

International Climate Fund Business Case for investment in Blue Ventures

ICF Business Case – GB-GOV-7-ICF-P0001-BV

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Intervention Summary

Context and Need for UK Government Intervention

Climate change will have the greatest impact on the poorest and most vulnerable in the developing world, including girls and women and marginalised groups. Low-lying areas, fragile states, emerging hotspots of hunger and increasingly crowded urban centres are most at risk. Climate risks are also likely to contribute to large scale migrations of people, with associated political and economic upheaval.

Mangroves – so called “blue forests” – play a critical role in supporting endangered biodiversity, carbon sequestration and a range of other ecosystem services such as storm protection and erosion prevention. In addition, hundreds of millions of coastal people rely on mangroves for their day to day livelihoods.

Despite their immense value, in many tropical coastal developing states mangroves are being quickly deforested – faster than any other forest type on earth – eroding coastlines and coastal livelihoods, as well as the capacity of poor coastal people to face the impacts of climate change.

Why is this occurring? It is a combination of institutional and market failure:

- Local people lack property rights or management structures which enable them to invest in sustainable long term use of the fisheries and other livelihoods which mangroves provide.
- The ecosystem services which mangroves provide are currently valued by the market at zero.

By helping local people to set up the appropriate institutional structures and internalising these externalities, this project aims to significantly reduce mangrove deforestation in the target area, bringing livelihoods and environmental benefits worth many times the project investment.

What support will the UK provide?

Blue Ventures' *Blue Carbon* initiative is currently focused in Madagascar with expectations to expand its geographical scope to Indonesia, new locations in Madagascar and a country in the WIO e.g. Mozambique. In Madagascar scoping projects have already begun.

Defra funding will allow the project to move beyond its current scoping efforts in Madagascar (stage 1), through full project development and implementation stages (stages 2 and 3) as well as to replicate the fully validated model (stages 1-3) in other countries.

Blue Ventures has initiated stage 1 activities independently in Madagascar, therefore Defra funding will initially enable the project to advance through the remaining stages in Madagascar, and the remainder of the funding will be used to replicate this model in threatened mangroves of high carbon, biodiversity and socioeconomic importance in

southeast Asia (Indonesia), and subsequently other regions (one or more of coastal east Africa and south Asia); thereby validating, executing and scaling up this innovative model in a range of environmental and socioeconomic contexts and proving its global replicability.

In each case, the project will comprise of four parallel areas of work.

- **Blue Carbon and forestry management**
- **Fisheries management and improvement projects**
- **Mangrove livelihood diversification**
- **Community health and women's empowerment**

Activities within the project's four work streams will follow a sequential three-staged approach at each project site, each stage lasting 2-3 years. Work streams will start with project inception (stage 1), advance through project development and validation (stage 2), and culminate in full project implementation (stage 3). In countries in which activities will take place across more than one site, interventions will be aligned to the same stage of progression. The three project sites in Madagascar will commence in stage 2 (building on inception efforts developed by Blue Ventures in advance of this project); while those in all other countries will begin in stage 1.

What are the main project activities?

A full breakdown of project activities for each work stream at each stage of the project can be found at **Annex 1**.

This project will meet both Defra and ICF objectives by combating mangrove loss. It will work with local communities, the private sector and government to establish improved livelihoods and green business opportunities based on sustainable mangrove forestry and fisheries management. The project will directly benefit coastal people through building climate change resilience and adaptation capacity, conserving threatened marine biodiversity¹.

This project is designed to develop a model for Mangrove conservation

Blue Carbon and Forestry Management

This work stream focuses on putting in place frameworks for sustainable use of mangroves, achieving secure tenure for communities, establishing robust monitoring and enforcement, and harnessing and monetising the carbon storage value of mangroves to incentivise their protection by mangrove-dependent communities. The generation of carbon offsets - or accessing climate change finance - through the conservation and restoration of mangroves could make an important contribution to poverty alleviation and biodiversity conservation in coastal areas.

¹ This project will meet the all the objectives of the ICF: reducing poverty, mitigating CO₂ emissions, and conserving biodiversity

Current regulations, as well as the jurisdiction of many government departments, conflict over the use of mangroves, and the place of mangroves in REDD+ remains ill-defined. On governance therefore, it is envisaged that the blueprint created for engaging competent authorities and relevant stakeholders in the project's pilot jurisdiction (Madagascar) could be replicated in other coastal states to create a wider scale and replicable solution to the regulatory confusions that characterise mangrove governance.

For example, in Madagascar Blue Ventures' work to date has integrated mangroves into the national REDD+ strategy. The further integration of mangroves into national climate change adaptation and mitigation strategies will make an important contribution to poverty alleviation and biodiversity conservation in coastal areas.

Stage 1 will commence with a national-level mangrove hotspot analysis and mangrove policy assessment, which will enable site prioritisation and feasibility analysis, identification of local partners, and participatory deforestation and resource use assessments. Stage 2 will see the finalisation of site selection, as well as more detailed remote sensing analyses, forest inventories, and biodiversity and carbon stock assessments. This stage will also begin the process of community outreach and awareness raising, ensuring free prior and informed consent, and aligning activities with national carbon plans. Stage 2 will culminate with the development of detailed carbon project idea notes and business plans for each site. Community outreach efforts will be continued in stage 3, along with commencement of community forestry management, enforcement and monitoring, and the submission, marketing and revenue management for the carbon projects at each site.

Fisheries Management and Improvement

This work stream is concentrated on building frameworks for sustainable small-scale fisheries management in order to overcome the existing lack of property and management rights, and the absence of incentives for more sustainable fishing; factors that commonly drive the unsustainable exploitation of fisheries resources by communities.

Mangroves are highly biodiverse marine environments, supporting productive marine and estuarine fisheries, and playing a critical role as nursery grounds for fish and invertebrate species, in turn maintaining broader tropical marine ecosystem resilience. Improved management of mangrove fisheries can generate significant economic returns for coastal communities, creating powerful economic incentives for sustainable fisheries management and mangrove conservation. Sustaining mangrove fisheries is also inextricably tied to effective forestry management and the two must be integrated into a single coherent management framework.

This work stream will include identifying and mapping mangrove fisheries management and improvement opportunities in line with national fisheries management frameworks, and prioritising sites, while incorporating considerations derived from parallel blue carbon and forestry management activities. Subsequent activities in stage 2 will include community capacity building and learning exchanges, commencement of participatory fisheries monitoring, establishing effective local fisheries management frameworks, piloting local or co-management of fisheries, and developing supply chain partnerships to incentivise

sustainable fisheries management through the launch of an agreed fisheries improvement plan (FIP). Fisheries co-management, monitoring and capacity building efforts will continue in stage 3, along with implementation of the FIP work plan. Stage 3 activities will also work with government partners, communicating and sharing the environmental and economic benefits of interventions to policy and decision makers, in order to strengthen national support for rights-based fisheries management by communities.

Mangrove livelihood improvement and diversification

Significant commercial opportunities exist in mangroves for livelihood improvement and diversification. Through establishing strong local management, addressing gaps in policy and working with the private sector, the project will innovate long-term financing for forestry and fisheries management.

Blue Ventures will engage closely with key stakeholders across the ‘blue growth’ sector, including partners in carbon finance, impact investing, fisheries eco-certification agencies and seafood supply chains. By working with responsible fisheries supply chain partners, the project will ensure that there are viable and improved livelihood opportunities for local people to help offset the opportunity costs communities must bear through conservation, as well as long term incentives to continue with sustainable management and reduce their vulnerability in the long run.

This work stream will begin by profiling viable income-generating activities in priority mangrove conservation areas, identifying mangrove livelihood improvement and diversification opportunities, and creating community trusts that will be capitalised through engaging donors, impact investors and seafood buyers. Stage 2 activities will focus on community organisation, capacity building and learning exchanges, and defining the opportunity costs and offsets to be made by the community trusts. This will include defining social contracts agreeing the forest and fisheries management measures to be undertaken by communities and the corresponding investments to be made by the trusts. This stage will also pilot aquaculture (or other livelihood, e.g. apiculture) production trials, as well as interventions to improve existing mangrove livelihoods (for example identifying markets and upgrading strategies focussed at the harvester level that will allow fishers to improve efficiencies and capture higher market value), with a strong focus on monitoring and evaluation of socioeconomic benefits. Stage 3 activities in this work stream will focus on scaling up those new and improved livelihood interventions that demonstrate effectiveness, and implementing the community trusts and social investments, the latter tied to the successful implementation of forest and fishery management.

Community health and women’s empowerment

Blue Ventures’ experiences in Madagascar have shown that poor health and higher than desired fertility rates resulting from lack of access to basic health services, and family

planning services in particular, significantly restrain the ability of communities, and women in particular, to engage in sustainable marine resource management.

This work stream will ensure the integration of community health services with mangrove management efforts through the replication of Blue Ventures' critically acclaimed Population-Health-Environment (PHE) model². This holistic approach enables couples to choose freely the number and spacing of their births, while equipping communities with the skills and tools they need to manage their resources sustainably. It has been shown to produce greater impacts than single-sector interventions, and to generate additional benefits such as the increased engagement of women in local management efforts³. Increasing access to family planning services improves maternal and child health outcomes, allows girls to delay their first pregnancy until after they have completed their education, and affords women more opportunities to become economically active.

This work stream will begin with community health needs assessments in each site, and the development of a working strategy for health partnerships. Stage 2 activities will include preparation for community health service delivery and training of community health agents where appropriate. Stage 3 will launch community health service delivery and community outreach and women's empowerment efforts, the latter including efforts to connect local women with opportunities to engage in mangrove management and alternative livelihoods. This final stage will also focus on institutionalisation of health-environment partnerships through regional government action plans where appropriate.

What are the expected results?

Detailed analysis of the benefits are included and the economic analysis section and accompanying Economic Analysis annex.

Carbon Savings

The Blue Forests project is expected to deliver carbon savings through conservation and restoration of mangroves that will reduce the rate of deforestation and increase capacity for carbon sequestration. The amount of carbon saved will depend on the policy option chosen, but our modelling informed by Blue Ventures project data and prior peer reviewed analysis suggests carbon savings of 11.0 – 13.9 MtCO_{2e} are possible for our central case. See the economic case and Annex 2 for further details.

Poverty and income benefits

² Currently reaching more than 25,000 people in Madagascar with [community health services](#), Blue Ventures is committed to scaling up its [holistic PHE model](#) throughout its field sites in Madagascar, while leading Madagascar's [national PHE network](#) to support partner conservation and health organisations to replicate this approach both around Madagascar and regionally across the Western Indian Ocean.

³ For example, there has been a significant increase in women's representation within the governing committee of Madagascar's first locally managed marine area (Velondriake), where Blue Ventures has been implementing its PHE model since 2007: at the most recent community elections, the proportion of women in the general assembly increased from 13% to 38%. This challenges political structures in the west in terms of inclusiveness: in comparison, female MPs constitute just 29% of the total in the UK's parliament.

The Blue Forests project is expected to deliver substantial livelihoods benefits to fishermen and in addition will provide other alternative livelihoods through its targeted fisheries improvement and livelihoods programs. These livelihood opportunities could include apiculture, sustainable shrimp harvesting and mud crab fattening, and have been valued in the economic case. For our central scenario, with £10.1m investment, the combination of the preservation of the existing livelihoods and generation of new opportunities could be worth over £70 million over 20 years.

Ecosystem service, biodiversity and wildlife benefits

Mangrove forests provide a range of ecosystem services including supporting endangered biodiversity, climate change adaptation and resilience. Mangroves also provide erosion control and storm protection services. Some of the value of these could be captured by future eco-tourism. As set out in the economic case, £10.1m of investment could secure ecosystem service benefits worth £22 million over 20 years.

What are the key risks to success of the programme?

Blue Ventures’ approach to risk management is proactive and fully integrated into day-to-day working. The organisation maintains a comprehensive register of risks (governance, operational, financial, regulatory, environmental & external risks), and maintains mitigation controls and contingency plans, with designated responsibilities for monitoring & managing risks. This register is reviewed and updated quarterly by their board. Field risk assessments are carried out annually for our programme operations, and our policies are fully compliant with the highest standards of field operating protocols in our diverse programmatic specialties.

The risks are separated into Delivery and Outcome risks.

Main Risks to Delivery:

Risk	Action
Political risk of countries – instability	BV will continue to maintain close communications with government authorities in partner countries and with security agencies where appropriate. The risk posed to this project by, for example, political disturbance in one country, will be mitigated by the project’s intentional emphasis on international replication beyond Madagascar, which will enable activities and resources to be redirected if required.
Political risk of countries - changes in Ministry support for conservation initiatives, support to international NGOs	BV will continue to maintain strong relations with government authorities in Madagascar and other partner countries, both at a ministerial level, as well as with technical staff and operatives within government agencies. These relationships are key to maintaining momentum with partnership initiatives, ensuring activities are not interrupted by short term political changes.

Difficulty securing further private sector leverage.	BV will continue to work in close collaboration with private sector organisations involved in natural resource exploitation in target countries, including seafood collection and export businesses.
Fraud risk.	BV has a fraud policy in place, as well as robust financial and manual and procedures to reduce this risk.
Risk of natural disaster for example, Cyclones, flooding etc.	BV has well evolved and practiced emergency protocols to deal with tropical storms, cyclones and emergencies. Risk assessments will also be incorporated at Stage 1 and fed into feasibility assessments.
Difficulty in NGO registration in new countries and/or enabling BV to employ staff in new countries.	Registration of BV in replication countries, and associated legal expenses, are included in the project budget.
Opposition from other NGOs for BV to start work in new countries.	BV is already exploring partnership agreements for model replication in the new countries targeted by this project, and has considerable experience in developing working collaborations and learning networks across the NGO sector.

Main risks to Outcomes:

Risk	Action
Support for sustainable forestry and fisheries displaces unsustainable activities into other locations through “leakage”.	Leakage will be partially managed through working to address directly the drivers of deforestation, providing alternative livelihoods and introducing management regimes where currently they do not exist or are inadequate. The model is designed to be replicable across jurisdictions.
Lack of M&E means that outcomes cannot be effectively measures and the project cannot report effectively against the KPIs.	Defra will work on developing an M&E framework with Blue Ventures including developing a reporting framework and schedule.
Lack of support from within communities for the projects.	The project will need to obtain the support of affected communities and the local political leadership. The project has already begun dialogue and consultations with stakeholders and these will continue.
Projects fail to create interventions that are sustainable in the long term	Project designed so that all sites start with Stage 1 (the pilot/scoping stage) to assess most suitable interventions. Sites and/or activities do not progress if likelihood or feasibility not deemed sufficient for long-term. The project is also designed with the permanence of the benefits in mind; The four parallel work streams are designed to drive sustainable changes by addressing

	the needs of the communities and beneficiaries.
Not possible to scale up interventions.	Blue Ventures' conservation interventions ("models") will have been rigorously tested at a number of sites within Madagascar, where scaling up has also begun. Only models that are deemed feasible to scale will be implemented. Feasibility is also informed through the scoping stage 1 at any new sites.
Limited pool of people globally with technical competence to support target communities and implement projects at scale, in line with standards and values of Blue Ventures.	<p>Blue Ventures will Leverage technical competence within existing field teams, and support progression of current staff.</p> <p>In addition BV will work to define relevant work descriptions for new employees, as well as engaging external competence specialists as needed to achieve expected objectives within the time frame and available budget.</p> <p>Assess staff competence and values regularly and reinforce as soon as needed.</p>

Strategic Case

Meeting HMG's International Commitments

Climate Change is one of the greatest challenges global nations face and is a threat to economic and national security. The Paris Agreement was a historic and significant step forward, with all 195 countries committing for the first time to make Intended Nationally Determined Contributions (INDC) to keep the average global temperature rise to well below 2°C, pursue efforts towards 1.5°C.

Climate finance is vital to support developing countries to mitigate and adapt to climate change, and to implement the Paris Agreement. The poorest and most vulnerable will be hit the hardest by the impacts of climate change, and need support to build resilience and take up low carbon opportunities.

International Climate finance is also the primary mechanism to meet the UK's international forests commitments:

- To play a leading role in supporting developing countries tackle the drivers of deforestation. This was reiterated in the New York Declaration on Forests in 2014 which committed to halve the rate of global deforestation by 2020 and halt it by 2030.
- At the Paris UN Climate negotiations in 2015 (UNFCCC, COP21) the UK signed up to a collective pledge with Germany and Norway that will make up to \$5bn available to support international efforts to tackle deforestation

The UK is one of the leading world donors on climate finance and is playing its part towards the \$100 billion goal, alongside others. The UK will provide at least £5.8bn from the UK aid budget between 2016 and 2021 as climate finance which will continue to provide strong support to help vulnerable developing countries adapt to climate change and take up sustainable, low carbon, resilient and inclusive development.

UK climate finance to date has already directly supported 21 million people to cope with the effects of climate change, and improved access to energy for 6.6 million people. The finance has also helped prevent 4.9 million tonnes of CO₂.

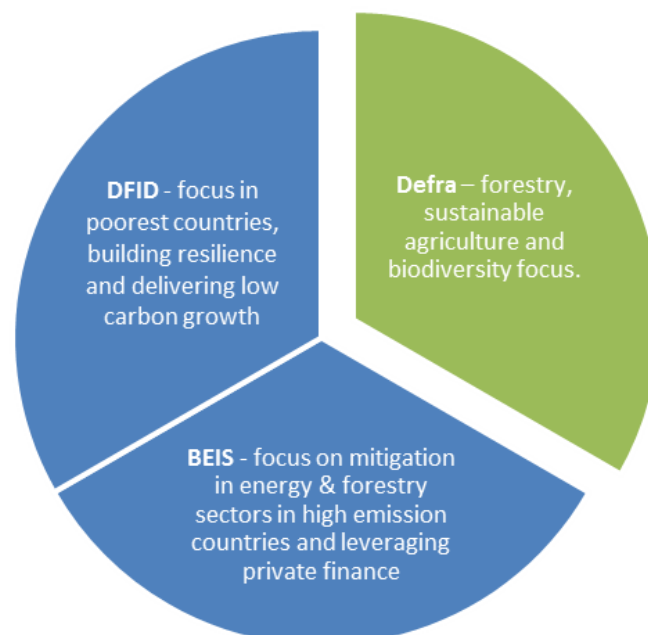
The main objectives of the ICF endorsed by the ICAI (Independent Commission for Aid Impact) are:

- To demonstrate that building low carbon, climate resilient growth at scale is feasible and desirable.
- To support International Climate Negotiations particularly through providing support for adaptation in poor countries and building an effective international architecture.
- To recognise that climate change offers real opportunities to drive innovation and new ideas for action, and create new partnerships with the private sector to support low carbon climate resilient growth.

The means to deliver these objectives have been defined broadly by Departments as follows:

- Meet development needs and supports economic development by adopting cleaner, low carbon approaches
- Help countries, communities and individuals to manage risk and build resilience to the effects of climate change; and
- Ensure effective management of natural resources: land, water, forests; clean air

Figure 1 shows the split in objectives between Defra, DFID and BEIS



Protecting and sustainably managing mangrove forests allow us to meet the objectives outlined in our UK Aid Strategy. They are:

- Strengthening resilience and response to crises: this includes more support for ongoing crises including that in Syria and other countries in the Middle East and North Africa region, more science and technology spend on global public health risks such as antimicrobial resistance, and support for efforts to mitigate and adapt to climate change.
- Tackling extreme poverty and helping the world's most vulnerable: the government will strive to eliminate extreme poverty by 2030, and support the world's poorest people to ensure that every person has access to basic needs, including prioritising the rights of girls and women. This will build security, stability and opportunity that will benefit us all.

Sustainable Development Goals

The UN's 17 Sustainable Development Goals (SDG), also known as the “Global Goals”, recognise the importance of integrating climate issues as part of good development assistance. World Bank research has shown that agricultural shocks, increased disease and other climate change impacts may push more than 100 million additional people back into poverty by 2030⁴. This requires policies and investments that work together to boost resilience through sustainable development and poverty reduction.

SDG 13 focuses specifically on urgent action on climate change and the commitments made by developed nations to support developing countries in tackling climate change through mobilisation of climate finance. SDG 15 focuses specifically on managing forests sustainably, restoring degraded lands and successfully combating desertification, reducing degraded natural habitats and ending biodiversity loss.

The focus of SDG 14 is to conserve and sustainably use the ocean, seas and marine resources for sustainable development. In addition to Goal 14, since tropical small-scale fisheries make a vital contribution to livelihoods, this work will also support both Goal 1 – End poverty in all its forms everywhere – and Goal 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Convention on Biological Diversity

The project's outcomes will contribute to 2 of the three main objectives of the Convention on Biological Diversity (the conservation of biological diversity, the sustainable use of its components) and relates in particular to Articles [6](#), [8](#), [10](#) and [11](#). The project is also strongly aligned with the CBD Programme of Work on Marine and Coastal Biodiversity by promoting full participation of communities in the establishment and maintenance of marine protected areas in line with decision [VII/28](#) on protected areas.

⁴ [Shock Waves: Managing the Impacts of Climate Change on Poverty](#), World Bank, 2015

Meeting Defra’s strategic objectives

Delivering ICF investments to combat climate change is an integral part of delivering Defra’s objectives on the international stage. Figure 2 illustrates the how ICF fits within Defra’s strategy by working internationally to meet all four impact objectives.

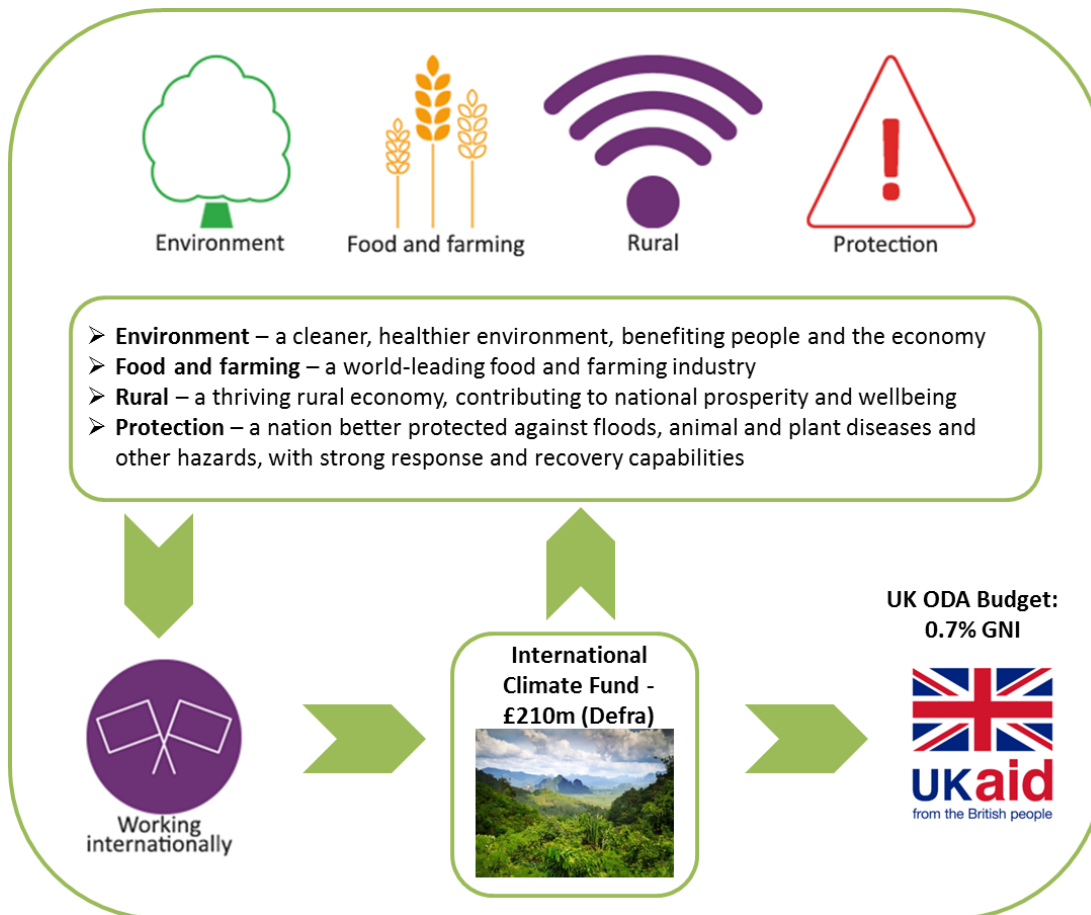


Figure 2

Defra secured a £210m share of the £5.8bn in climate finance for 2016-2021. Defra expertise and capacity is essential to achieving these goals. Defra committed to invest in projects under the International Climate Fund that will:

- Secure biodiversity benefits,
- Promote more sustainable land use and agricultural practices,
- Unleash the power of the private sector and
- Contribute to global food security.

Defra have committed to use our funding to continue to invest in forestry projects that secure biodiversity benefits, promote more sustainable land use and agriculture practices, and contribute to global food security, as well as work to unleash the potential of the private

sector and make a significant new contribution to Climate Research and Development. We also committed to using ICF to help deliver direct wildlife benefits, including addressing underlying issues that contribute to the increasing trend in the Illegal Wildlife Trade.

Defra's existing portfolio:

Defra's existing projects will reduce greenhouse gas emissions by 37 MT CO₂e, create sustainable livelihoods for more than half a million people and protect and restore more than 500,000 hectares of forests.

Title	Aim	Cost	Start	End
Reducing Deforestation in the Brazilian Cerrado	Will significantly reduce biodiversity loss by restoring 360,000 hectares of native vegetation and reducing deforestation by 128,000 hectares.	£10m	Dec 2012	June 2018
Low Carbon Agriculture for Avoided Deforestation in Brazil.	Supporting small and medium sized farms in the Amazon and Atlantic Forests to implement low-carbon agriculture, protecting forests and biodiversity. It will increase annual income per hectare 5-fold and restore 41,100 hectares of forests.	£24.9m	May 2013	May 2017
The BioCarbon Fund – Initiative for Sustainable Landscapes	A multilateral project administered by the World Bank, will avoid deforestation by building sustainable livelihoods in developing countries. Defra is supporting programmes in Indonesia and Zambia and in Sri Lanka; our project tackles Human-Elephant conflict by adopting a landscape conservation strategy. The fund also supports programmes in Ethiopia, Liberia and Colombia.	£85	Dec 2013/Dec 2014	2020
Eco.business Fund – South America (initially Peru, Ecuador, Colombia)	The Eco.business fund is a public-private partnership. The fund will support sustainable production of agricultural commodities and forest products, therefore encouraging wildlife conservation and sustainable use of natural resources.	£20m	Dec 2015	TBC
Ecosystem Conservation and Management Project- Sri Lanka	This World Bank managed project aims to improve the management of protected areas and biologically critical ecosystems, in order to avoid deforestation and increase resilience to climate change. The project will focus heavily on biodiversity conservation and in particular tackling the causes of Human/Elephant conflict,	£19.5m	Dec 2015	2020

Choosing projects for the Defra portfolio

This year we have considered several options for ICF pipeline development.

Given the amounts we need to spend in each year (>£40m) it's not feasible to invite tenders – there are few organisations than can legitimately tender for projects of this scale (as a comparison the upper limit for a Darwin fund scheme is around £300k-£350k over 3 years.) We know from experience that only a certain number of routes can absorb this funding securely.

Over the past 5 years we have developed a longlist of portfolio options for future ICF projects. Longlisted projects must meet both the Defra and ICF objectives, we also aim to balance geographical coverage as well as account for resource constraints by balancing bilateral and multilateral spend.

This year a longlist went through a detailed multi-criteria analysis process (Annex 4) to compare twelve potential options and identify suitable projects for investment.

Blue Ventures were chosen because of their strong performance across both Defra and ICF objectives as well as strong links with Defra priorities on Blue Carbon, Ecosystem services and Biodiversity.

Why Mangroves?

Not only are mangrove forests particularly sensitive to the effects of climate change but they are also vital for resilience to it. As outlined in the UNEP report on 'Building Mangrove Resilience to Climate Change', these trees act as nurseries for fish and invertebrate species that later live on coral reefs and in the pelagic zone, and they control aspects of water chemistry in coastal zones. They provide food, fuel and other services to human communities. And they serve as a critical buffer against storms and other extreme events. During the 2004 Asian tsunami, areas with intact mangroves suffered significantly less damage than areas where they had been cleared.

Despite this, mangroves are among the most critically threatened ecosystems in the world. Less than 1 percent of the remaining mangrove forests are adequately protected. The impacts of climate change, particularly sea level rise, will make conditions even more precarious for mangroves and heighten the urgent need to improve their management and protection (UNEP).

As well as this, a recent [WWF report](#) conservatively estimates the goods and services from mangroves, to be worth US\$186 million each year. They include: Fisheries, Timber and plant products, Coastal protection, Tourism. Further evidence of the economic value of mangroves is included in the Economic Case in this Business Case.

Madagascar

Over half of Madagascar's population lives on the coast and mangroves play an important role in the well-being of many of these people, both urban and rural. Yet for the reason that they provide so many valuable products, these mangroves are increasingly deforested and degraded. There are a number of underlying causes of this:

In Madagascar, forests provide 100% of domestic energy needs in rural areas and over 70% of the total energy consumption of the country. Some 93% of logging is for firewood, charcoal or poles for local markets

Ineffectual forest governance and failure of the land tenure system mean that forests are essentially open access resources. While local people may earn a meagre daily wage by logging and producing charcoal for outside middlemen, they have little control over their own forest resources

The [Redacted] failure to manage forest resources means that market demand for forest products cannot be met from sustainable sources. The outlook is that the rapidly growing population of the west coast will continue to meet its needs by exploiting natural forests.

The result is the widespread deforestation and degradation of mangroves that are accessible from urban markets.

Blue Carbon

The International Blue Carbon Partnership initiative was launched by the Australian government at the UNFCCC COP21 in Paris last year. This partnership has the potential to play a central role in the development of blue carbon initiatives on a global scale. Blue Ventures is currently in discussions with the Australian government in order to incorporate Blue Ventures and Madagascar as NGO/country partners on this initiative.

Rationale for Intervention

Mangroves play a critical role in supporting endangered biodiversity, coastal livelihoods, fishing economies, carbon sequestration and climate change adaption and resilience.

Hundreds of millions of coastal people rely on mangroves for their day to day livelihoods, yet in many tropical coastal developing states mangroves are being quickly deforested – faster than any other forest type on earth – eroding coastlines and coastal livelihoods, as well as the capacity of poor coastal people to face the impacts of climate change .

Mangroves support important fisheries, including shrimp and crabs, which are crucial to the livelihoods and food security of local communities. A conservative estimate based on 43 datasets is that one hectare (0.01 km²) of mangrove supports around \$1,134 per year in fishing activity⁵. With 2,900 and 2,800 km² of mangroves respectively, Mozambique and Madagascar harbour Africa's second and third largest expanses.

Drivers of mangrove loss vary between countries. In Southeast Asia coastal aquaculture has caused widespread mangrove loss over the last 20 years⁶, while in East Africa and the

⁵ Ronnback, P. 1999. The ecological basis for economic value of seafood production supported by mangrove ecosystems. *Ecological Economics* 29:235–252.

⁶ Richards, D. R. and Friess, D. A. [Rates and drivers of mangrove deforestation in Southeast Asia, 2000–2012](#). *PNAS*, v113, no.2, 344-349 (2016)

West Indian Ocean (WIO) region, timber and charcoal production are the main drivers of mangrove deforestation⁷, with agriculture also a threat in certain areas.

One of the key reasons mangroves are being destroyed despite their importance for the livelihoods of so many people is that there is a lack of **management or usage rights**. This could be seen as a ‘government failure’ or as an institutional failure. Blue Ventures has carried out analysis of this issue in the Ambaro-Ambanja Bay region of northwest Madagascar and found that 81% of mangrove, some 19,560 hectares, lacked any formal management arrangements. The prevailing lack of secure management allows third parties to exploit the mangrove without any legal consequences, while also decreasing local communities’ incentive to invest in the conservation and sustainable management of mangroves.

A key part of the proposed programme therefore constitutes understanding further the legal structures that exist in the target region and working with local and national partners to establish these in a more transparent legal framework and develop an integrated approach that addresses some of the underlying drivers of mangrove loss.

As with other types of deforestation, mangrove destruction also occurs because the value which mangroves provide to local ecosystems and global climate regulating services (such as CO₂ sequestration and coastal protection) are not adequately compensated by existing markets. These market failures include:

- **Local externalities:** mangroves provide habitats which support fisheries in the local area. However those destroying mangroves are not currently required to compensate the fishermen whose livelihoods they jeopardise. Establishing and integrating management rights for mangrove and fisheries will help to ‘internalise’ this externality.
- **Wider externalities:** Mangroves also provide wider ecosystem services which may not support any particular market activity, for example the sequestration of carbon, supporting important biodiversity. Mangrove forest delivers carbon sequestration services worth at least £2,000 per hectare over 20 years (see annex 2), and yet currently those clearing the mangrove will value this service at zero. The proposed programme aims to tackle this market failure by producing independently certified emissions reductions which can be sold into the voluntary offset market for the benefit of the local community. This will create a powerful incentive to conserve the mangrove and its broader ecosystem services.

Both fisheries and mangroves, even if owned at the community level, face a classic ‘**tragedy of the commons**’ challenge whereby individuals may jeopardise the sustainable management of the resource by overexploiting, destroying or failing to maintain the

⁷ [The world's mangroves 1980-2005](#), FAO Forestry Paper 153, Food and Agriculture Organization of the United Nations, Rome (2007)

resource. This programme will aim to address these issues by promoting improved community management regimes, as well as by working to improve livelihood opportunities in both fisheries and mangroves.

Many of those who depend on mangroves are living in conditions of extreme or close to **extreme poverty**. This means that even though they wish to use the mangrove over the long term, opportunities for short term profit arising during times of particular stress (e.g. to produce and sell charcoal in order to deal with immediate medical or nutritional needs) may override these long term considerations. The proposed programme aims to tackle this issue by investing in the health and nutrition of local people, such that they are better able to engage with long term sustainable management regimes.

The project can deliver across several of Defra's ICF objectives.

Mangroves support a unique system of **biodiversity**, whether it's the mangrove trees themselves or the ecosystems built around them. Many mangrove trees are listed as endangered or critically endangered on the IUCN Red list as well as many of the land, sea and river species that depend on them.

Mangroves also support important **fisheries**, including shrimp and crabs, which are crucial to the livelihoods and food security of local communities. For example, mangrove-dependent fisheries represent 40% of Mozambique's Gross National Product, which was valued at 55.4 million US\$ per year (MICOA, 1998). Indonesia has the largest mangrove forests on earth, and with 2,900 and 2,800 km² of mangroves respectively, Mozambique and Madagascar harbour Africa's second and third largest expanses.

This project aims to create a replicable and scalable model for the protection of mangrove forests – so that future funding can go further to protect these unique habitats.

While Defra ICF projects support sustainable land agriculture we have not as yet directly supported sustainable coastal fisheries in this way. The project aims to gain significant **private sector involvement** by engaging partners in carbon finance, impact investing, fisheries improvement projects and seafood supply chains to maximise long term incentives for sustainable management.

Economic Case

Overview

The economic case gives an indication of the costs and benefits of the project over the timeline of project implementation and monitoring follow up, currently predicted to be 20 years. We compare the different intervention options against a ‘do nothing’ scenario, and also provide sensitivity analysis for optimistic, conservative and realistic scenarios in the Annex. Benefits and costs are discounted at a rate of 10%, with the exception of carbon which is discounted at 3.5% in line with DFID and DECC guidance.

Table 1 summarises the costs and benefits for the realistic scenario. The remainder of the economic case will set out the evidence base for these.

Table 1: Cost and Benefits Summary- realistic scenario.

	Option 2	Option 3	Option 4
Level of funding	£3.7M	£5.1M	£10.1M
Sites in scope	3 sites in Madagascar	3 sites in Madagascar and 1 site in Indonesia	3 sites in Madagascar, 2 sites in Indonesia and 1 site in SE Asia
NPV (£m)	20.9	94.5	141.3
Benefit Cost Ratio	4.5	11.5	12.6
Carbon saved (MtCO ₂ e)	1.2	11.0	13.9
Hectares protected (avoided deforestation plus reforestation with project)	4,139	13,190	19,421

Note: all above figures are calculated over 20 year appraisal period

Options appraisal

In this analysis we consider four options:

- 1) Do nothing
- 2) Provide £3.7 million support to Blue Ventures


- 3) Provide £5.1 million support to Blue Ventures
- 4) Provide £10.1 million support to Blue Ventures


Table 2 (below) provides a graphical summary of the different investment scenarios.

Table 2: Funding options considered

	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Madagascar							
Indonesia							
SE Asia							

 Option 2 – Madagascar only (3 sites)

 Option 2 – Madagascar plus Indonesia (1 site)

 Option3 – Madagascar (3 sites), Indonesia (2 sites) plus SE Asia (1 site)

Option 1: do nothing

While Blue Ventures has made significant headway in developing the Blue Forests prototype in Madagascar, the organisation is not able to undertake full validation of the model across all existing pilot sites in Madagascar – or embark on broader international expansion to maximise carbon savings and economic benefits – without additional support. In the absence of ICF assistance, Blue Ventures will continue with a single site in Madagascar (the smallest area intervention - Tahiry Honko - in southern Madagascar).

Blue Ventures will need to fundraise in 2017 for the Tahiry Honko project costs in 2018 and beyond. The total funds they anticipate being able to raise is up to £5m over 20 years which will deliver very modest mangrove protection of around 142 Ha saving 25,000 tCO₂.

Nevertheless very significant deforestation will occur in the ‘Do Nothing’ scenario relative to the present day. It is estimated that over 25,000Ha of mangrove will be lost across Mangrove sites in Madagascar, Indonesia, and SE Asia, emitting over 42 MtCO₂.

Option 2: £3.7m investment in Blue Forests project

In this option, ICF funding and £10m match funding to be secured by Blue Ventures will cover 3 project sites in Madagascar. Blue Ventures has already secured £0.5m of this match funding, and has already invested in the project in Madagascar. They have completed the stage 1 activities including a national-scale hotspot assessment that highlighted the 3 critical sites for intervention, securing management rights for local associations at 2 of these sites, baseline forestry and fisheries

surveys, feasibility assessments for 3 alternative livelihoods and a case for proceeding to the next stage.

The first 2 years of the project will focus on the stage 2 development and validation activities and the following 3 years on implementation. Around 24% of funding will be spent on field staff costs, 40% on project activities and 36% on programme management and support.

In this option, Blue Ventures needs to raise a further £1.7m in years 6 & 7 to complete the project implementation, followed by an annual maintenance & monitoring cost of approximately £0.5m per year (increasing with inflation) which could be funded through other means such as impact investment. This amounts to £10m over the full 20 year project cycle. This fundraising target is considered realistic given the highly innovative nature of this project, delivering the world's first project scale Blue Carbon conservation initiatives.

Table 3: Cost and benefit summary for Option 2

Costs	Present value (20 years), £2016
Project implementation costs (Defra funding first 5 years)	2,708,339
Project implementation costs (Funding leveraged)	2,562,293
Third party project validation and verification costs	250,844
Opportunity Cost of foregone mangrove deforestation (charcoal; timber; agriculture; aquaculture)	462,817
Present Value Total Costs	5,984,293
Benefits	
Carbon savings	5,377,327
Mangrove fisheries (fisheries, nursery & aquaculture)	14,376,188
Mangrove forest products (energy resources; timber; food)	63,378
Mangrove non carbon ecosystem services: ecotourism & recreation; biodiversity; shoreline protection; protection from sedimentation	4,146,527
Fisheries Improvement Programme targeted small-scale fisheries	872,458
Small-scale aquaculture	2,067,211
Present Value Total Benefits	26,903,089
NPV	20,918,795

BCR	4.50
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The total present value of costs over 20 years for this scenario comes to £6.0m in the central estimate (including the foregone income arising from mangrove deforestation for the communities of £0.5m)⁸. However, the total discounted benefit is nearly £27m, mainly contributed by the fisheries income (£14m, 53% of the total discounted benefit) from the standing mangroves that are protected from deforestation as well as those planted with the project. This is followed by the carbon savings (£5.3m, 20%). In addition, a benefit of £4m (15%) is expected from ecosystem services benefits such as ecotourism, biodiversity and coastal protection.

The BCR (Benefit Cost Ratio) over 20 years is 4.5, dividing the present value of benefits by the present value of costs. At the 7 year point (when the project is fully implemented) the BCR will be 1.6, with additional benefits being realised once the project is fully implemented and moving into maintenance & monitoring stage (stage 4).

Advantages of this scenario:

- Strong value for money given relatively low investment from ICF
- Relatively low risk to test the Blue Ventures model success in one country (Madagascar) prior to scaling up to other regions

Risks:

- Risk of Blue Ventures being unable to secure funding for years 6 & 7, thus project not fully implemented, risk of realising the full benefits
- Project not starting/ delayed start in other regions mean the mangroves deplete further in these regions

Option 3: £5.1m investment in Blue Forests project

In this option, £1.4m extra funding from Defra will cover 1 project site in Indonesia for 5 years in addition to the 3 project sites in Madagascar in option 2.

Building on the stage 2 activities at the Madagascar sites in the first 2 years of the project, Blue Ventures will start analysis and assessment work (stage 1 activities) in Indonesia. By the end of year 5, it is expected that the Indonesia site will be ready for implementation (stage 3), while the Madagascar sites will be well into their implementation activities (as with the previous option).

Table 4: Cost and benefit summary for Option 3

Costs	Present value (20 years), £2016
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⁸ Present values are obtained by summing discounted streams of costs or benefits. Discounting involves multiplying the expected value by a discount factor to take account of the way society values things more in the present than in the future.

Project implementation costs (Defra funding first 5 years)	3,750,335
Project implementation costs (Funding leveraged)	3,220,680
Third party project validation and verification costs	250,844
Opportunity Cost of foregone mangrove deforestation (charcoal; timber; agriculture; aquaculture)	1,804,465
Present Value Total Costs	9,026,325
Benefits	
Carbon savings	46,827,133
Mangrove fisheries (fisheries, nursery & aquaculture)	39,249,502
Mangrove forest products (energy resources; timber; food)	3,340,757
Mangrove non carbon ecosystem services: ecotourism & recreation; biodiversity; shoreline protection; protection from sedimentation	7,607,105
Fisheries Improvement Programme targeted small-scale fisheries	3,823,453
Small-scale aquaculture	2,633,007
Present Value Total Benefits	103,480,956
NPV	94,454,631
BCR	11.46

For option 3, 31% of funding will be spent on field staff costs, 39% on project activities and 30% on programme management and support. Programme support/ admin work for additional sites can be absorbed within the programme management staffing level in Option 2, bringing some economies of scale to the larger project.

In this option, Blue Ventures needs to raise a further £2.4m in year 6 & 7 to complete the project implementation followed by an annual maintenance & monitoring cost of approximately £0.8m per year (increasing with inflation) which could be funded through other means such as impact investment. This amounts to a total match funding requirement of £15m over 20 years.

The total project cost (discounted) over 20 years comes to £9.0m (including the foregone income from mangrove deforestation for communities of £1.8m). However, the total discounted benefit is expected to reach £103m, mainly contributed by carbon savings (£47m, 45%) and additional fish

catch (£39m, 38%). Some £8m (7%) of the total benefit will come from the ecosystem services benefits. The reason why carbon savings are more important in this option is the greater carbon density of the mangrove sites which are added, in particular Indonesian mangrove which is estimated to store 568 tC per Ha compared to only 53tC/Ha for the Tahiry Honko site in Madagascar⁹.

Increasing the funding from Defra from £3.7m to £5.1m (38%) would bring more than triple the benefits (£103m vs. £27m). The BCR over 20 years is 11.5 compared to 4.5 in Option. 2. The reason for the jump in benefit is because the additional site in Indonesia has more than double the area of mangrove forest area compared to the 3 sites in Madagascar combined. In addition, Indonesian mangroves have significantly larger carbon storage compared to Madagascar as mentioned. Table 1 summarises these differences.

Advantages of this scenario:

- Significantly higher value for money compared to Option 2; a relatively small increase in investment bringing substantial benefit gains
- Given its ecological characteristics the Indonesia site in scope is likely to deliver the highest benefits and carbon emissions reductions of all sites considered by the Blue Forests project; thus an immediate start in Indonesia will bring the biggest chance to realise the enormous potential benefits

Risks:

- Risk of Blue Ventures not being able to secure the funding for year 6 & 7, thus project not fully implemented, risk of realising the full benefits

Option 4: £10.1m ICF investment in Blue Ventures project

In this option, funding will comprise the same activities as Option 3, with an additional (second) site in Indonesia as well as one site in a separate low income Southeast Asian coastal state (likely Myanmar or Bangladesh). In addition, the funding will cover 7 years of activities compared to 5 years in the Option 2 and 3.

For option 4, 29% of funding will be spent on field staff costs, 45% on project activities and 25% on programme management and support. Compared to other options, a greater proportion is spent on project activities compared to staff costs as the technical knowledge and learning from one site can be shared across others and the same programme staff can service multiple projects.

In this option, Blue Ventures needs to raise around £1.3m per year from year 8 - 11 for maintenance and monitoring of the Madagascar sites and the remaining implementation activities for Indonesia and Southeast Asia sites. From year 12, all sites will be in maintenance & monitoring stage with an annual cost of approximately £1.1m (increasing with inflation) which could be funded through other means such as impact investment. The total funding leveraged in this option is therefore £15.7m. Blue Ventures will have the highest chance of securing further funding in this

⁹ Carbon figures derived from Blue Ventures fieldwork, IPCC default values and https://www.researchgate.net/profile/Daniel_Alongi2/publication/274116107_Carbon_sequestration_in_mangrove_forests/links/556b926408aec22683037b84.pdf

option given success will be proven by year 7 through full implementation in all regions within the project term, and the lower required leverage ratio.

Table 5: Cost and benefit summary for option 4

Costs	Present value (20 years), £2016
Project implementation costs (Defra funding first 5 years)	6,509,977
Project implementation costs (Funding leveraged)	3,153,223
Third party project validation and verification costs	250,844
Opportunity Cost of foregone mangrove deforestation (charcoal; timber; agriculture; aquaculture)	2,306,920
Present Value Total Costs	12,220,964
Benefits	
Carbon savings	58,820,737
Mangrove fisheries (fisheries, nursery & aquaculture)	59,227,316
Mangrove forest products (energy resources; timber; food)	4,422,308
Mangrove non carbon ecosystem services: ecotourism & recreation; biodiversity; shoreline protection; protection from sedimentation	22,428,007
Fisheries Improvement Programme targeted small-scale fisheries	5,716,004

Small-scale aquaculture	2,880,497
Present Value Total Benefits	153,494,868
NPV	141,273,904
BCR	12.6

The total discounted project cost over 20 years is £12.2m (including the foregone income of mangrove deforestation for the communities of £2.3m). However, the total discounted benefit is expected to reach £153m, mainly contributed by the fisheries income (£59m, 39%) and the carbon savings (£59m, 38%). Other benefits include ecosystem service benefits of £22m (15%).

The BCR over 20 years is 12.6 compared 11.5 in Option 3 and 4.5 in Option 2, demonstrating the highest value for money of the three investment options. The carbon saved is expected to reach 13.9 million tonnes compared to 11.0M tonnes in Option 3 and 1.2 M tonnes in Option 2. These figures are summarised in Table 5

The reason why the fisheries harvest is the most significant benefit (like option 2 but unlike option 3) is the conservative approach to valuing carbon emissions which we have taken in this appraisal. We only value carbon emissions for which Blue Ventures is seeking to obtain Verified Carbon Standard accredited emissions reduction certificates (see Annex 2 for details). Because Blue Ventures are only currently seeking to produce verified carbon credits on one of the two additional sites in Option 4, Option 4's carbon savings are a highly conservative estimate, even more so than Option 3.

Advantages of this scenario:

- Highest impact, value for money and BCR of all funding options
- The longevity of the funding will give the highest chance of realising expected benefits and in turn attracting further funding from the private sector through impact investment

Risks:

- Commitment of large amount of funding upfront

The following sections will set out the economic analysis of costs and benefits which has informed this economic appraisal. The numbers set out here are for the central, 'realistic' scenario, with 'optimistic' and 'conservative' sensitivities provided in the Annex.

Costs

[Redacted]

Foregone income from deforested mangrove

By avoiding deforestation in the project sites, a number of economic activities which are driving the deforestation will be foregone. These activities include:

- **Timber production:** Blue Ventures project data indicate that land cleared for timber

production in Madagascar generates \$80/ ha (£65), with a range of \$64- \$88 (£52-72). Meanwhile in Indonesia this opportunity cost is larger, estimated at \$492- \$677 (£402-£554), with a central estimate of \$615 / Ha¹⁰(£503). The reason for this is the higher carbon density of Indonesian forest.

- **Charcoal production:** Similarly Blue Ventures data indicate that charcoal production in Madagascar generates around \$165 /hectare (£125) with a range from \$132- \$182 (£108-£149).
- **Agriculture:** Blue Ventures has estimated that agricultural production on deforested mangrove in Madagascar is worth \$483 (£395) per hectare with a range of \$386-\$531 (£316-£435). Although conversion of mangroves to agriculture is the main cause of mangrove deforestation in Southeast Asia, we could not find a reliable value for this for Indonesia. We used Bangladesh as a proxy as it is in the same income group classification and region.

One might also be concerned about short term losses arising for fishermen due to temporary closures of fishing grounds. Evaluation studies carried out on previous closures however suggest that such costs are minimal or non-existent due to the displacement of fishing activity from temporarily closed areas to other areas¹¹.

Benefits

Carbon Savings

Reduction in deforestation: The Blue Forests project is expected to deliver carbon savings through conservation and restoration of mangroves that will reduce the rate of deforestation and increase capacity for carbon sequestration. These should occur through two main channels:

- 1) Putting in place property and/or management rights which set up the framework to preserve the mangrove
- 2) Livelihood improvement and the certification and payment of carbon credits to further increase the incentive to conserve the mangrove.

It is challenging to forecast the reduction in the deforestation rate that will occur as a result of these activities. Since this is the first time that the range of activities which Blue Ventures propose has been tested at this scale, there are no results of previous projects that can be used¹². To address this a conservative approach has been used, allowing for some residual deforestation in the 'with project' case whereas some proposals assume near complete stoppage of deforestation¹³. It is also not possible to forecast the displacement of deforestation activity to other areas, although given that many of the drivers addressed relate to local poverty and lack of management infrastructure, it is likely that such displacement will be very small. Nevertheless to account for uncertainty three sensitivities have been produced for the reduction in deforestation rate at the site level, which are

¹⁰ Gren, I.M. and T. Soderqvist (1994) Economic valuation of wetlands: a survey. Beijer International Institute of Ecological Economics. Beijer Discussion Paper series No. 54, Stockholm, Sweden.

¹¹ <http://blueventures.org/wp-content/uploads/2015/06/Briefing-doc-Oliver-et-al-2015.pdf>

¹² The only other mangrove carbon certification project in the world, the Mikoko Pamjoa project in Kenya, has stopped deforestation in the area but is on a much smaller scale <http://www.planvivo.org/docs/Mikoko-Pamoja-Annual-Report-2014-2015-web.pdf>

¹³ The Makira forest carbon project in Madagascar predicts a drop in annual deforestation rate from 817 Ha/yr (0.23%) to 70 Ha/yr (0.02%/yr) (<http://www.vcsprojectdatabase.org/services/publicViewServices/downloadDocumentById/14091>)

set out in Annex 2.

What is the value of saved carbon? Mangroves continue to store additional carbon as they grow and develop, and so in assessing carbon savings we take account of both the total stock of carbon which is stored in the mangrove at the moment that deforestation is avoided, as well as the additional carbon that is sequestered in subsequent years. A set of conservative assumptions set out in the annex suggest that saving one hectare of mangrove could save around 350 tCO₂ and be worth around £2,000 over 20 years, just considering the value of the carbon saved. This logic is set out in Annex 2. In order to provide a conservative estimate, only those carbon savings for which Blue Ventures can obtain certified carbon credits have been valued in our analysis.

Poverty and income benefits

The Blue Ventures project is expected to play a key role in preserving the livelihoods of fishermen that depend on the mangrove and in addition will provide additional livelihoods benefits through its targeted fisheries improvement and livelihoods programs. This section summarises these benefits:

Shrimp trawl catch: The conservation of mangrove will in particular help maintain the fishing economy which depends on the mangrove. Taking a value toward the low end of a synthesis of 43 datasets which estimated the value of offshore shrimp fisheries which rely on the mangrove, we obtain a value of \$1,134 (£872) per hectare of mangrove saved¹⁴. This value is conservative when compared to studies estimating the value of mangrove fisheries as high as \$17,090/ Ha of mangrove, although we flex it in our sensitivities (Annex 2)¹⁵.

Additional shrimp through Fisheries Improvement Projects (FIP): The Blue Forests project includes FIP actions that will target improving small-scale mangrove fisheries. These are distinct from the offshore shrimp described above, and will be raised within the mangrove. We expect them to generate approximately \$13 (£10.30) in additional fish catch per hectare of mangrove saved.

Other aquaculture: Blue Ventures' proposed livelihoods improvement programmes could lead to the establishment of new/ additional aquaculture projects such as shrimp, mud crab and sea cucumber. These would be small scale, for example 6 hectares of sea cucumber harvesting could generate around \$100,000 (£84,000) per year for local communities.

Forest products: Avoiding the deforestation of mangrove will also preserve economic activities which are carried out in the mangrove, such as sustainable fuelwood and charcoal production, timber and honey. These have been valued at \$5.40 (£4) / Ha for Madagascar, but for Indonesia could be as high as \$615.80 (£466)/ Ha (\$178 or £135 in our central scenario)¹⁶. The reason for this difference is that Indonesian mangroves are generally taller and grow quicker than those in Madagascar, and also have a more ready market demand.

¹⁴ Ronnback, P. 1999. The ecological basis for economic value of seafood production supported by mangrove ecosystems. *Ecological Economics* 29:235–252.

¹⁵ Ecosystem Service Valuations of Mangrove Ecosystems to Inform Decision Making and Future Valuation Exercises <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0107706>

¹⁶ Ruitenbeek, H. J., 1992. Mangrove Management: An Economic Analysis of Management Options with a Focus on Bintuni Bay, Irian Jaya. Environmental Report 8, Environmental Management Development in Indonesia Project.

Other ecosystem service, biodiversity and wildlife benefits

Mangrove forests provide a range of additional ecosystem services including supporting endangered biodiversity, climate change adaptation and resilience. These can be valued using a range of economic methodologies. A selection of conservative estimates has been used here, carefully selected in order to avoid double counting.

Ecotourism: One way to proxy the value of these ecosystem service benefits is to use the value added generated by (eco) tourism to these areas. Studies estimate these benefits for the East Africa region to be in the region of \$6.50 (£4.92) per hectare annually¹⁷ up to around \$9.30 (£7.05)¹⁸. We use these values in the conservative and optimistic scenarios respectively, with the average of these two figures used for the realistic scenario for the Madagascar project. For Indonesia we transfer the benefit for our central estimate from a UNESCO study in Vietnam of \$7.31 (£5.50) per Hectare annually¹⁹.

Future options: Additionally, biodiversity can be valued using the value of medicinal and pharmaceutical extracts obtainable from the forest, much of which represent options in the future even if they are not currently extracted. UNEP obtain a value for East Africa of \$5 (£3.79) per hectare of mangrove for these services in East Africa²⁰, while a figure of \$19 (£14.39) per hectare has been estimated for South East Asia²¹.

Other ecosystem services: Mangroves also provide erosion control and storm protection services. These can be valued by for example estimating the cost of constructing a similar man made structure to provide the same service in the absence of the mangrove²². Synthesizing a range of literature, Blue Ventures estimate that these benefits amount to over \$300/Ha*yr (£227) for Madagascar (central estimate) but could be over \$6,000/ha*yr (£4,500) for middle income countries in Southeast Asia, although the latter value is not used in our analysis in order to provide a conservative estimate of the benefits. Some sensitivity analysis for the value of avoided soil erosion is presented in the Annex.

Health Benefits

One component of the project will include integration of community health services through the replication of Blue Ventures' population, health and environment approach (see Annex for details). Blue Ventures experience has shown that the poor health and high fertility rates resulting from lack of access to health services, and reproductive health services in particular, significantly limit

¹⁷ UNEP, 2011. Economic Analysis of Mangrove Forests: A case study in Gazi Bay, Kenya, UNEP, iii+42 pp.

¹⁸ Kairo J, Wanjiru C and Ochiwo J, (2009) Net Pay: Economic analysis of a Replanted Mangrove Plantation in Kenya. Journal of Sustainable Forestry, 28:(3):395 — 414

¹⁹ Tri, N.H. (2002) Valuation of the mangrove ecosystem in Can Gio mangrove biosphere reserve, Vietnam. The Vietnam MAB National Committee, UNESCO / MAB.

²⁰ UNEP, 2011, as above

²¹ Samonte-Tan, G.P.B., A. T. White, M. A. Tercero, J. Diviva, E. Tabara and C. Caballes (2007) Economic Valuation of Coastal and Marine Resources: Bohol Marine Triangle, Philippines. Coastal Management 35(2): 319-338.

²² For example, Nam Hoang Nguyen (2015) Cost benefit-analysis of climate adaptation: A case study of mangrove reforestation and conservation in Ca Mau Province, Vietnam. Journal of Mekong Societies, Vol. 11, pp 19 - 43

communities' ability to engage in sustainable marine resource management. Because of the uncertainty involved in predicting health outcomes and valuing these we are not at present able to monetise these benefits. Since we are confident that these benefits would be positive, our analytical estimates therefore represent a conservative picture of the overall project benefits.

Recommended Option

Table 2 illustrates that the option with the highest Net Present Value and ratio of benefits to costs is Option 4, which is £10m investment in Blue Ventures. This option also generates the greatest carbon savings (13.9 MTCO₂) and represents the largest area of forest protected (19,421 Ha). As such this is our recommended option.

It is worth understanding why the largest investment represents not only greater benefits, but the best value for money of the proposed options. There are 3 components to this:

1. As more sites are included, overhead costs such as non-project staffing requirements can be absorbed by more project activities. This is reflected in the breakdown of costs such that project activities represent the highest proportion of costs for Option 4.
2. Adding in Indonesian rainforest represents very good value because it is very carbon rich, resulting in more than 10 times the carbon benefit of option 2, with less than a doubling of costs.
3. Increasing Defra's contribution to Blue Ventures reduces the risk of them not being able to obtain external financing, reducing the overall risk of the option (not quantified in the above analysis).

Commercial Case

Competency of the organisation to deliver

Blue Ventures has over 14 years' experience supporting incentive-based approaches to marine conservation and fisheries management in the western Indian Ocean regions, and has maintained a permanent presence in the Mozambique Channel region since 2003, with over 140 full-time staff working worldwide, supported from Blue Ventures' London headquarters.

This team includes specific technical expertise in community engagement, mangrove forest and fisheries management, fisheries science, carbon project development, private partnership development and, critically, project management in diverse and challenging environments. The team is also experienced in building learning networks to scale up effective models for community-led marine management.

While there are many organisations working on mangrove conservation, very few groups are aiming to use blue carbon as a funding and incentive mechanism and to our knowledge no-one is implementing blue carbon in the integrated approach outlined in this proposal - looking at not only the carbon in the forest, but the intrinsic connection between this and the fisheries that mangroves support, as well as the vital links between these commodities, community health and national legislation.

Blue Ventures have previously carried out two Darwin Award projects with a total value of over £0.5m, where they delivered solidly against both project outputs and administrative requirements²³.

Blue Ventures' team comprises expertise in mangrove carbon science, locally led marine conservation and environmental education, mangrove deforestation analysis and mitigation, fisheries assessment and management, coastal livelihood diversification, and the integration of community health programming within community-based coastal management and conservation efforts.

Capacity of Blue Ventures to Deliver

Blue Ventures has seen a rapid expansion of its programming and geographic reach since 2015. In 2015, Blue Ventures' total income more than doubled to £1.9m and with the focus on growth, it continued to attract funding in 2016 with an income level of £2.2m.

This period of development has seen continued emphasis placed by the board and senior management team on preparing the organisation for significant future growth to achieve effective expansion of Blue Ventures' work in line with the organisation's 2020 vision.

²³ <http://www.darwininitiative.org.uk/project/institution/lead/blue-ventures/>

Blue Ventures has a system of developing strategic operating plans addressing areas such as human resources, monitoring and evaluation requirements and capacity gaps, as well as developing results-oriented programme-specific strategies for all Blue Ventures' models.

Blue Ventures' management team has also received technical training in preparing for and managing growth, delivered through ongoing tailored tuition from the London-based School for Social Entrepreneurs.

In preparation for expansion of Blue Ventures' work to Indonesia and since the commencement of discussions with DEFRA regarding the ICF project in April 2016, Blue Ventures' Executive Director and three other senior staff have completed reconnaissance studies in different regions of Indonesia to identify potential partners, and visit possible field sites.

These scoping studies (which are ongoing) have already resulted in framework MoUs being signed with two international conservation organisations, one national environmental network NGO, and two local community-based organisations, all of whom are enthusiastic for collaboration in scaling up Blue Ventures' incentive-based models, should the project go ahead.

Management and Governance

As a charity registered in England and Wales (number 1098893), overseen by an independent board of Trustees, Blue Ventures is independently audited annually, and maintains rigorous financial management and operating procedures to manage the complexity of supporting field programmes across numerous jurisdictions.

Blue Ventures is managed by a senior management team comprising four directors, and overseen by an independent Board of Trustees, which has approved the design and development of this project proposal.

The day-to-day operations of Blue Ventures Conservation are overseen by a management team: Dr Alasdair Harris (Executive Director), Mr Richard Nimmo (Managing Director), Ms Xi Chen (Finance Director) and Dr Frances Humber (Conservation Director). All strategic decisions concerning the activities, management and spending of Blue Ventures Conservation are governed by the Trustees of the charity, and also supported by a team of technical advisors. The management team of Blue Ventures is fully accountable to the board of Trustees.

The Trustees of Blue Ventures Conservation are responsible for overseeing all of the activities of the organisation and for reviewing the financial reports produced by the management team. All organisation accounting and auditing are carried out in line with UK statutory guidelines and by an independent firm of accountants.

Appointment and competency of subcontractors

Blue Ventures' Procurement Policy contains rules and procedures for contracting local people and agencies. It covers procurement controls, process and financial delegations for local purchases, competitive quotes and tendering process for large purchases/ contracts and process for capital expenditures.

Blue Ventures staff may not commit the organisation to any contractual obligations including financial, before a contract has been vetted by the appropriate authority as outlined within the Delegated Authority Document of Blue Ventures' General Finance Manual. All legal and contractual matters should be referred to the Finance Director in her capacity as *de-facto* Company Secretary and who will keep the directors of Blue Ventures abreast of new contracts.

Carbon Credits

The Blue Carbon programme will generate carbon credits accredited according to the Verified Carbon Standard (VCS)²⁴. These recognise the value of carbon saved by avoiding mangrove deforestation in the form of a tradable certificate which can be purchased by organisations and individuals wishing to offset their carbon emissions. The sale of carbon credits from Option 4 (£10m funding) is expected to generate an income of £52m over 20 years, although significant benefits will not be obtained until year 9 (expected income increases from £265,000 to £3.9m/ year).

From the sale of carbon credits generated by the project Blue Ventures state that a minimum of 50% of income will go to the partner communities for development projects and local marine management, decided by local partners. For Madagascar, some 20% of income will go to the Government as they possess a right to any carbon stored. An additional 5% will go to VCS to cover verification and monitoring.

Blue Ventures plan to use the remaining 25% of income from the sale of carbon credits for funding ongoing project costs (restricted to the carbon sequestration activities), providing a useful source of match funding. In the case of Option 4, this amounts to £13m over 20 years, although given that the bulk of the income won't arise until year 9 onward, external financing will still be required in the short term.

Social and environmental safeguarding

The Blue Forests project does not involve activities that are likely to bring about adverse impacts on the environment or local communities. Where fisheries and forestry management interventions undertaken during the project bring about changes in people's

²⁴ <http://www.v-c-s.org/>

resource use patterns - for example through the introduction of periodic or permanent closures of fishing sites, or the elimination of certain fishing gears, these will be carried out to enhance fisheries sustainability. The project’s monitoring and evaluation programme will track biological, fisheries and socioeconomic impacts on communities, in order to ensure net positive benefits to livelihoods and biodiversity.

Budget and reporting arrangements

We intend to implement an annual review process for all Defra projects; the Blue Ventures project will be included in this process.

In addition we will specify in the the grant agreement a payment schedule with Blue Ventures in order to manage the flow of funding into the project. However, we intend to have low involvement and control over the day to day project arrangements and Blue Ventures will be leading on delivery.

Commercial Risks:

Risk	Action
Level of funding is too high for Blue ventures to manage effectively	BV has managed contracts with Defra, DFID and many other government agencies and will be using their existing knowledge and procedures to mitigate risks. They have set out procedures for staffing and scaling up in country and costs are included in the project. We will work closely with them in the inception phase to set milestones and monitoring and reporting procedures.

Financial Case

What is the proportion of Defra's component spend on the Project

Three possible scenarios for spend have been considered to gauge where the best value money for Defra lies, this has also been balanced against the funding we are committing for other projects and the recommended option is an investment of £10.1 million.

What is the value of matched funding or private sector investment attracted?

Several others have already contributed to the project. At this stage the funding has not been allocated.

[Redacted]

Blue Ventures anticipate that their total non-Defra funding raised will total £15.7 million over 20 years, thus giving a leverage ratio of 1.5 on Defra funding. As stated in the commercial case, Blue Ventures are permitted to retain 25% of the expected £52m income from the sale of carbon credits to cover carbon related project costs, and this value of £13m is nearly sufficient to cover the match funding requirement. However given that the majority of the carbon income will arise after year 9 of the programme, some interim financing will also be required. In particular in year 8 Blue Ventures anticipate requiring £1.3m to cover costs in addition to those financed by Defra yet carbon income is projected at £66,000.

We do not envisage it will be problematic for Blue Ventures to obtain the interim and additional financing they require. This project is highly innovative- both through delivery of the world's first VCS-accredited mangrove carbon conservation projects, as well as the project's novel approach to integrating livelihood diversification and health programming within a community carbon project. As a result, interest in Blue Ventures' Blue Forests initiative is growing rapidly, across private philanthropy, research council, and impact investing sectors. We therefore consider expectations to attract ongoing match funding to be realistic.

What is the split of funding required?

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	
Field Staff	136,975	271,000	373,332	398,863	426,700	457,113	490,408	
Project Activities	567,500	668,453	805,500	873,000	873,000	839,000	822,000	
Programme Management & Support	180,671	268,168	306,862	329,186	342,361	351,506	364,373	
Total in GBP	885,146	1,207,621	1,485,695	1,601,049	1,642,061	1,647,619	1,676,781	10,145,972

Rdel	£4,650,000
Cdel	£5,495,972

Private sector leveraged funds expected: £15.7m (1:1.5 match funding)

Administrative Costs

Within HM Government, managing the UK’s contribution, as well as influencing and participating in key decisions, will require the below staff dedication (full time equivalent (FTE)) from DEFRA and the overseas network.

The allocation of FTE below is an expected average across the lifetime of the project, with peak staff time at the beginning whilst the project is set up. There will be an added resource requirement from the ODA Board in ensuring that the Senior Reporting Officer Manager is held to account in delivering value for money on UK investments and risk are managed effectively.

Short Term:		Long Term:	
Grade	Resource	Grade	Resource
SCS	0.1	SCS	0
G6	0	G6	0
G7	0.2	G7	0.2
SEO	0.3	SEO	0.1
HEO	0.2	HEO	0.3
EO	0	EO	0
Total	0.8	Total	0.6

Financial accounting considerations for Defra

By December 2016, Defra will lodge a Promissory note for the total amount with the Bank of England which Blue Ventures will be able to drawdown based on the terms of the Grant Agreement. Blue Ventures will administer and account for the spending of Defra/ICF resources in accordance with its financial rules, procedures and practices.

Financial and fraud risk assessment

Blue Ventures has set policies and procedures in place to reduce the risk of fraud and corruption.

Provisions for DEFRA to withdraw funding

Potential suspension of funding, termination and returns to DEFRA and how they might be triggered, including by the monitoring and reporting cycle, will be set out in detail in the Grant agreement with Blue Ventures, and will include actions available to Defra to take in the event

of the occurrence of any illegal or corrupt practice and any extraordinary circumstances that seriously jeopardise the implementation, operation or purpose of the programme.

Scenario	Timing and reporting trigger (if relevant)
Occurrence of any illegal or corrupt practice	Annual Report
Extraordinary circumstances that seriously jeopardise the implementation, operation or purpose of the programme. This is primarily designed to cover instances of force majeure. This may also provide some cover in extreme cases of under delivery.	Annual Report
If Blue Ventures does not fulfill its commitments according to the Administrative Agreement contract	Annual Report

Management Case

What are the management and governance arrangements?

Blue Ventures will be responsible for the day to day running of the project, with Defra taking an oversight role.

A grant agreement will be set out between the UK and Blue Ventures outlining the management roles and responsibilities of Defra and Blue Ventures.

Subject to negotiation it is expected that Blue Ventures will supply Defra with an annual report on the project's activity and spending during the previous calendar year. This report will include:

- amounts received from the donor (ICF/Defra) in relation to the project;
- approved and disbursed amounts relating to the project, broken down by components;
- general description of each approved activity and its implementation, broken down by components; and
- results achieved in respect to the project's expected M&E results.

Within Defra the ODA Board has a remit to monitor progress of funds, portfolios and projects against expected results including to

- Monitor and advise on risks associated with the ODA budget, including for high risk and transformational programmes
- Reflect and advise on Monitoring and Evaluation for the ODA budget
- Recommend remedial actions if operational or financial performance is off track

We will report to the board periodically on progress of this project alongside others in the Defra ICF portfolio.

How will progress and results be monitored, measured and evaluated?

Blue Ventures monitors the diverse ecological, fisheries and social impacts of its work, using integrated and participatory approaches wherever possible. At a global level, the organisation measures how many people its models are reaching, and the area of marine and coastal zone governed by community management resulting from interaction with Blue Ventures' models.

Blue Ventures' work is also at the forefront of developing open source data systems to enable communities to play a central role in marine management. These include tracking seafood landings in real time using mobile monitoring tools, and assuring the quality of community-based health services. The Blue Ventures' team is at the forefront of efforts in the fisheries management sector to build and develop smart data collection and visualisation systems to strengthen local engagement in conservation.

Defra and Blue Ventures will work together to develop a robust and streamlined approach to Monitoring and Evaluation that provides the assurance the HMG needs but that also works with and complements Blue Ventures existing procedures.

We expect to also set a series of financial milestones in order to enable Blue Ventures to draw down funding as the project progresses.

Monitoring and evaluation plan

We are working with Blue Ventures to develop a monitoring and evaluation plan that ensures the project meets its objectives; we are also exploring a possibility of using the draw down facility of the overarching ICF M&E contract in order to fund specific M&E work.

Blue Ventures already has a rigorous approach to evaluating the effectiveness and impact of its models. The organisation's work on mangrove carbon, and incentive-based approaches to mangrove conservation, are documented in a number of peer-reviewed scientific publications and technical documents²⁵

The project will be monitored against its own objectives as well as the ICF Key Performance Indicators (KPIs). The KPIs are a comprehensive set of indicators which will capture, where possible, results relating to the core goals and objectives of the ICF. They have been designed to monitor aggregate results of diverse climate change programmes. As such, they are a major contribution to the evidence base upon which climate finance policy and programme decisions can be made.

Key performance Indicators:

KPI 3: Number of forest dependent people with livelihoods benefits protected or improved as a result of ICF support

KPI 6: Net Change in Greenhouse Gas Emissions (tCO₂e) – tonnes of GHG emissions reduced or avoided.

KPI 8: Number of hectares where deforestation and degradation have been avoided through ICF support.

KPI 10: Ecosystem Services

KPI 15: Extent to which ICF intervention is likely to have a transformational impact.

²⁵ <https://blueventures.org/conservation/blue-forests/>



Annexes

Annex 1 – Table of Activities

Annex 2 – Economic Analysis

Annex 3 – Theory of Change