**Project Title**: MINAGRI Climate mainstreaming pilot for the coffee and tea sectors

**Project Summary**

(In 75 words or less please summarise what your project intends to achieve and how)

This project pilots the mainstreaming of climate change into the agriculture sector development investment plan of MINAGRI. It focuses on the tea and coffee programme, as key export crops which are highly climate sensitive. It will develop an action plan, and deliver capacity building and low regret adaptation and mitigation, for both current and longer-term. The project will also pilot FONERWA’s shift towards more strategic delivery and has a learning and dissemination component.

**Anticipated Start Date**: December 1st 2015

**Project Duration**: 42 months (6 months design and 36 month implementation)

**Funding Requested (RWF)**: RWF 2,000,000,000

**Name of Lead Organisation**: Ministry of Agriculture and Animal Resources (MINAGRI)

**Type of Organisation, which best describes the Lead Organisation (please select only one box)**

- [x] Government Institution
- [ ] Non-Governmental Organisation (NGO)
- [ ] Private Sector Enterprise
- [ ] Academic Institution
- [ ] Other (please specify)

**Partner Institutions**: NAEB (National Agricultural Export Development Board)
RAB (Rwanda Agriculture Board)
Sustainable Harvest
Wood Foundation
Paul Watkiss Associates

**Full Office Address**: Ministry of Agriculture and Animal Resources (MINAGRI) P.O. Box 621 Kigali-Rwanda

**Website Address**: [http://www.minagri.go.rw](http://www.minagri.go.rw)

**Contact Person**

- **Name**: Dr Octave Semwaga
- **Position**: Director General of Strategic Planning and Programs Coordination
- **Email**: osemwaga@yahoo.com **Tel**: 0788810123

**Is this a resubmission of an earlier submitted PD**: NO

---

**For Internal Purposes Only: To be Completed by the Fund Manager**

<table>
<thead>
<tr>
<th>Date Received:</th>
<th>PD Code:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date Comments Sent:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feasibility Study? (Y/N):</th>
<th>PPD Code:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thematic Financing Window:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FONERWA Entry Point:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Appraisal Score:</th>
<th>Rank:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**National Climate Change and Environment Fund (FONERWA)**

**Full Project Document (PD)**

(Please provide a complete answer to each question, even if the answer is duplicated elsewhere. This PD should not exceed 35 sides of A4 size paper.)

### SECTION 1: INFORMATION ABOUT THE APPLICANT

**Q 1.1 What** is the Lead organisation’s total number of full-time employees?

The lead organisation is the Ministry of Agriculture and Animal Resources (MINAGRI), and within this, the new Special Project Implementation Unit (SPIU) of the Strategic Planning & Programme Coordination Directorate. MINAGRI has 47 full time employees, and a further 50 are employed in all MINAGRI SPIUs.

**Q 1.2 What** is your organisation’s experience of managing similar projects or activities *(please explain why you think your organisation and partners are capable of managing the project)*?

The project will be managed by MINAGRI. The project is collaboration between institutions inside Government, and thus includes two key government partners, the National Agricultural Export Development Board (NAEB) and the Rwanda Agriculture Board (RAB), who will responsible for implementing components of the project that align to their areas of responsibility. It also will provide collaboration with the private sector, for implementation, and includes the Wood Foundation and Sustainable Harvest. Together this partnership provides all the necessary experience for the project.

MINAGRI will be responsible for leading the project. They have developed Rwanda’s 3rd phase of the agriculture sector development strategy (PSTA III), and are implementing this through the Agriculture Sector Investment Plan (ASIP II - 2013/14 to 2017/18). MINAGRI has considerable experience of managing similar (and indeed much larger projects) and has a proven track record of delivery. The planning unit in MINAGRI will also be supported by DFID Rwanda’s Programme of Support to Agriculture (PoSA) and the new Technical Assistance Facility (TAF). This will provide additional technical assistance support in the area of climate and environment. The additional partners include NAEB, including both the tea and coffee divisions. This is the organisation responsible for implementation of the tea and coffee sub-programmes of the ASIPII. This organisation has the track record in the implementation of tea and coffee programmes, including the tea expansion programme. The project also includes RAB, which leads on agricultural research and extension services in Rwanda. They have recently completed pilot studies on coffee shade trees, and pest and disease monitoring, so have an excellent technical as well as implementation experience of similar projects. All these Government organisations have excellent GIS facilities, and information management systems, which will provide the capacity for the information components of the project. NAEB has 88 employees and RAB has 461.

Additional project partners are included to provide the private sector linkages for the low regret implementation components, both for larger-scale tea plantations and smaller co-operatives and small-holder farmers. Their involvement ensures the impacts of the project by maximising the impact (and efficiency). The Wood Foundation is a charity which is working in a partnership model with small-holder tea farmers in Mulindi and Shagasha (two tea factories and surrounding plantations). These account for over 25% of Rwanda’s tea production in a shared ownership model with 12,000 smallholder farmers (as a joint charitable company, Rwanda Tea Investments (RTI)). Sustainable Harvest is a philanthropic funded organisation that is working in the coffee sector in Rwanda. It is supporting small-holder coffee producers, particular to encourage more sustainable production, and has a particular focus on improving the livelihoods of low-income women farmers through training and support. These two organisations provide the necessary private sector experience of running a tea factory, as well as the connections and extension services with small-holder farmers.
Finally, the development of the climate mainstreaming and action planning component in the initial phase of the work will be financed by Paul Watkiss Associates, as a non-funded partner on the project. PWA has been working in Rwanda for the last seven years, and developed similar mainstreaming and action plan projects in other East African countries. The capacity building components throughout the project will be supported by the new Technical Assistance Facility (TAF) in MINAGRI, both in terms of core team and short-term support.

Q 1.3 List the name, position, and email of key personnel involved in the project, such as the project executive, project manager, and core technical staff. (Provide a CV for each of the key personnel as an attachment to this PD)

- Dr Octave Semwaga (Project Executive). Director General of Strategic Planning and Programs Coordination.
- Ritwika Sen (MINAGRI). (Project Manager). Lead Economist, Strategic Planning and Programs Coordination.
- Dr Celestin Gatarayiha (NAEB, Coffee Division Manager).
- Issa Nkurunziza (NAEB, Tea Division Manager).
- Joseph Bigirimana (RAB).
- Paul Watkiss (independent, providing technical assistance for design phase and action planning).
- Sanjay Kumar (The Wood Foundation)
- Christine Condo (Sustainable Harvest)

MINAGRI is currently in the process of appointing a climate and environment focal point, and they will take on the project management role on the project, within the Strategic Planning SPIU.

Q 1.4 Lead Organisational Finances. Provide a copy of these from the most recent audited annual accounts (income and expenditure statement & balance sheet in RWF, as well as the main sources of funding) as an attachment to this PD.

The most recent accounts are included in an appendix to this PD.

SECTION 2: INFORMATION ABOUT THE PROJECT

Q 2.1 Why is the project needed (clearly state the problem this project will address and the evidence base for its justification. Where possible, refer to international, national and/or sectoral strategies.)?

Agriculture contributes a third of GDP and dominates employment (about 80%) in Rwanda. It is a highly climate sensitive and also a source of greenhouse gas emissions. It also is a major source of export value, particularly from tea and coffee. Tea and coffee represent over 20% of total (all sector) exports by value in Rwanda (>$100 million/year), and the land under production has grown considerably in recent years. The future development of these cash crops for export is therefore a high priority for the Government.

The Agriculture Sector Investment Plan (ASIP2) has a strategic sub-programme 3.3 on Development of Priority Value Chains: Export Crops. This includes Sub-Program 3.3: Development of Priority Value Chains: Export Crops, which is focused on coffee and tea and includes indicators for 3.3.2 Productivity of coffee production, 3.3.4 Revenue of exports – Coffee, 3.3.5 Productivity of Tea production, 3.3.7 Revenue of exports – Tea. A key part of the forward looking plan builds on the fact that Rwanda has been making progress in moving to more specialized markets. This includes more sustainable production (sustainable or organic). It also includes moving towards higher quality / specialty coffee and tea, which command much higher prices as these are outside the bulk commodity markets. However, this higher value market is very sensitive to the quality of the tea and coffee, and these cash crops are themselves highly sensitive to the climate. The current ASIP does not include any consideration of the risks of current and future climate on these crops, and a focus on this area provides a third justification for the project.
**Current climate**

Tea and coffee are highly climate sensitive crops. In Rwanda, they are grown only in certain areas of the country, where the soil, temperature and rainfall (climate) are suitable. For both tea and coffee the main production areas correspond to certain temperature zones, which are at elevation (height above sea level) where it is slightly cooler.

In Rwanda, the ideal growing conditions for tea are for average annual temperatures of 18-20°C. Therefore, most Rwanda tea production is at the height of 1600 to 2200 metres above sea level. These high area teas have more desirable characteristics (in terms of flavour or colour, which arise because the tea tips grow more slowly) and these fetch a higher price than their lower-altitude counterparts. Below 1500 m yields increase but the tea flavour decreases and tea from these areas struggles to complete with volume Kenyan production. This can be seen in the maps below, which shows tea production is concentrated in narrow band of the country from north to south with suitable climate. In Rwanda, tea can be harvested year round due to the lack of a cold season with peak tea production coinciding with rainy seasons. A large proportion of the tea estates in Rwanda are on the valley floors, often in (drained) wetlands or marsh areas, rather than on the slopes. Tea also requires a certain rainfall level distributed evenly throughout the year. High season variability can lead to problems for the tea growing. New tree plants are generally planted in season A (end of September to end of December), but if it is too dry, then planting has to be delayed, and this has an impact on the seedlings. For mature plants, the expected period of rainfall in season A is associated with fertiliser application. If there is no rain – or too much/too heavy rain - then fertiliser cannot be applied. This affects the quality as well as the quantity (i.e. the leaves are not tender enough). There are some reports from farmers of higher variability of rain, affecting the tea volumes seen in the factories. ITC (2014) reports that during times of drought the Tea Research Foundation of Kenya (TRFK) estimate that crop yields reduce by an average of 20 – 30%.

![Figure 1. Elevation (height) (left) and the climatic suitability for Tea (right). The most suitable areas (right, in green) are on the left of the country, along the main ridge north to south, and also below Kivu.](image)

Coffee is also a highly climate sensitive crop, especially Arabica which is the dominant variety in Rwanda. Again there is a temperature suitability range for this cash crop, but this is lower than tea, and most production is between 1000 and 1700 metres above sea level. This means the two production areas are complementary. Again the distribution of coffee is in certain parts of the country, as can in the figure. Coffee also requires certain conditions, with a dry period during the flowering stage, rainfall to initiate flowering, and a dry period at harvest to facilitate picking and sun drying. Rainfall variability in seasonal patterns can therefore have a major impact on these key stages, and can have a negative direct impact on yield and quality. Too little, or too much rain, especially in key phases are a particular problem. In Rwanda, the September rains are critical to flowering, in order to harvest in March to June. However,
intense rainfall events can also be a problem. There have also been problems this past season due to unexpected rain affecting the drying process. There are some coffee production areas in the east that are already close to the suitability zone for coffee, as highlighted below. These are at highest risk, especially because of the rainfall variability in this part of the country. For both crops, longer dry seasons cause high vaporisation of moisture in the soil and can negatively affect production in the following season. Heavy rains, landslides and floods can affect the fertility of land.

![Figure 2](image)

**Figure 2.** The climatic suitability for Arabica Coffee (left) with the most suitable areas shown in green. The current areas (in brown) are shown on the right and match to the suitability zones.

As well as the direct effects of climate on the crops, there are also important effects of climate on pests and diseases, many of which are also temperature sensitive. Antestia (variegated coffee bug) is the most common pest in Rwanda for coffee, and is currently controlled through spraying. There are some suggestions that the incidence of the pest changes when the rainy season is shorter. Coffee (leaf) rust is found in Rwanda, and while this used to be constrained to the drier, lower areas (especially in the east), it has been spreading, outwards and upwards (Bigirimana et al 2012), again possibly due to more favourable warmer conditions. Tea pests are less of an issue for Rwanda, though when there are long dry seasons, red spider mites increase.

**Future climate change**

Climate change will affect the temperature and rainfall in Rwanda, and will thus impact on tea and coffee production. These effects are particularly important because tea and coffee are long lived crops, much more so than cereal crops. Tea plants take several years before they are ready for harvesting, and the pay-back period for a new plantation is around 15 years, although the bushes will be typically grown for 50 years. Coffee trees also take time to mature (e.g. 3 to 5 years before they bear fruit) and are typically harvested for decades (the average lifespan of a coffee plantation is about 30 years but can be more than 50 years). Given the long life-times, and the high climate sensitivity, future climate change is a real risk to tea and coffee production in Rwanda. There are important risks in terms of changing climatic zones, rainfall variability and changes in pests and diseases. Importantly, the climate of Rwanda is changing already. There are observations of increasing temperature over recent decades (left), though changes in average precipitation are more uncertain (right). However, there are indications of increasing rainfall variability. Future climate change will exacerbate these trends, and it could be especially important for tea and coffee, because it will increase temperatures and affect the suitability of where tea and coffee is grown.
The latest changes in projected temperature and precipitation are shown below, taken from the CMIP5 database (UK Met Office). The projections show that future temperatures will rise in Rwanda, with a median increase of around 1°C by the years 2020 to 2050, relative to a baseline period of 1970-1999, though there is a range around these values. The potential increase by the end of the century will be much higher, though it varies strongly according with the scenario (i.e. a 2 or 4°C world) and climate model. The projected changes in average rainfall are more complex, and there may be little change from current. There is, however, greater confidence that there will be an increase in heavy precipitation events, a finding projected in all the models. This heavy precipitation will increase soil erosion problems, and it also exacerbate the issues above, e.g. in relation to fertiliser application, flowering and drying, etc.

Climate change will mean that the areas currently suitable for tea and coffee in Rwanda will change. This implies reduced productivity/quality, unless adaptation measures can be taken. For example, with the 2°C or so increase in temperatures projected over the next few decades, the low lying areas of current production of tea (around 1700 metres) will become hotter, and less suitable for optimal production of tea of high quality. At the same time, areas towards the higher end of the current growing range will become more optimal, and new areas for cultivation (that are currently too cold) will open up. These provide opportunities for Rwanda.

Studies in other countries indicate just how important these impacts could be. In Ethiopia, a study on
coffee, Davies et al (2012), found that climate change will lead to dramatic reductions in suitability of current areas for unmanaged coffee. Craparo et al. (2015) projected that without adaptation, there will be a significant decrease in production of Arabica coffee in Tanzania by 2060. CIAT (2011) show that in Kenya, the change in suitability by 2020 and 2050 will mean many current areas will become unsuitable for tea production. Kenya was found to have fewer areas which will become suitable in the future (i.e. at higher altitudes).

Finally, climate change will affect the spread and prevalence of pests and disease, and this is a particular concern for coffee. At the moment, the incidence of pests and diseases, notably coffee leaf rust is confined to the warmer, lower elevations. However, coffee borer is highly climate sensitive. At the moment it is currently only in one area of Rwanda, near lake Kivu, but it favours warmer temperatures and could spread to other coffee areas as temperatures increase. Indeed, other countries have seen coffee borer expand its distribution range and prevalence over recent decades due to warmer temperatures, resulting in increased damage to coffee crops. As an example, climate data for Ethiopia show that prior to 1984 temperatures were too cold for coffee berry borer however, higher temperatures now allow for survival of 1 - 2 generations per year/coffee season (Jaramillo et al. 2011).

It is therefore clear that future climate change has the potential to lead to very large impacts on coffee and tea productivity and quality, and thus export earnings, for Rwanda. This could impact the numerous people who rely on these sectors for their livelihood, potentially increasing poverty. Addressing these risks is therefore an early priority. These risks provide a key justification for the project.

**Green Growth and Climate Resilience strategy, Tea expansion and Rwanda’s Comparative Advantage**

Rwanda has already recognised the risks to tea and coffee. The Green Growth and Climate Resilience strategy (RoR, 2011) highlighted the effects on these export crops as a key concern. It reported that ‘coffee and tea, Rwanda’s cash crops, are likely to require higher altitudes as temperatures increase’, which may reduce the amount of suitable land available due to differing soils and steeper slopes.

This issue is absolutely critical for tea, because Rwanda is currently expanding the area under tea cultivation, as part of a major tea expansion in ASIPII. A further 10 new tea production zones (a factory, each with a 300 - 400 hectare industrial estate, and then additional smallholders around this) are planned, thus the area of expansion will be 30 000 hectares or more. However, the location of these areas has been based on the suitability of soil and the current climate, and not the future one under climate change. Given the long-life-time of tea, and the rapid changes in climate, this is a concern.

As highlighted above, with climate change, there will be a shift in the climate suitability of current production areas. A useful analogy is to use the relationship between the height of a hill and the temperature. Temperature increases at lower elevations, i.e. it gets hotter as one goes down a hill (lower) and conversely it gets colder as one goes up. Climate change will lead to a similar type of effect, i.e. higher temperatures will be like moving tea or coffee production down the hill. As a rule of thumb, a 1°C increase in temperature from climate change will be equivalent to around a 200 metre shift down the hill, and 2.5°C increase equivalent to a 500 metre shift. Therefore, if tea is being grown at 1800 metres today (optimal), 1°C of climate change (2040) will alter the climate so it will be like growing tea at 1600 m currently. With 2.5°C of warming, a site at 1800 metres today will be like growing tea at 1300 metres (and no-one grows tea at 1300 metres, because it is too hot for quality production!) Conversely, the optimum height to grow tea in Rwanda will increase with climate change to an altitude between 2000 - 2300 m over the next few decades. This is important in looking at where Rwanda may need to shift production in the future, and where expansion should focus. Initial work by MINAGRI has looked at the planned tea expansion areas (show in red lines), and mapped this against elevation. This shows that
while some expansion areas are located at slightly higher altitudes, which would be resilient to the future (the areas in white), there are some low lying areas (in green), which would be highly at risk. A key issue is therefore to use this information when developing rural land use and tea expansion plans.

Figure 5. Overlay of Future tea expansion areas (red lines) and elevation (colour) in Rwanda.

Similar issues exist for coffee. There is likely to be an overall reduction in current Arabica growing areas and concentration towards higher altitudes. It would be possible to replace Arabica areas by the more heat-tolerant, but Robusta, but this is lower value.

However, tea and coffee are part of international markets. Therefore, a further issue is what happens in other countries, i.e. with Rwanda’s competitors in the market. Some countries will be able to respond to climate change, and will gain a comparative advantage over those that do not have the space to change. A key issue is whether Rwanda is a country that could gain (compared to regional or global countries). Bunn et al. (2014) looked at current and future climate suitability (2050) for coffee production on a global scale. This indicates some reductions from other global producers, but a relatively positive finding for East Africa. It also indicates the area suitable for Robusta will increase in Rwanda. This is important for two reasons. First, the decrease in suitable areas for coffee production globally by 2050 is likely to result in an increase in coffee prices and a reallocation of production to regions gaining in suitability. Similar issues will arise for tea. Second, it seems that Rwanda does have the potential to change production areas to take account of these changes, i.e. it may be one of the countries that has a comparative advantage under climate change.

Alongside this, it is also stressed that there are many opportunities for improving the productivity for tea and coffee today in Rwanda. There are large potential economic and livelihood benefits from introducing measures to help the farmers now, both to cope with current climate variability and the near-term impacts of climate change. This involves the development of adaptation options to help the current production areas that are low lying, or affected by current variability. For coffee this can include shade trees, which provide cooler temperatures that increase quality, and can produce co-benefits. For tea it can include a variety of options, which can include new planting on the slopes (up from the current
marsh areas which are at lower elevation). The proposal includes major pilots on these low-regret options, targeting vulnerable areas, to help the most vulnerable areas. This will lead to immediate benefits, and thus provides a further justification for the project.

The final element is with respect to pests and diseases, which affect current production, and could start to significantly affect coffee under a changing climate if their range and prevalence alters. However, there is a lack of information on which areas of Rwanda might be affected by changing pests and disease, and a lack of monitoring information to enable effective responses. Better information provides the early steps to understand changing patterns, and to respond with early pest management strategies.

All of these issues highlight that the priority given to coffee and tea in the GGCRS is justified, and that given that Rwanda is expanding production, and has some potential global comparative advantage, then a tea and coffee resilience programme is justified. The importance of this is reinforced by the long life times involved in the sector, and by the current focus of major expansion at the current time: the window of opportunity for making the tea and coffee sectors resilient is urgent, as decisions are being made now that will lock Rwanda into sector plans that last decades. Building resilience to current climate variability is essential to reduce current impacts and increase productivity, and the project is structured to also provide immediate economic benefits.

There is also an opportunity to leverage the activities of the ASIP towards more sustainable and climate smart agriculture, starting with tea and coffee. As well as enhancing production, this may bring in additional source of finance, from international climate funds. This FONERWA project is therefore an opportunity to develop an action plan and prioritize risks and opportunities, and to demonstrate the process to implement mainstreaming to allow this to happen. The project will provide key lessons and guidance for wider scale-up.

Finally, the GGCRS highlighted the high energy use in tea factories, and that there are opportunities to reduce emissions and unsustainable biomass use (mitigation). Factories boilers at tea factories are powered by wood fuel, which can represent over 35% of total annual spend on energy. Typically, the surrounding smallholder communities to each factory are also reliant on fuel wood, primarily for cooking, placing additional pressure on this natural resource. Wood has the potential to be a low carbon or an emissions free energy source if the forest from which the wood is derived is managed in a sustainable manner. A sustainable forest management strategy for tea, aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber or energy from the forest, will generate a large sustained mitigation benefit. It would also have wider co-benefits by reducing erosion and reducing emissions. To do this, tea factories can increase the size of sustainably managed wood plantations through afforestation, reforestation and forest restoration – and new factories in the expansion areas can plan sustainable forest plantations from the start.

**Additional justification: Piloting more strategic and mainstreaming activities for FONERWA**

FONERWA has been highly successfully in operating as a demand-led challenge fund since its operation. However, opportunities for its future development are emerging, and to make the most of these, it is timely to start thinking about the future direction of the fund. In late 2014, a Backward and Forward Looking Review of FONERWA was undertaken. This was followed by an options paper, which outlined possible options for the future role and direction of FONERWA, which was completed in April 2015. The paper proposed that FONVERA should develop a strategic component, but it also made a strong recommendation that FONERWA should keep the demand-led fund, i.e. it recommended a complementary mix of strategy and demand-led activities.
This strategic direction will help FONERWA become more transformative, integrate it in national and sector development planning, and allow it to leverage greater climate finance to scale-up existing sector development budgets. The paper was presented at the FMC meeting in May. At this meeting:

- The Board agreed there was a need for FONERWA to become more strategic alongside a continued demand-led fund.
- There was some concern about moving too quickly and it was recognised that moving strategically will involve new activities and skills. The board therefore proposed to test the strategic aspects in a sector pilot study. This would provide a proof-of-concept to demonstrate the development of climate mainstreaming and action planning. However, it was also considered important that the pilot should include a capacity building and a learning component to allow scale-up across Government.

This PD responds directly to these issues: therefore the additional justification for the project is to provide a strategic pilot for FONERWA, i.e. the current conditions have highlighted the need to add a strategic component, and this project provides the pilot to do this.

This shift also aligns with national and sector policy objectives, notably the focus for climate and environment mainstreaming (integration). Mainstreaming is explicitly included in the National medium term development plan (Economic Development and Poverty Reduction Strategy, EDPRS), phase II (2013-2018) as one of a number of cross cutting issues [cross cutting issue b] Environment and climate change: major areas of attention will be mainstreaming environmental sustainability into productive and social sectors and reducing vulnerability to climate change. The mainstreaming process is being advanced by the individual sectors, following guidance that has been issued by the responsible authority (REMA), and working through dedicated staff in each of the sector ministries. Following from this, all sector development plans (for 2013 – 2018) have considered Environment and climate change as cross cutting theme. There has also been an initiative to mainstream these aspects within the budgeting process and the Ministry of Finance in the planning and budget call circular, as Annex 19. However, the level of mainstreaming in sector development plans is at an early stage, and most plans have few concrete actions. Large opportunities exist to scale this up. Part of the reason for the low initial uptake is there is no case study to demonstrate how to mainstream climate into a sector plan. This project will address this gap by advancing a real mainstreaming application with one of the major sectors, MINAGRI.

The mainstreaming application will focus on the existing agriculture sector development plan (Strategic Plan for the Transformation of Agriculture in Rwanda, PSTA III), which includes a specific area for mainstreaming (SP4.6 Environmental Mainstreaming in Agriculture, and a number of sub programme activities, involving MINAGRI, NAEB and RAB). This has been translated through into the Rwanda 2nd Agriculture Sector Investment Plan (ASIP-2). This includes Sub-Program 4.6: Environmental Mainstreaming in Agriculture, which includes specific actions, objectives and indicators. MINAGRI has made good progress on developing a climate and environmental screening tool to advance this, and this provides the basis for the next step which is a systematic analysis of risks across the ASIP, followed by the development (prioritisation) of a set of mainstreaming actions, to enhance resilience, reduce environmental impacts, and enhance low carbon resilience.

This PD responds directly to this challenge, thus there is a justification for the project to demonstrate the development of mainstreaming in a sector action plan. To do this the pilot has focused on an area of the agricultural plan which is material to the development of Rwanda’s agricultural development and future export growth, as well as being highly climate vulnerable: the tea and coffee sector.
The project has three key components:

1) **To pilot a strategic project**, to help show how FONERWA can move in a more strategic direction alongside the continuation of the demand-led fund. This strategic component has been identified as a key way forward for the fund to expand its leveraging and transformational impact, and to expand the potential opportunities for finance upscaling. The project will focus on the development of an action plan, and the mainstreaming of climate change into a sector development and investment planning, within MINAGRI;

2) **To build a tea and coffee resilience plan for Rwanda**, and mainstream this within the MINAGRI agriculture sector investment plan and sub-programmatic area. This will include early implementation of low-regret projects to enhance productivity and increase climate resilience for Rwanda’s tea and coffee sector, and early planning, information and monitoring to start preparing for future climate change. This activities will also deliver the programme of action for tea and coffee resilience that was recommended in the Green Growth and Climate Resilience Strategy;

3) **To include a capacity building, learning and dissemination** component to document and feed-back the lessons on mainstreaming within MINAGRI, as well as providing lessons and training for other ministries and more broadly for FONERWA for strategic programming.

To maximise piloting and learning, the project is proposed as a design and implement project.

The intended **impact** of the programme is that environmental and climate change issues are **mainstreamed into policies, programmes, plans and activities for public and non-public agencies**. This captures this program’s ultimate objective to represent a pilot for mainstreaming into policy-making, and for mainstreaming to be adopted by relevant decision makers across government and sectors that face climate change risks. The uptake of mainstreaming processes and practices will be facilitated through documentation and guidance on how this was done for MINAGRI. Note that the number of policies and plans in which environment and climate is mainstreamed is likely to increase after this programme is completed but cannot be known with certainty at this stage.

The long term legacy will be secured by linking this with a learning and capacity building component (see later) and using this to encourage similar activities in other programmatic areas of MINAGRI, and wider to other sectors, allowing further leveraging of FONERWA to sector development budgets. This will allow FONERWA to increase scale and increase impact.

The impact this programme intends to achieve aligns very strongly to the following national and sectoral change and environment objectives, and the development of mainstreaming in EDPRSII and the ASIP-2.

The **outcome** of the programme is that climate mainstreaming is advanced in MINAGRI, and contributes to making the tea and coffee sector more resilient to future climate. The programme will contribute to making the sector climate resilient, enabling Rwanda to strengthen its international comparative advantage while supporting continued economic growth, wealth creation and poverty reduction.

Following from this, the project has a number of key outputs or deliverables, as indicated in the logframe. They include:
Output 1: Environment and climate change issues are mainstreamed into MINAGRI development plan. The programme will contribute to developing a tea and coffee resilient action plan. This will ensure tea and coffee production in Rwanda are environmentally sustainable, low carbon and climate resilient. This will be the first tangible output of strategic mainstreaming: it will show how climate change can be mainstreamed into sector development and investment plans, and will demonstrate that FONERWA can move in a strategic direction.

Output 2: Climate information and knowledge on climate change impacts improved. This will include enhanced risk and vulnerability analysis, climate risks screening and mapping, and the development of a pest-monitoring programme. The findings of these activities will include information to allow Rwanda to take advantages of the opportunities for expanding production in suitable areas, and will all feed into the sector resilience plan (Output 1).

The specific aims of this component of the programme are to enhance the information on climate change impacts and adaptation, and to start enhancing the knowledge base to help address longer-term climate change, i.e. to provide the building blocks for transformative and iterative resilience. The task will also have the objective of producing a priority programme (of action) as recommended in the GGCRS, POA 2: Agricultural Diversity in Local and Export Markets, Action 4: Expansion of Exports. It also will deliver the first mainstreaming components of the ASIPII ensuring the prosperity of the sector.

Firstly, enhanced risk and vulnerability analysis will consider the immediate impacts of current climate variability and early trends, as well as resilience to long-term climate change. The first sub-project deliverable will entail using GIS analysis to assess the current and future risks to tea and coffee production in Rwanda, including the climate information, and climatic shifts, to develop maps of current and future risks. This will enable a prioritization of high-risk areas for early adaptation, and long-term future areas at risk or where there is the opportunity for expanding production. The use of higher resolution data (and possibly satellite information) will enhance the accuracy of the existing scoping analysis, taking account of Rwanda’s variable terrain and micro-climate. The potential for linking this to meteorological station data will also be explored. For tea the analysis will include the production of more detailed spatial expansion maps and identify areas of suitability to provide a ranked analysis and identify low and high-risk areas. The analysis will also look at the other land-use patterns in suitable areas, to ensure there are no conflicts with biodiversity or ecosystem services in particular.

The second sub-project deliverable will entail developing the existing coffee pest monitoring programme to develop a climate change component, and to enhance the monitoring trends of climate-sensitive pests and diseases. This will also be linked to risk mapping (linked to the GIS and climate information above) to investigate where the potential risk might emerge, based on climate suitability and shifting temperatures. At the moment, the level of coffee pests are below the economic threshold levels, but the spread and prevalence is already changing. There is existing monitoring being undertaken by RAB that which is monitoring outbreaks of coffee pests, including coffee berry borer, particularly in the Western Province. When economic thresholds (for damage to crops) are hit, control measures are organized. There is a need to start preparing to scale-up these activities, extending the monitoring to other high risk areas (e.g. in the East and the South) and using the climate information to start building preparedness plans and early responses (rather than being reactive). The information will also be used to increase the adaptive capacity of the industry and of farmers (e.g. through existing Farmer Field Schools) in priority risk areas.

The measurable indicators will be the completion of the risk analysis and maps (that will feed into the
resilience plan hence demonstrating the use of the climate risk information in tea and coffee strategy and planning in Government – output 1), and the development of a climate focused pest and disease monitoring programme (which in the longer-term is expected to contribute to a reduction in pest and disease related losses for coffee and tea), providing benefits to smallholders. There are also large effects on knowledge and technology transfer through the GIS information and risk information generated, which will have multiple applications across MINAGRI.

**Output 3: Coffee and tea low regret and sustainable adaptation options implemented.** A series of low-regret projects in the coffee and tea sectors will be implemented, working with Government, the private sector and farmers, to address existing climate variability and immediate economic benefits, as well as building resilience for early climate change.

The exact focus will be confirmed during the action plan and design, but are likely to involve two major intervention areas that are expected to deliver high VFM (see below). Options will be assessed together with all partners through a stakeholder consultation during the inception phase. The project will involve working with Government and the private sector. A particular focus will be to target smallholder farmers, especially women, to look for wider livelihood and development benefits alongside climate resilience. This programme component aligns to the Agriculture Sector Investment Plan (ASIP2) and the strategic sub-programme 3.3 on Development of Priority Value Chains: Export Crops. It also helps deliver the GCCRS POA 2: Agricultural Diversity in Local and Export Markets, Action 4: Expansion of Exports. It also will deliver the components of the ASIPII ensuring the continued prosperity of the sector.

Pilots could include:

**Coffee shade trees.** The introduction of shade trees in coffee areas alters the microclimate, decreasing temperature around the berry by up to 4 degrees (Jaramillo et al. 2011) and increasing relative humidity, leading to positive effects for growth as well as decreases in the rates of pest infestation. Shade trees also provide benefits to soil and water conservation and management (Wijeratne et al. 2007), as well as biodiversity (Lin et al. 2008), and refuge for beneficial arthropods, leading to higher levels of biological control for pests (Jha et al. 2014). Furthermore, shade trees create synergies with mitigation aims, with triple-wins in terms of food security, adaptation as well as mitigation (known as ‘Climate Smart Agriculture’) and may provide opportunities for generating price premiums due to the higher quality that results (Rahn et al. 2014). Shade trees for coffee are seen as particular relevant for Rwanda, as much of the current sector is small-holder dominated, and spacing among trees is currently not dense. There have been tree shade coffee pilots along the lake Kivu (with CGIAR), and these have shown good results. There are also shade coffee trials in Rubona and Rutsiro, and the successful pilots and be scaled up to other project sites. A key priority of the project is to target the highly vulnerable areas of the East of the country, as these are seen as the most vulnerable, and to focus on working with women.

The design phase will consider exactly which shade trees to use, building on the results of the completed trials. The options include the use of agroforestry/intercropping, to provide wider co-benefits. Banana can improve soil carbon and fertility (Zake et al. 2015), enhancing agricultural production. It can improve the efficiency of land utilization and improve farmers’ incomes while ensuring household food security; it is therefore an important intervention in crop intensification within the country. Intercropped systems have been found to have significantly higher soil organic matter, carbon pools and total N.

RAB in collaboration with NAEB have started a study on intercropping coffee with banana. The first trial has been established in Kireha and there are on-going trials at Huye and Nyamasheke. Intercropping banana with coffee provides an opportunity for expanding coffee production to relatively drier areas of
the country (although this may not be a good strategy under a changing climate) and for increasing the resilience of the crop to climate change in areas already growing coffee. It is also possible to intercrop coffee (Arabica) plants with macadamia nut plants. Other alternatives include pollinator conservation measures. It would also be possible to identify and promote other indigenous tree species suitable for shade coffee in the project sites. It is also possible to introduce improved soil conservation practices. The water holding capacity of the soil is a key component in areas where drought is prevalent. Soil improvements aimed at soil and soil moisture conservation can minimize the adverse effects of dry weather and high temperatures (Rahn et al. 2014, Wijeratne et al. 2007). There have been trials in Rwanda on coffee, and production records of indicate that traditional mulching increases the yield of coffee than cover crops. While the focus will be on shade trees, the pilot and design phase will also consider a number of other alternatives, which could be scaled up subsequently. These include planting more resilient coffee cultivars ad insurance.

**Tea resilience measures.** There is a similar set of potential options to enhance productivity in the tea sector, build resilience, and deliver co-benefit. As with coffee, it is possible to introduce soil and water conservation for tea. Amarthung and Wijeratne (2000) demonstrate that an increase of soil organic Carbon by 1% could lead to an increase in annual tea yield by approx. 400-500kg/ha. Measures can include composting, hedgerows, envelope forking (loosening soil without turning), burying prunings, and mulching (Wijeratne et al. 2007). There is also a set of more sustainable practices that can reduce water stress (e.g. mulching). It is also possible to use shade trees for tea, although this is more challenging due to the current high density of planting. High intensity intercropping measures can also reduce the ambient temperature around tea plants (Wijeratne et al. 2007). In the Sri Lanken tea context, intercropping with rubber or coconut trees is suggested (Wijeratne et al. 2007), but the suitability of these in Rwanda is not documented.

There is also a short-term option to work with smallholders to start planting tea on some of the higher slopes around the existing tea plantations. These has potential multiple benefits by generating cash crops and increased incomes, as well as providing benefits to the industry through the development of production at higher elevations, ensuring longer-term production. As tea is densely planted, it also has high soil and water conservation benefits, reducing erosion and reducing run off. However, it may require some degree of water conservation (e.g. rainwater harvesting) for dry season periods. A number of other alternatives would be considered during the design phase. These include planting more resilient tea cultivars, improving water conservation and management through efficient artificial irrigation and drainage systems, as well as water harvesting, and insurance.

For both the coffee and tea components, the specific impact of this component of the project will be to implement resilience measures that increase production, deliver climate resilience, and lead to wider co-benefits to poorer smallholder farmers, through the planting of shade trees and other measures which would leave a long term legacy.

At this stage, the output indicators relate to the area of production covered and the number of practices tested through the pilots. It is anticipated the project will deliver low regret coffee and tea resilience to 1000-1500 hectares. This is likely to lead to benefits for around 3000 farmers. During the design phase, it will be possible to determine if other output indicators can be measured, including: improvements in quality and quantity of crops (though most of these will fall outside of the time-frame of the project), impacts on employment and poverty reduction, as well knowledge and technological transfer, and income diversification.
Output 4. Sustainable wood fuel is used for low carbon tea production.

The programme has a climate change mitigation component: a low-regret project on sustainable biofuel to improve the energy efficiency of tea factories. The GGCRS highlighted the high energy use in tea factories in Rwanda, and that there are opportunities to reduce emissions and unsustainable biomass use (mitigation). While most plantations manage some forest plantations, these are not adequate for 100% supply, therefore wood supply depends partly on out growers/contractors.

This supports the government objectives as stated in the thematic areas of EDPRS 2 of Rural development (Natural resources and environmental management) with Protection of environment and sustainable natural resource management, as well as the climate and environment mainstreaming components in the ASIP. This project component is expected to have positive impacts on the environment through the creation of sustainable sources of fuel wood, and create employment in rural areas.

The exact options will be developed during the design phase. The specific objectives are likely to be to facilitate 100% sustainable biomass fuel supply for a tea factory from wood plantations in order to save natural forests, though the potential to contribute to rural electrification by assessing the viability of rural, renewable small scale power generation options (biomass, solar and wind) in tea factories will also be considered. There are a number of options that will be accessed during the design phase:

- Enhancing the sustainable management of an existing tea plantation forest, and reducing the draw down on additional wood suppliers from outside (that are less sustainable). This could include development of short rotation plantations, or indigenous trees.
- Developing new sustainable wood plantations for one of the new tea expansion areas, working on sites with existing erosion problems, to deliver additional benefits through watershed management, reduced soil erosion, carbon sequestration.
- Investigating enhancing boiler efficiency, or using renewables to provide ancillary electricity supply for tea factories.

Some early work has already been undertaken in Rwanda. The main result was an Action Plan for each plantation/factory and a common Sustainable Energy Supply Manual for Tea Factories. This suggested a number of activities that will be considered (see [http://www.ndf.fi/project/ncf-enhancing-sustainable-energy-supply-tea-factories-ndf-c3-c7](http://www.ndf.fi/project/ncf-enhancing-sustainable-energy-supply-tea-factories-ndf-c3-c7)).

The potential for other income streams from managed land will also be considered. This could include collaboration between the tea factory and this timber production to create off-farm green jobs as well as providing low carbon materials for the local housing projects. It could also use the nurseries to scale up tree planting and agroforestry for localized watershed management and soil stabilization.

At this stage, the output indicators in the logframe are indicative and include hectares of forest and agro-forest cover (disaggregated by afforestation / restored forest / agroforestry; and tonnes of CO2 emissions avoided. Provisionally, the planned plantation size for the sustainable plantation for the existing tea factory (e.g. at Mulindi) or a new tea expansion area, are both around 300 hectares. As the time taken to maturity will be beyond the project length, the output would be in terms of seedlings planted.

However, there are also potential ancillary impacts from reduced soil erosion and enhanced watershed management. The action plan will determine the most cost-effective options and also undertake the analysis of the siting (whether for a new or existing factory). The lessons from this will be rolled out to other plantations to ensure legacy.
Output 5: Capacity building enhances government staff and the private sector’s capacity on climate change mainstreaming. The programme has a strong capacity building component, which will be delivered through training, mentoring and workshops, leading to the enhanced capacity in MINAGRI, and more generally across GoR and in FONERWA on mainstreaming and strategic programming, drawing lessons, providing case study material and providing training capacity of government staff (that could be measured through and capacity building needs assessment and evaluation analysis). This will leave a legacy of the project in MINAGRI and across GoR. This aligns with sub programme 4.1.1 of the ASIP: Capacity building action plan. It will have expected impacts on knowledge and technological transfer. This component will be supported by the new MINAGRI Technical Assistance Facility, which has the objective to build sustainable capacity and knowledge transfer.

This component will also contribute to enhancing the climate change knowledge of the private sector on climate change adaptation and mitigation. It will do so by disseminating guidelines/sharing lessons with cooperatives, farmers, and NGOs.

A draft Logframe is attached as an Annex. This will be revised at the end of the design phase (see below) and re-submitted to FONERWA for discussion and agreement, before the main implementation phase is launched. It is stressed that the design phase will be an inclusive process, including consultation.

| Q 2.3 | How will the project objectives be achieved (include a detailed Work Plan as an appendix highlighting key deliverables and activities and responsibilities. Clearly describe the approach and methodology to be followed and the sequence of activities planned.)? |

The programme is structured as a design and implement project to allow a more detailed design and feasibility stage, and allows time for the analysis of the options as part of a prioritization and action plan phase. This will also provide FONERWA with an example of this type of design and implement project, which will be more important as the fund scales-up, as it reflects a more standard approach to programming.

To deliver the intended objectives outlined above there are two critical issues. First to ensure a logical and transparent methodology for the work, and second, to have a clear and detailed work plan to deliver this. These are discussed below.

**Methodology**

A key issue with the move towards a more strategic project is the need to have a clear methodology to allow the identification and prioritisation of options, i.e. to have an action plan. This is more challenging than with a single, specific project, because it involves concepts around how to sequence and prioritise climate risks and adaptation (or mitigation) responses.

For this study, we propose to use a framework that has been developed for DFID, which is based on the iterative risk management and low-regret concepts recommended in the IPCC’s 5th Assessment Report. This focuses on delivering Early Value-for-Money (VFM) Adaptation, and thus aligns strongly with the FONERWA VFM focus. This framework was applied to the backward and forward review of FONERWA in late 2014. A key element of the approach is “learning by doing”, i.e. to ensure evaluation and learning is used to improve the outcomes of an intervention. The methodological approach starts with current climate variability, and then considers future climate change over the medium and long-term, taking account of uncertainty. This is also complemented with a focus on low regret options for adaptation and
low-carbon growth. The focus is on policy relevant decisions, i.e. those which are needed and justified (in economic terms) in the next decade for climate resilient and low carbon development noting some of these have a life time that spans many decades. Three types of adaptation decisions are identified for early adaptation, each with different needs in terms of economic analysis and decision-support.

First, immediate actions that address the current adaptation deficit and also build resilience for the future. This involves early capacity-building and the introduction of low- and no-regret actions, as these provide immediate economic benefits. In the PD, this includes actions that will address the problems of weather on existing tea and coffee production, such as shade trees.

Second, the integration of adaptation into immediate decisions or activities with long life-times, such as infrastructure or land-use planning. This requires different tools and methods to the above, because of future climate change uncertainty. It involves a greater focus on risk screening, the risks of lock-in. A good example for tea in the PD is the use of climate information to identify the areas for future tea expansion under climate change.

Finally, there is often an immediate need to start planning for the future impacts of climate change, noting the high uncertainty. This includes a focus on adaptive management, the value of information and options/ learning. In the PD, this is advanced through the early monitoring to address major changes in the future pest and disease for cash crops. Using this method will help to mainstream climate change in MINAGRI’s plans more systematically, but also deliver benefits today. It will also provide a case study to show the importance of mainstreaming projects as part of the strategic development of FONERWA.

**Work Plan: Design and Implementation**

This is a new type of FONERWA project, focusing on mainstreaming at the strategy level (rather than the individual project level). It requires cross-government collaboration and will involve a combination of components. While recognizing the need to provide concrete actions, it is therefore important not to lock the project into an overly rigid set of actions, as this will mean it is less likely the project will have a transformational effect. The project itself also adopts a “learning by doing” approach, i.e. to ensure evaluation and learning is used to improve the outcomes of an intervention. For these reasons, we believe that there is strong case for using a design and implement approach on this project. Such an approach is typically used when developing a more strategic programme (rather than for an individual project) and involves a more in-depth design phase ahead of implementation. It also provides a more flexible approach to emerging problems and opportunities during the early stages of the project for enhancing climate change response from both the public and private sectors. Following from this, the proposed project would comprise of an inception (Design) phase, during which more detailed design work of the components will take place, and the action plan will be developed, followed by an implementation phase.

In terms of specific activities, during the **Design (Inception) phase**, the project would:

- Undertake the risk analysis, to develop a problem-driven approach, focusing on the key agricultural risks, in particular the risks for the tea and coffee sector. This would also identify the priority areas (the high risk areas of the country for possible low-regret implementation)
- Develop an action plan, to identify and prioritise potential adaptation (and mitigation) options.
- Technical review and feasibility study on promising options, or mixes of options, including updates to the cost-benefit analysis.
- Stakeholder analysis with key implementation partners and local groups, to ensure suitable locations are chosen for the interventions, along with environmental and social safeguards are undertaken.
- Development of linkages to other Government Initiatives and Development Partner programmes, to
ensure additionality over and synergies with existing initiatives.

- Set up of monitoring and evaluation components including baseline studies and framework.
- Production and consultation on the climate mainstreaming plan for coffee and tea including a strategy climate action plan.
- Update of the project concept including updated logframe and detailed implementation plan, including delivery milestones.
- Documentation of the activities and steps above, to provide a learning component, for action planning and early mainstreaming.
- Capacity building and workshops with MINAGRI, and FONERWA/other ministries, to feed back the lessons from the design phase, and to hold training and training workshops.

Note that towards the end of this phase, the project documents (work plan and logframe) would be resubmitted to FONERWA to check these with the FMT. Should a major change be involved, this may then require a re-evaluation, or a review and discussion.

During the Implementation phase would develop the priorities identified in the design phase and the action plan and would include:

- The use of GIS information on climate risks into the tea expansion programme with a similar information-based assessment for coffee. This would involve
  - Finalisation of risk mapping and development of a simple climate screening tool;
  - Engagement with relevant interest groups (tea private sector, small-holder communities, the latter involving community participation);
  - Capacity building of private sector/local communities/farmers/ institutions in the risk and options.
- The implementation of the additional climate change related pest and disease monitoring programme. This would include:
  - Risk analysis and mapping (GIS) information;
  - Extension of the existing monitoring of key pests (e.g. coffee berry borer) to additional high risk areas.
  - Use of extension services to start promoting pest management practices to coffee farmers.
- The implantation of the low regret actions for coffee (coffee shade trees) and tea resilience. This would follow the steps in the design phase. Using coffee as an example it would the steps of:
  - Local engagement and community participation (following similar steps in design);
  - Capacity building of local communities/farmers/ institutions in the risk and options.
  - Topographic survey and land use planning.
  - Nursery development and management
  - Land preparation,(levelling and lining)
  - Transport and planting of the seedlings/ planting
  - Management (weeding, pruning etc.)
  - Design and implement monitoring and evaluation
- The development of a sustainable wood fuel plantation for one of the major tea factories. This would include the steps of
  - Local engagement and community participation (following similar steps in design);
  - Capacity building of local communities/farmers/ institutions in the risk and options.
  - Topographic survey and land use planning.
  - Nursery development and management
  - Land preparation,(levelling and lining)
  - Transport and planting of the seedlings/ plantings
Management (weeding, pruning etc.)
- Design and implement monitoring and evaluation
- An ongoing capacity building programme.

We believe this design and implement based approach will deliver higher effectiveness (and enhanced outcomes), rather than defining all specific aspects of the programme at the start. The design phase will allow MINAGRI – and others - to learn from experience elsewhere, and to bring together individuals from different organisations across Government with a common interest in building transformative change. The flexibility of the programme will help to mitigate risks, by allowing the Government to be highly responsive to opportunities, and to benefit from what works.

Q 2.4 How does the project address cross-cutting issues such as gender and youth?

The project is targeting smallholder farmers, with actions that increase production, and thus reduce poverty levels. It is also introducing measures (e.g. shade trees) that have potential livelihood or food benefits, which will be of large benefit to poorer families. A particular focus of the programme, especially for coffee, is the implementation of low regret measures with Sustainable Harvest, who target the improved livelihoods of low-income women farmers through training that creates the basis for more transparent trade, improved quality, and higher prices. The project will work with the existing networks of women farmers, who have been able to grow more from their small plots of land, and further help improve the productivity, environmental sustainability and resilience of their communities.

In the design phase particular attention will be given to the participation in the project of women and youth. Some actions will be taken as follows:
- With support of the NGOs, the stakeholder engagement process with local farmers will be designed to be as inclusive as possible, to ensure that women and youngsters are active participants throughout project implementation. For example, focus group discussions could be organised by gender, age etc. and facilitators could be used to engage with the most marginalised people who tend to be passive listeners. Different language registers can be used to reach out to different groups.
- Data collected in the baseline studies as part of the M&E design phase will be disaggregated by gender and age;
- Impacts on women and youth will be monitored through the M&E framework;

The project addresses other cross-cutting themes in EDPRSII, as explained below:

Capacity building. This is a theme throughout the project, from Government level (and the explicit capacity building component) through to individual capacity development with small-holder farmers through the various programme activities and supporting actions (see previous section).

Regional integration: The project has an explicit component that is looking at the comparative effects on Rwanda versus other regions, and the issue in relation to increased access to trade and finance.

Q 2.5 Who are the stakeholders affected by the problem, and who are the stakeholders influential in solving the problem? How have they been incorporated and involved in project design and delivery?

The project involves multiple stakeholders. For the first element, in relation to environment and climate mainstreaming, the key stakeholders are MINAGRI itself, as well as NAEB and RAB, and the relevant landscape of agricultural development (across Government, from the finance provided by the development partners and international finance institutions). It also includes REMA (due to the mandate for mainstreaming) and FONERWA in relation to the strategic pilot and action planning, as well as civil
society in relation to environment and climate issues.

For the tea and coffee resilience element, there are a very wide range of stakeholders across supply (value) chains, which involve national government to individual farmers, and the public and private sectors, with the latter including major multi-nationals and larger investors (e.g. in tea factories and plantations) as well as small-holder producers or co-operatives. There are also important stakeholders in relation to development partners, civil society, charitable trusts and foundations and non-government organisations.

This PD has been put together following consultation with these various stakeholders. Discussion and agreement on the proposal has been undertaken with NAEB and RAB, and with NGO partner organisations, including Wood Foundation and Sustainable Harvest. This consultation has led to the explicit roles and responsibilities assigned across the partnership, which represent their responsibility and influence in solving the problems identified. The project also has a strong component to continue this engagement during the project duration, expanding this as well to include greater focus on small-holders and cooperatives.

The government and its agencies can advance low carbon and climate resilience through the appropriate regulatory framework and by designing expansion plans that are climate smart (i.e. through mainstreaming). They also have an important role in collecting and disseminating information that enable the private sector to adapt (i.e. increasing awareness on climate change impacts).

The private sector also has an important role: the livelihood of many farmers relies heavily on the income streams generated by tea/coffee production (often the only income activity for them), and their choices and harvesting techniques (e.g. mulching, pruning) affect productivity. Farmers tend to respond to perceived (current) climate variability only, and often have limited ability to respond to changes (e.g. due to lack of knowledge, or capital). As a result, their actions could result in mal-adaptation (i.e. objectives are not met, or the costs of the measures taken outweigh the benefits). For this reason, the project engages partner organisations (WF and SH) which have already established networks, and who have built the necessary extension services and outreach programmes. They will help in the identification of suitable areas/districts where the pilots will be implemented, liaising directly through a consultation with the co-operatives and farmers; and helping to set up the monitoring and evaluation plan.

Q 2.6 How will the benefits of the project be sustained after FONERWA funding comes to an end?

The different components of the project are all deemed to be sustainable after the project ends. First of all, the project intends to pilot low regret measures, or measures that at a relatively low cost yet able to generate income streams for farmers, tea and coffee companies, and the GoR in the face of climate change. The project will gather evidence that such measures increase the resilience of the sector rather than lock in vulnerability. Preliminary economic analysis undertaken by the PD team, showed that such measures would increase revenues for farmers and factories compared to a scenario where no action is taken ahead of climate change to mitigate impacts (i.e. no adaptation). By testing and proving (empirically) the effectiveness of adaptation measures, the programme will create an incentive for the relevant stakeholders to undertake them autonomously, and scale them up. If barriers to the uptake of measures become evident during project implementation, they will be addressed as far a possible - as part of the programme and within the existing budget.

There is also a large component associated with capacity building, which seeks to use the project to leverage large-scale climate and environment mainstreaming across MINAGRI (and agencies) and also across to other sectors of Government (and for the strategic component, to FONERWA itself). This is
reinforced through the Special Project Implementation Unit (SPIU) of the Strategic Planning & Programme Coordination Directorate and the Technical Assistance Facility. The mainstreaming pilot will be used by MINAGRI to update the mainstreaming into the overall Agriculture Sector Investment Plan budget and this will sustain the project lessons (and benefits) accordingly. The wider application in MINAGRI and in other sector will also provide key opportunities for leveraging on major sector development budgets.

**Q 2.7 What is the scope for income generation from the project?**

Current climatic variability is already affecting the quality and quantity of the tea/coffee produced, hence also revenue streams. This is particularly important for the higher quality specialized markets which provide higher prices. The project will help to provide low-regret options for tea and coffee which help income generation.

For coffee, the existing focus of Sustainable Harvest is on providing enhanced income for small-holders and women, from access to international buyers, reducing their exposure to financial commodity market risk, and increasing women’s livelihoods, e.g. by funding washing stations (providing higher incomes from a farm gate price). The low regret options (e.g. agroforestry shade trees) will reduce the productivity losses from current variability, and provide additional sources of income, and the introduction of pest and disease monitoring and response will address the potential for major losses. For tea, the Wood Foundation, is already working to increase income generation for small-holder farmers (currently, Rwandan smallholder tea farmers get a much lower % of the tea price than Kenya for example), and is working on providing access to finance and enhanced payments. Again, the focus on low-regret options will enhance productivity and thereby increase income.

The potential expansion of tea areas to new small-holders at higher elevation, e.g. on the slopes, will provide source of income, as well as leading to local ancillary benefits (e.g. reduced soil erosion, increasing productivity of other crops on the land). In both cases, future climate change has the potential to reduce yields and incomes, resulting in revenue losses for tea factories (due to lower auction price obtained for low quality vs. high quality tea, and/or lower quantities produced and sold), and farmers (due to decreasing green leaf payments). By mainstreaming climate change into tea/coffee expansion plans, these losses will be prevented – i.e. the project will deliver income savings at large scale – and economic gains can be generated, as well as the localised benefits above. For example, changes in green leaf revenues will have a direct impact on the livelihood of farmers who rely on agriculture as the main source of income. During drought years, net revenues to smallholder farmers (0.25ha) could reduce to RWF 39,285 or approximately 55 USD per annum, compared to RWF 177,000 in a scenario where climate change does not materialise.

Change in revenues for individual farmers would have a domino effect on the local economy through a multiplier effect. For example, in a scenario where climate change materialises and the quality of green leaves at 1700m will be lower, a typical farmer owning a small plot of 0.25 ha would get annual net cash flows of about RWF 55,000 compared to RWF 177,000 per year in the no-climate change scenario. This means that if climate change is not accounted for in farmers’ planning, it could lead to a reduction of their annual cash flows by more than half, with possible impacts on their household livelihood (e.g. access to education and health services) and poverty. Assuming a (conservative) economic multiplier effect of 1.7, in the long term this would mean a foregone positive effect on the local economy worth about RWF 207,000 per year per farmer.

Coffee and banana intercropping could benefit smallholder farmers by diversifying income sources, and providing some buffer against climate shocks. The undergoing trials in Rubona and Rutsiro will be used
and lessons will be drawn to inform the design of pilots under this programme.

The analysis of income generation and benefits from the low-regret studies is outlined in the cost-benefit annex. Finally, the low-regret projects and the sustainable fuel wood pilot will result in job creation for local communities.

Q 2.8 **Preparation:** Has a feasibility or pre-feasibility study been conducted *(If yes, then please attach a copy to this PD)*?

The PD has undertaken a detailed analysis and literature review to develop the PD outline, consistent with the development of a more strategic proposal. This has included detailed economic analysis. The study will also be subject to a detailed feasibility study during the design phase.

Q 2.9 **Preparation:** Are there any outstanding regulatory or legal requirements that need to be met before the project can proceed *(access to land, planning consent, use of new technologies)*?

It is not anticipated that there are any outstanding regulatory or legal requirements. This will be checked again during the design phase as the final action plan recommendations are considered.

Q 2.10 **Preparation:** Has an Environmental Impact Assessment been conducted for the project *(If yes, then please attach a copy to this PD)*?

The need for an EIA will be discussed and agreed during the design phase, once the final components are designed, if needed, an EIA will be undertaken during the design phase period.

Q 2.11 **How** will the performance of the project be monitored and evaluated *(both during and after the project)*?

A dedicated M&E plan will assess the performance of the project. The M&E plan will be delivered as a specific component of the design phase. As a minimum, the M&E plan will collect the information for the logframe. This will start with a baseline (e.g. number of people trained, separated by gender). It will include the contribution of activities to logframe outputs and VfM indicators. All indicators will be agreed with FONERWA. For the capacity building components, the planned support from the PoSA TAF would undertake a baseline capacity assessment and needs survey and would then repeat this annually to monitor capacity building and learning levels.

For the low-regret interventions, there is an additional option to undertake detailed M&E analysis, e.g. to examine the effectiveness and efficiency of the interventions ex ante and ex post, such as the change in productivity in the area. This requires the introduction of a counter-factual and control area. As the project is building on existing pilots (undertaken by RAB) the need for a detailed evaluation is not necessarily a priority. However, the potential for such a framework will be considered during the design phase in consultation with stakeholders. It would be possible to introduce a more advanced M&E plan that involves performance indicators, field work and analysis of a baseline (control group) and counter-factual, including questionnaires, to provide baseline, control and impacts ex post. However, the introduction of this more advanced component with have time and resource implications, likely slowing down the project and would involve (relatively) high costs due to the detailed design and field work required.

 Provisionally, the M&E will be prepared during the design phase; and be undertaken specifically for output 3 (tea and coffee pilots) and output 4 (sustainable fuel wood) for a total of RWF 581,268,254.
<table>
<thead>
<tr>
<th>M&amp;E Activity</th>
<th>Responsible person</th>
<th>Timeframe</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;E plan</td>
<td>MINAGRI SPIU and PWA</td>
<td>Quarter 1 and 2</td>
<td>Included in co-financing</td>
</tr>
<tr>
<td>Baseline</td>
<td>MINAGRI SPIU and PWA</td>
<td>Quarter 2</td>
<td>Included in co-financing</td>
</tr>
<tr>
<td>Logframe reporting</td>
<td>MINAGRI SPIU</td>
<td>Quarterly</td>
<td>Included in co-financing</td>
</tr>
<tr>
<td>Needs assessment and baseline capacity survey</td>
<td>MINAGRI SPIU and TAF</td>
<td>Quarter 2</td>
<td>Included in co-financing</td>
</tr>
<tr>
<td>Review</td>
<td>TAF, DFID PoSA annual</td>
<td>Annual</td>
<td>Included in co-financing</td>
</tr>
<tr>
<td>Optional detailed M&amp;E</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline survey</td>
<td>NAEB / RAB / WF/ SH</td>
<td>Quarter 3</td>
<td>To be determined if requested</td>
</tr>
<tr>
<td>Inception workshop</td>
<td>NAEB / RAB /WF/ SH</td>
<td>Quarter 3</td>
<td></td>
</tr>
<tr>
<td>Annual review</td>
<td>MINAGRI SPIU</td>
<td>Annually</td>
<td></td>
</tr>
<tr>
<td>Final evaluation</td>
<td>External Consultant</td>
<td>Final Quarter</td>
<td></td>
</tr>
</tbody>
</table>

### Q 2.12 How will you involve the beneficiaries and other stakeholders in monitoring and evaluation?

The main stakeholders involved in monitoring and evaluation will be the direct beneficiaries. As highlighted above, the capacity and planning components will be evaluated through the existing beneficiaries (MINAGRI, NAEB and RAB) and through the annual review process introduced by the PoSA TAF. NAEB and RAB will support MINAGRI in delivering and the output objectives stated in the logframe. For the implementation components, the farmers and the NGOs involved provide M&E support by helping in the selection of pilots, engaging with farmers and facilitating the collection of data for the logframe reporting. However, there will be oversight by NAEB and RAB, to design a baseline for the M&E (with counterfactual), and facilitate the consultation with local farmers.

### Q 2.13 Which Output from the FONERWA's overarching M&E framework will be contributed to the project's M&E Framework (if possible choose an indicator from FONERWA's M&E framework)?

The project will contribute to three output indicators in the FONERWA logframe.

**Output indicator 3**: Environment and climate change issues mainstreamed into policies, programmes, plans and activities for public and non-public agencies. In particular: total number of programmes of action in the Green Growth Strategy supported by approved PDs fund; and number of people involved in climate resilient income generation activities.

**Output indicator 1**: Management of Natural Resources strengthened and sustained as a result of fund support. In particular, Area (ha) of land secured against erosion, Area (ha) forest and agro-forest covered (disaggregated by afforestation/restored forest/agroforestry).

**Output indicator 2**: Renewable energy and other environmentally sustainable, low carbon and climate resilient technologies adopted, developed and/or improved for use in Rwanda as a result of the Fund; Tonnes of CO2 equivalent avoided. For this indicator, there are direct outputs for i) Research and feasibility studies for adoption of clean and climate resilient technologies ii) Tonnes of CO2 equivalent avoided and iii) Number of people supported to cope with effects of climate change.

### Q 2.14 Duplication of project with other funding sources - all relevant potentially overlapping projects need to be identified and the areas of overlap and complementarity identified, drawing lessons and establishing a framework for coordination during implementation. Please provide a summary of recently concluded, ongoing, and pipeline projects that are relevant to the proposed project in the table below.
<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Timing and geographical coverage</th>
<th>Potential duplication and synergies</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECONADAPT</td>
<td>EC Research project, providing case study on appraisal of climate resilience in LDCs</td>
<td>Ongoing. Rwanda</td>
<td>Synergies. The EC research project will provide funding for Paul Watkiss Associates to undertake the mainstreaming and action planning in component 1 (avoiding the need for FONERWA funding for this component).</td>
</tr>
<tr>
<td>POSA TAF</td>
<td>DFID Rwanda’s Programme of Support to Agriculture (PoSA) and the new Technical Assistance Facility (TAF),</td>
<td>To commence Autumn 2015. Rwanda.</td>
<td>Synergies. Ongoing technical assistance and capacity assistance to the SPIU of MINAGRI Strategic Planning &amp; Programme Coordination Directorate in the area of climate and environment (as well as gender and nutrition).</td>
</tr>
<tr>
<td>Coffee Shade Trees</td>
<td>RAB research project piloting shade trees in research plots</td>
<td>Completed soon. Multiple pilots.</td>
<td>Synergies. Will provide information on pilot studies to allow scale-up of low regret coffee options</td>
</tr>
<tr>
<td>Pest and disease monitoring</td>
<td>RAB project monitoring pests and diseases in Western province.</td>
<td>Ongoing.</td>
<td>Synergies. The project will add a climate risk component to start mapping risk areas, and extend the monitoring to other high risk areas.</td>
</tr>
<tr>
<td>Wood Foundation</td>
<td>Imbarutso - Win-Win for Rwandan Tea.</td>
<td>Ongoing. Mulindi and Shagasha</td>
<td>Synergies. Involves 12,000 tea smallholder farmers in shareholder and development partnership</td>
</tr>
<tr>
<td>Sustainable Harvest</td>
<td>Rwanda project. Coffee</td>
<td>Ongoing. Coffee areas in south and east</td>
<td>Synergies. Involves coffee farmers primarily women in development partnership</td>
</tr>
<tr>
<td><strong>Q 2.15 Lesson Learning</strong>:</td>
<td>Please explain how the learning from this project will be disseminated and shared during (and at the end) of the project, and to whom this information will target (e.g. Project stakeholders and others outside the project)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The project has an explicit learning element, as part of a capacity building and training component. This will ensure a learning and dissemination component to learn lessons, document and feed-back the lessons on mainstreaming and strategic programming within MINAGRI. There will also be training and dissemination on mainstreaming and action planning to other ministries, and to FONERWA. The expected impact of capacity will be delivered through the training, mentoring and workshops, leading to the enhanced capacity of staff. This component will be supported by the new MINAGRI Technical Assistance Facility, which has the objective to build sustainable capacity and knowledge transfer. A further component will be to provide training and dissemination on the low-regret options, working through the partner organisations to enhance the roll-out. The project also includes specific elements – notably around climate risks to agriculture, and coffee and tea risks – that will be communicated and disseminated to the relevant government and private sector organisations in the sector. This information, and early work on the pest and diseases, will also be disseminated and shared through the NGO partnership networks and through Government Farmer Field Schools. More specifically, the
information on low regret options (e.g. for coffee and tea, as well as tea wood fuel plantations) will be developed into further training and outreach material, across the partner organisations (through extension, farmer to farmer) and nationally (through the RAB Farmer Field Schools). This will help ensure dissemination and roll-out at the national scale. To encourage this, the low regret components will help gather information on adaptation costs and benefits, as well as the existing barriers to the take up of measures by the private sector (at the micro level).

Q 2.16 **Risk Management:** Please outline the main risks to the successful delivery of this project indicating whether they are high, medium or low. If the risks are outside your direct control, how will the project be designed to address them?

<table>
<thead>
<tr>
<th>Risk description</th>
<th>Category (political, operational, financial, environ.al)</th>
<th>Risk level (L/M/H)</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government staff dedicate insufficient time to the project/ have low capacity (people and time)/ high turnover</td>
<td>Operational</td>
<td>Low</td>
<td>The workplan has been agreed amongst the partner institutions and agencies and there is a clear split of roles and responsibilities, and accountability. The project lead (MINAGRI) is being supported by a technical assistance facility (TAF) as part of DFID Rwanda’s Programme of Support to Agriculture (PoSA), which will provide dedicated support and technical capacity on cross cutting issues of climate and environment, which will ensure time and capacity for the project; and will help manage human resources so as to reduce the risk of high turnover and keep capacity losses to a minimum.</td>
</tr>
<tr>
<td>Weak coordination between NAEB, RAB and MINAGRI</td>
<td>Operational</td>
<td>Low</td>
<td>The existing mandates and responsibilities are clear and early consultation has been conducted, and there is a strong commitment to working together on this project. Regular project meetings will be held, and updates of the project will be included at the relevant Agriculture sector working group, ensuring coordination and updates on the project.</td>
</tr>
<tr>
<td>Delays in identifying and setting up baseline for low regret schemes</td>
<td>Operational (High transaction costs)</td>
<td>Low</td>
<td>Early consultation has carried out, and NGOs partners have been identified and agreed to the projects. The design (inception phase) will provide the necessary time to conclude the schemes and to consult with stakeholders.</td>
</tr>
<tr>
<td>36 months is not enough time to prove benefits from adaptation.</td>
<td>Environmental / Operational</td>
<td>Medium / Low</td>
<td>The focus of the projects is on low-regret options, and these provide immediate benefits in relation to productivity. This will allow several years of data from the initial implementation, although the values may be affected by normal climate variability (e.g. if there is a particularly bad year). This would allow to identify emerging problems and opportunities for enhancing climate change response from both the public and private sectors.</td>
</tr>
</tbody>
</table>

Q 2.17 **Risk Management:** What specific risks, if any, does your project pose to the environment, people or institutions affected by the project and how will these be managed and mitigated?

<table>
<thead>
<tr>
<th>Risk</th>
<th>Risk level (L/M/H)</th>
<th>Mitigation</th>
</tr>
</thead>
</table>

Projects lead to environmental degradation or impact

Low

The project components are either process / office based, which involves very low risks, or are actually environmentally targeted climate smart agriculture options, which have benefits for productivity, resilience, mitigation and ancillary environmental benefits. The EIA will be undertaken during the design phase to assess the adaptation pilots recommended by the stakeholders during the consultation, and will quantify more precisely the environmental benefits generated by the project. The final selection of pilots will indeed be informed by the EIA.

People. Participants in low-regret studies have lower yields than usual and blame the project for that

Low

Different factors can affect tea and coffee production. Climatic factors are important, but proper management is also crucial. The project will provide farmers not only with clear guidance on adaptation activities but also on good agricultural management practices; and NGOs will help to closely monitor their compliance with the guidance. Regular monitoring activities will enable the project to implement corrective measures if necessary.

Institutional risk to MINAGRI and other organisations

Low

The project is supported by capacity building and technical assistance, from the technical assistance facility (TAF) (PoSA), which will provide dedicated support and technical capacity.

People. Selection of counterfactual group vs participants in the pilot might create winners and losers

medium

The selection of participants and counterfactual group in the pilots could encounter the opposition of local farmers. A system of incentives could be built into the M&E for the counterfactual group who will not participate in the pilot (e.g. reimbursement of expenditures incurred for monitoring and reporting).

SECTION 3: PROJECT BUDGET AND VALUE FOR MONEY

Q 3.1 What is the total cost of the project (RWF; provide total cost for each year of the project disaggregated by capital and recurrent expenditure)?

The total cost of the project is 2,490,000,000 RWF. The split is shown below, based on the indicative costing. The exact split may be revised during the design phase, but the budget total will not increase.

<table>
<thead>
<tr>
<th>Output 1: Mainstreaming</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Total Rwf</th>
<th>% of total budget</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80,000,000</td>
<td>0</td>
<td>0</td>
<td>80,000,000</td>
<td>3%</td>
</tr>
<tr>
<td>Output 2: Information and knowledge</td>
<td>262,500,000</td>
<td>165,000,000</td>
<td>82,500,000</td>
<td>510,000,000</td>
<td>20%</td>
</tr>
<tr>
<td>Output 3: low regret tea and coffee pilots</td>
<td>807,856,085</td>
<td>335,767,196</td>
<td>335,767,196</td>
<td>1,479,390,476</td>
<td>59%</td>
</tr>
<tr>
<td>Output 4: Sustainable wood fuel</td>
<td>42,100,000</td>
<td>138,700,000</td>
<td>40,600,000</td>
<td>221,400,000</td>
<td>9%</td>
</tr>
<tr>
<td>Output 5: Capacity building</td>
<td>200,000,000</td>
<td>0</td>
<td>0</td>
<td>200,000,000</td>
<td>8%</td>
</tr>
<tr>
<td>Grand total</td>
<td>1,392,456,085</td>
<td>639,467,196</td>
<td>458,867,196</td>
<td>2,490,790,476</td>
<td></td>
</tr>
</tbody>
</table>
The indicative split of capital and recurrent expenditure is 30:70. A more detailed budget allocation between recurrent and capital will be developed in the early phase of the design.

A detailed budget breakdown is given in Annex 1 in the work plan.

**Q 3.2 What is the total amount requested from FONERWA (RWF; provide financing needs for each year of the project)?**

RWF 2,000,000,000

The split by year is shown below. The design phase is separated out. The exact split may be revised during the design phase, but the budget total will not increase.

<table>
<thead>
<tr>
<th></th>
<th>Design (in year 1)</th>
<th>Year 1 (excl. design)</th>
<th>Year 2</th>
<th>Year 3</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1,258,730,000</td>
<td>370,630,000</td>
<td>370,640,000</td>
<td>2,000,000,000</td>
</tr>
</tbody>
</table>

**Q 3.3 List all other sources of funding. Note whether the status of other funding sources (i.e. Whether the money has been approved or is awaiting authorisation)**

There are a number of sources of relevant funding that will be provided to specific components of the project. It is estimated that these sources of funding would contribute to around 20% of the project value. The details are provided below.

<table>
<thead>
<tr>
<th>Project components</th>
<th>Additional sources of funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design phase (action planning)</td>
<td>The technical assistance to undertake the design phase and action planning will be provided by Paul Watkiss Associates, under a research grant from the European Commission under the ECONADAPT Project. No FONERWA funding will be involved in this component, and from the technical assistance component, supported by DFID Rwanda’s Programme of Support to Agriculture (PoSA).</td>
</tr>
<tr>
<td>Tea and coffee resilience plan</td>
<td>The development of the tea and coffee resilience will be supported by the technical assistance component, supported by DFID Rwanda’s Programme of Support to Agriculture (PoSA) and Technical Assistance Facility (TAF).</td>
</tr>
<tr>
<td>Management activities associated with tea expansion programming, existing pest and disease monitoring</td>
<td>Provided by relevant staff in MINAGRI, NAEB and RAB.</td>
</tr>
<tr>
<td>Low regret coffee and tea measures</td>
<td>Wood foundation, Sustainable Harvest, in terms of time and management, and from their extension services. Farmer contribution with their labour, land, time, skills and participation in the pilots and M&amp;E programme. Cooperatives can provide training spaces, and organisational support. Once the benefits of adaptation</td>
</tr>
</tbody>
</table>
measures are proven, farmers and cooperatives will undertake them autonomously. Undertaken at a large scale, these measures will benefit the Rwandan economy as a whole.

**Capacity building**

The capacity building aspects will be supported by the technical assistance component, supported by DFID Rwanda’s Programme of Support to Agriculture (PoSA) and Technical Assistance Facility (TAF).

DFID Rwanda’s Programme of Support to Agriculture (PoSA) and Technical Assistance Facility (TAF) will provide core team members and short-term technical support. The exact amount of co-financing is difficult to estimate, but the total TAF value is £4 million, and includes four components, one of which is climate and environment. While this component will include a number of aspects, mainstreaming will be an important component. A lower estimate of RWF 150,000,000 is therefore assigned. In addition, there is a technical capacity component financed from Paul Watkiss Associates, which will provide initial technical assistance during the mainstreaming and action planning phase. An estimate of RWF 25,000,000 is assigned for this. Note that NGOs and farmers fall under the definition of private sector. These measures are to facilitate autonomous adaptation – i.e. to remove the initial barriers to climate-smart agriculture. Once these are removed, farmers and cooperatives are expected to undertake them autonomously. This ultimately will benefit the sector as a whole.

**Q 3.4 Additionality:** Explain why the project cannot be fully financed by other sources than FONERWA?

The mainstreaming components in MINAGRI (action planning) are additional to the core agriculture development planning, but are being supported with technical assistance through the DFID Rwanda’s Programme of Support to Agriculture (PoSA).

The tea and coffee resilience plan, and the implementation of the low-regret options in this sector, are additional to the current agricultural sector development and investment plan and there is no existing budget allocation for mainstreaming these additional actions. The request for finance therefore aligns with the additional (marginal) activities for climate mainstreaming for FONERWA.

The additional finance includes activities led by the Government that will create and dissemination information and deliver the enabling environment for the private sector to act. In this regard, climate risk information has public good characteristics, and it is appropriate for the Government to provide this as there is a market failure to the under-investment in public goods by private producers, which lead to allocatively inefficient decisions by those affected (e.g. tea plantations, farmers).

There is also a national incentive to act, from the broader development and economic growth potential offered by advancing a resilient tea and coffee sector and increase sustainable exports, gaining a comparative advantage for Rwanda. This also offers benefits to support smallholder farmers’ livelihood and reduce poverty, provide good returns and investment opportunities for private investors, and assist the country in meeting its balance of payments targets. This project is therefore pivotal to ensuring that two of the most important export revenues for the country’s economy are climate resilient and will continue to generate significant revenues for farmers and the economy as a whole under future climate change.

Furthermore, the additional finance does include low-regret activities that are targeted at the most vulnerable, notably small-holder farmers in the tea and coffee sector, recognizing this is a highly climate sensitive sector. These groups are already being affected by changing climate variability and will be
affected by future climate change (even though they have low per capita emissions and have not contributed to the problem of climate change). There is therefore an equitable and distributional reason why climate finance should be directed to assist them. Importantly, the activities proposed in the PD are directly targeting climate variability and future climate change, and thus are directly targeting the externality that is being imposed on these groups. These groups also face many barriers to respond to these climate changes themselves (autonomously) and factors, such as access to finance, prevent the economically efficient level of uptake of low regret practices, thus there is a role for government, including addressing the information failures and barriers to uptake.

It is also highlighted that the strategic nature of the project, and the shift to mainstreaming in sector development plans, is a first: it requires cross-government collaboration and multi-level governance, and will involve a combination of components. Critically, it moves beyond a standard development project: it will deliver a transformative approach to address short-term climate variability and start to build for long-term climate change.

FONERWA is therefore the best source of finance and support for this project for the following reasons:

- The funds for additional climate and environmental mainstreaming activities are not available in full within the MINAGRI budget, and FONERWA has an objective to provide the marginal funds for additional such activities.
- There is a major opportunity to incorporate mainstreaming at a pivotal point in a sector development plan, in this case, at the point where a major expansion in policy (tea expansion) is occurring. This provides a window of opportunity. Once the planning has finished, and the land-use plans have been implemented, there will be little chance to reverse decisions.

We also believe that this project is important for FONERWA, and can help the Fund deliver against its mandate and strategic objectives:

- FONERWA’s strategy is to provide technical and financial support to the best public and private projects that align with Rwanda’s commitment to a green economy.
- In the last Annual Review of the Fund (commissioned by DFID), one of the recommendations was for the Fund to help pilot promising areas scale-up (including more innovative projects), to support the integration of climate into sector development and investment planning, and to help fund or leverage projects at scale and deliver greater (transformational) impact.
- Finally, according to the annual review, FONERWA is currently underperforming against output indicator 3.2 Number of approved PDs for incorporating additional climate and environment interventions into SSPs, DDPs and other plans, and this project would help the Fund improve its performance.

Q 3.5 What non-financial support is needed to implement the project? What is the best way for FONERWA to deliver this support?

Technical advice on M&E framework design and implementation..

Q 3.6 Value for Money (Economy):

i) Briefly describe how the required inputs have been identified and how the GoR procurement procedures will be used to ensure they are obtained cost effectively

ii) Provide identified unit cost measures or selected project outputs? (Please see VfM guidelines on how to determine these. Further guidance from the FONERWA Secretariat is available)

The project will deliver VFM economy through ensuring lowest cost for the procurement of goods and services within project design, and focusing on making sure that the unit costs are benchmarked against market norms. For example, we will ensure that the costs of an intervention (seedlings for shade trees)
are in line with market expectations (following government procurement rules and ensuring competitive rates).

The programme management costs will be reduced through the use of ancillary projects and funding (reducing FONERWA contribution and increasing programme and management cost efficiency). Indeed, the programme management costs borne by FONERWA are likely to be very low.

While the project has a component related to information, there is no anticipated purchase of new computers or software, as there are already existing information systems in place (and GIS) thus avoiding the need for new equipment or software. There may be some procurement of detailed spatial data, but this will be based on government procurement rules and ensure competitive rates.

The costs of the low-regret implementation measures will be reduced by focusing on a low cost community-led service provision, which is much more economic than a higher cost external commercial service contract. This will be achieved through the use of existing NGO partners, their existing networks and extension services, and participating farmers. The use of existing land from the participation of farmers will provide land and labour. Moreover, the existing coffee spacing and inefficient use of land means that there is no opportunity costs. Where costs are involved, we will benchmark community level adaptation labour and material costs for specific climate smart activities.

The CBA provides some preliminary measures of adaptation options
- Soil and water conservation measures: RWF 89821 (123 USD) /ha/year
- Intercropping coffee and bananas: Establishment costs of additional RWF 553,252/ha (USD 758) compared to monocropping, and O&M increasing by RWF 140,939 (USD 193) for intercropping relative to monocrop.
- Integrated pest management: decrease use of pesticides and increase monitoring (labour costs increases by 10%).

In terms of unit costs

For component 3 (resilient tea and coffee
- The cost per hectare of resilient tea/coffee is estimated at RWF 493130 /ha.

For component 4 (sustainable wood)
- The cost per hectare of forest is estimated at RWF 738000/ha.
- The cost per tonne of CO2 abated is estimated at RWF6709/tCO2.

These will be refined during consultation with the relevant stakeholders during the design phase. Further work on VFM will be undertaken during the design (inception phase), and this will include a specific assessment to deliver high VFM.

Q 3.7 Value for Money (Efficiency):
- Briefly explain how the provision and operation of project inputs produce the expected outputs
- What is the Net Present Value (NPV) and benefit cost ratio for this project (Please see VfM guidelines on how to determine these measures. Further guidance from the FONERWA Secretariat is available)?

The project will deliver VFM efficiency by ensuring the interventions have a high benefit to cost ratio (positive NPV). It will also ensure that the choice of goods and services results in the envisaged outputs and that the input to output ratios are a key consideration.
For the information components of the project, we will deliver efficiency by ensuring the necessary training, analysis capability and communication/dissemination is undertaken, both within the Government and to ensure that benefits reach potential users, i.e. to ensure that investment in results in the envisaged outputs. This will be delivered by the capacity building component on the project.

For the low regret options, we have identified the key cost drivers. These relate to the costs of land, development of nurseries and seedlings, planting costs, and maintenance costs. To address these we are focusing the low regret options on community based schemes, thus land costs are borne by the farmers. We are considering payment structures that reflect implementation progress e.g. payment by ha upgraded under sustainable management (tea plantations) or payment by ha of shade trees. We have also considered how the operational effectiveness will be secured ex-post to ensure adequate maintenance through the community level management structure that is proposed (and the NGO partners, who are in long-term benefit or shareholder sharing schemes). There is therefore a high level of community contribution (both financial and in-kind labour and materials) in this model. To ensure the delivered efficiency, there is also a training, capacity building and communication/dissemination component for farmers. It is also highlighted that there is finance and in kind support from MINAGRI, NAEB and RAB, as well as Wood Foundation and Sustainable Harvest, to deliver project outputs.

As part of the analysis, a detailed CBA literature review has been undertaken on the proposed components. This finds:

- Climate risk information, and the use in downstream applications (such as agriculture) have high benefit to cost ratios. A review of the literature is provided by Clements (2013) with over 40 studies identified, indicating benefit-cost ratios of between 2 and 36.
- Climate smart agriculture, as being advanced in the low-regret component, has also been studied extensively (for a review see OECD, 2015). These interventions have a benefit-cost ratios of >1.
- Coffee shade trees (inter-cropping) have been found to have high marginal rates of return (van Aasten et al, 2011).

This CBA information has been used to maximize the efficiency of the interventions selected (at the scoping stage). A detailed CBA has been undertaken on the main low-regret options, which is presented in Annex 3. This has assessed the main project components. The analysis estimated the costs and benefits of tea and coffee production under different climate scenarios. Using data from NAEB and provided by the international literature, it modelled cash flows (costs and benefits) generated over the life of a tea/coffee plantation, and discounted them (using a 13% discount rate, with a sensitivity of 10% and 3.5%)) to derive net present values and internal rate of returns for comparison.

The first CBA looks at the potential impacts of climate change on tea, and the potential benefits of shifting production zones for new tea plantations. The baseline analysis shows that as climate change impacts worsen, and tea quality reduces, the internal rate of return decreases. The analysis shows that this could lead to a reduction of farmers annual cash flows by more than half. The CBA then assesses the benefits of siting new plantations at higher elevation, and finds these increase the IRR back up, and allow farmers to get higher quality green leaves with positive impact on revenues from green leaf payments.

The second CBA at a low regret option for current tea production, enhancing soil and water conservation. A cost benefit analysis on these shows that such measures generate high net present values (and high IRRs). Again, this would generate net cash flows per year for farmers.

The analysis then considers coffee. A similar economic model for coffee has been produced and this has
been used to look at shade trees as a form of resilience. The results show much higher NPVs are produced from the implementation of these (using a case study on coffee-banana intercropping) and new revenues are generated leading to higher NPVs than in the baseline, or in the case of climate change. Under the assumptions used in the model, the introduction of intercropping would lead to the higher benefits. The model foresees an increase in O&M – intercropping is more labour intensive than mono-cropping - which is more than compensated by an increase in quality of coffee (due to more nutrients in the soil and shade provided by the banana trees) and revenues from banana sales.

An analysis has also been undertaken on the potential benefits of an enhanced pest and disease monitoring programme for coffee under climate change. The introduction of IPM practices is expected to reduce the use of pesticides and increase productivity and quality, leading to higher NPVs than the baseline.

The final analysis is of sustainably managed tea plantation. These have been assessed for two scenarios. One reflects the switch to sustainably managed forests for an existing site, which increases production and has ancillary benefits. The second involves the development of a new site. This has relevance for the new plantations being developed as part of the tea expansion plans, but also reflects a potential alternative site for an existing forest. The CBA considers the costs against a number of market and non-market benefits, the latter including the carbon price associated with carbon sequestration, reduced soil erosion, etc. The values are expressed as an Net Present Value. The results show that the scheme has a positive NPV over a range of discount rates (13%, 10% and 3.5%), with the size of the net benefits determined by the carbon price and assumptions about the volume of carbon sequestered.

The aggregate provisional CBA is provided in the FONERWA template. This assumes that aggregate measures will be undertaken by farmers and factories as a result of the programme, with benefits materializing after the end of the programme and for the duration of the life of plantations (35 years). The aggregate CBA shows CBRs of 6.7 at 10% discount rate. Further work on CBA will be undertaken during the design phase.

Q 3.8 Value for Money (Effectiveness):
How does your project demonstrate effectiveness:
- How will it show the outputs meet the project objectives?
- Which indicators will you measure to demonstrate effectiveness?

The VFM for effectiveness will focus on outcomes most likely to result in the desired impact. It will ensure that the options selected (in the action plan) are the most (cost) effective way of delivering resilience.

The outcome indicators against which effectiveness will be assessed are:

- Number of direct project beneficiaries who have built resilience to climate change, indicating 1) Gender or % of women 2)% of poor (use 1st and second ubudehe categories) (target: 3000 farmers)
- Number of hectares of climate resilient tea and coffee measures implemented (target: 1500 ha)

With regards to the information components of the project, the design phase will choose the appropriate balance of investment between equipment, capacity, institutional strengthening, dissemination, to result in the desired outcomes (and impacts). This will be based on an initial needs assessment.
For the interventions, we will focus on the options that are most likely to deliver cost-effective benefits, noting this will include non-market benefits (e.g. ecosystem benefits, carbon sequestered) and equity consideration (the most vulnerable). Indeed, these elements have already been included in the design of the project and the initial choices of the interventions selected. For example, the focus on climate smart agriculture addresses potential threats (soil degradation, erosion, soil productivity). They will also lead to financial and economic benefits, through the targeted use of no and low regret options.

The evidence from the pilot work – taken up in the options in this proposal – also seeks to reduce other cost inputs. The focus on climate smart agriculture (e.g. mulching) reduces input costs and increases outputs, although there is some trade off with labour costs. Where possible portfolios of options will be considered that deliver co-benefits and enhance the effectiveness of individual interventions. As an example, farm level interventions that are accompanied by enhanced extension services (and information and training) will deliver higher effectiveness and this has been factored into the project. These training components will also address barriers to implementation, and the provision of inputs (e.g. seedlings and initial support) address the identified barriers of access to finance.

The efficiency of scale-up will also be ensured through the use of Farmer Field Schools and out-reach and dissemination activities, and will be accompanied by farmer training seminars, study visits for policy makers, and cost benefit analysis to inform policy makers).

At the broader level, the focus on the tea and coffee sub-sector represents a very sensible use of funds based on risk and vulnerability assessment and also the important to the economy of Rwanda and export values. The balance of low regret activities to address current climate variability and enhance production has been considered against early actions to address climate risks, with an appropriate balance included based on the cost benefit analysis and the value of information. The project has avoided hard protective infrastructure and has focused on low cost and effective soft and climate smart measures. The inclusion of capacity building also addresses barriers to implementation.

Further work on effectiveness will be undertaken during the design phase. This will include the identification of a set of activities that can be monitored to ensure they deliver against the intended objectives.

**ATTACH ANNEXES HERE TO THE PD APPLICATION** – these can be accepted as separate files but clearly organise and identify the annexes so they are easy to refer to.