverty and vulnerability in coastal zones.

Humans tend to be highly concentrated along coastal margins, many of whom are driven from other places by poverty and/or population growth and tending to occupy the least economically valued sites that may also be important natural habitats. People on the coast tend to value provisioning services above other ecosystem services; consequent exploitation and short-term management often degrades other ecosystem services with high societal costs, e.g. flooding, reduced water quality, soil erosion, loss of future economic opportunities. In addition, coastal zones are frequently vulnerable to the impacts of environmental and climate change which increase the vulnerability of poor people disproportionately.

Outcome:

The sustainable management of coastal ecosystem services to reduce poverty and vulnerability in coastal areas.

Outputs

- a) Systems-based knowledge of coastal zone socio-ecological systems (including the inter-linkages with terrestrial & marine ecosystems) to understand better the ecosystem services that they provide, their dynamics, resilience and tipping points, as linked to poverty and vulnerability in coastal communities.
- b) New knowledge generated on the sensitivity of coastal ecosystem services to human-induced, environmental and climate change and the implications for the poor, and how to manage coastal ecosystem services better for reduced poverty and vulnerability.
- b) Techniques, including system modelling, monetary and non-monetary valuation and scenario planning, to understand and deliver evidence on the social, environmental and economic consequences of crossing thresholds in coastal ecosystems.
- c) Application of systems knowledge for evidence-based policy and decision making in coastal areas, including the development of practical tools for application in environmental management and planning to support poverty reduction & reduced vulnerability.
- d) Strengthened institutional capacity to design, conduct and use research on sustainable ecosystem services in support of poverty alleviation in coastal communities.

Political Economy**The political economy of sustainable ecosystem services for poverty reduction and sustainable growth**

Vital ecosystem services, particularly supporting and regulating, are taken for granted and degraded because they are not seen to hold economic value and are not therefore factored into policy. Cost and benefits are often not equitably distributed.

Outcome:

Poor people benefit equitably from sustainable ecosystem services management

Outputs:

- (1) Develop theories and methods necessary to upgrade the quality of policy, institutional structures and management on the political economy of ecosystem services (scaling, distributive, etc, values, trade-offs people are making) at the resource specific level (understanding existing cost) and /or a policy level (communicating to the appropriate audiences), now and into the future.
- (2) Conceptual framework and contextual evidence on how the range of risks, uncertainties and resilience influence ecosystem service values and their sustainability.
- (3) Embed better scientific understanding of all ecosystem processes and functions in appropriate monetary and non-monetary valuation methods, including accommodating both poor people's underlying values and other stakeholders' interests
- (4) Improve the understanding and measurement of the subjective welfare of poor people and communities in terms of their interrelationships with ecosystem services, wellbeing and livelihood provision and integration with poverty monitoring frameworks and indicators.

Annex 3: ESPA Guiding Principles

ESPA will use the following 'Guiding Principles' to establish additional criteria for the calls for proposals. They are intended to guide ESPA research rather than restrict it and simply require that researchers consider these principles and weight them accordingly in the context of their specific thematic and regional research. ESPA will nonetheless expect research consortia to provide justification as to why certain principles are weighted high or low in their proposals. Collectively, however, they should assist in ensuring a comprehensive and holistic approach to ESPA research.

- i. Demonstrate potential for scientific or methodological breakthrough, for instance by encompassing research that is 'ahead of the curve', and that holds opportunity for real integration across the different scientific disciplines and promoting new ways of inter-disciplinary cooperation.
- ii. Ecosystem services should be viewed in their entirety, albeit acknowledging that regulating, supporting and cultural aspects of ecosystem services are under-researched. ESPA will therefore encompass research across the range of supporting, provisioning, regulating and cultural ecosystem services and will attempt to look at the tradeoffs between them and implications for poverty reduction.
- iii. All research should ensure that it is developed with a clearly articulated link to poverty reduction and/or inclusive growth with a full understanding of the political economy and social context.
- iv. ESPA projects will support the co-production of knowledge and the sustained and ongoing engagement with key stakeholders throughout the research process, beginning at the proposal development stage.
- v. Projects should support researchers from different disciplines, and from different regions of the world, to come together and work in equitable partnerships in an interdisciplinary manner encouraging the development of replicable interdisciplinary research methodologies.
- vi. Recognise potential links with work going on elsewhere, particularly where the UK has a stake (e.g. EU, IGBP, IHDP, World Bank, GEF, UNDP, UN CBD, IPBES, MA follow up) and other relevant research programmes funded by the ESPA partners, e.g. the DFID Climate and Development Centre, the Renewable Natural Resources and Growth programme and the NERC Changing Water Cycle and Valuation programmes.
- vii. Build on the outputs of other relevant research. ESPA will develop its programme with a clear understanding of existing and on-going research activities and ensure that it builds upon and strengthens these where relevant as well as driving new and innovative research into ecosystem services.
- viii. Build on lessons learned from other relevant activities in order to make a new and innovative contribution to the systems science of sustainable development.
- ix. Ensure attention is paid to environmental, social and economic processes and dynamics and how they interact and impact on ecosystem services.
- x. Target under-researched issues and areas.
- xi. Take into account the multiple spatial and temporal scales across which ecosystems and the services that they provide operate and are impacted.

- xii. Give attention to the development of research methodologies which are replicable in developing country context to promote scale-up of ESPA approaches.
- xiii. Ensure that there is maximum chance of impact by ensuring relevance to policy and decision making and other end-users, through research into use and communications approaches.
- xiv. Incorporate methodologies that disaggregate data as a rule, by sex and other socio-economic variables such as income, age, ethnicity, race, disability etc., and also by geo-spatial criteria. It will be incumbent upon researchers to demonstrate clearly where and why any of these are deemed to be inappropriate in the research proposal.
- xv. Build links, where relevant, between formal and indigenous science.