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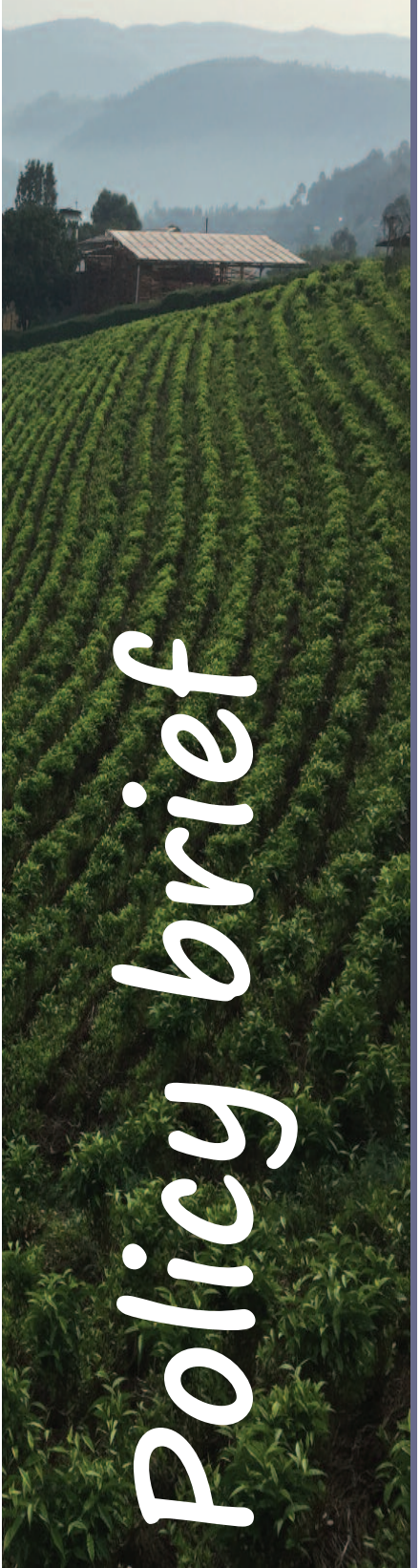
ECONADAPT

The Economics of Adaptation



Appraisal of Adaptation for International Climate Finance: Case study in Rwanda

ECONADAPT is a research project funded by the European Union's Seventh Framework Programme for research, technological development and demonstration. The objectives of the project are to advance the knowledge and evidence base on the economics of adaptation, and to convert the findings into practical material to help support adaptation decisions.

ECONADAPT is undertaking a number of case studies to demonstrate the project methods and approach. The case studies are focusing on a number of policy domains where more advanced economic analysis of adaptation would be beneficial. One of these relates to the flows of international climate finance for adaptation, i.e. from Europe (and European Member States) to developing countries, and the appraisal of potential project and programmes.

This policy brief reports on one of international case studies, which applies iterative frameworks and economic appraisal for an adaptation project in Rwanda. The ECONADAPT project has worked with the Government of Rwanda and supported this project from the early design through to successful climate financing and implementation, using economics to help identify and prioritise promising adaptation options and justify the investment.

Rwandan Case Study on Tea and Coffee Adaptation

This case study is piloting the mainstreaming of climate change into the sector development plan, the agriculture sector investment plan (ASIP2) of the Ministry of Agriculture (MINAGRI), starting with the tea and coffee sectors. These were chosen as these are long-lived and climate sensitive crops. They are also important exports, representing around 20% of total Rwandan exports by value. There are ambitious growth plans to expand the land under production and enhance the quality of these crops, thus this also provides an example of mainstreaming adaptation into development planning.

As well as providing support to the analysis of adaptation, the ECONADAPT project also worked with MINAGRI to apply for climate finance to implement the project and successfully applied for funds from the Rwandan national climate and environment fund, FONERWA.

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Application of the project framework

The ECONADAPT project has developed an iterative framework to help address the challenges of adaptation, including uncertainty. This starts with the identification of the current risks of climate variability and then looks at the future risks of climate change over time, considering the levels of uncertainty.

Following this, the framework considers the phasing and timing of adaptation by advancing three general types of interventions.

- Immediate low-regret actions that address the current adaptation deficit and also build resilience for the future, providing early economic benefits.

- The integration of adaptation into immediate decisions or activities with long life-times, such as infrastructure, as these will be affected by climate change in the future. This involves a greater focus on decision making under uncertainty, and introducing flexibility or robustness.

- Early planning to start addressing the future impacts of climate change, especially when decision life-times are long or future risks are very large or irreversible. This involves a focus on the value of information, future options and learning.

Risk analysis for the tea and coffee sector

The starting point for the analysis – following the initial policy analysis– was to assess the current and future risks to the sectors.

In Rwanda, tea and coffee are grown in certain areas of the country, where the soil, temperature and rainfall are suitable. For both tea and coffee, the main production areas are at higher elevation where it is slightly cooler, as these produce higher quality tea and coffee which have a price premium.

Coffee leaf rust

Tea requires a certain rainfall level distributed evenly throughout the year and variability affects production. Low rainfall years can see yield reductions of up to 20%. High rainfall intensity can also affect seedlings and young plants.

Coffee is also a highly climate sensitive crop, especially Arabica which is the grown in Rwanda. This variety is sensitive to high temperatures, and too little, or too much rain, especially, at key times, are also a problem. The climate is also a key factor in the distribution of coffee pests and diseases. For example, coffee leaf rust is prevalent and there is much higher incidence in the hotter parts of the country.

Looking forward, future climate change is likely to affect the production and the quality of tea and coffee, and some areas of the country might become unsuitable for production. It will also affect the prevalence and especially the range of climate sensitive pests and diseases.

A particular concern relates to the development plans to expand tea production into new areas. These are long-term investments: plantations take many years to establish and they have a long pay-back period. Expansion into new areas today will lock-in investments and land use patterns for many decades to come. It is therefore important to consider where to expand, as areas that are suitable for the climate of today may not be suitable for the climate of the future.

Adaptation

In response to these risks, the project applied the iterative framework to look at the timing and phasing of adaptation. It developed economic and financial models for the tea and coffee sectors to prioritise a portfolio of options in the three areas.

i) A set of early low-regret options was identified. This included opportunities for improving the productivity and quality of tea and coffee today in Rwanda, by helping farmers cope with current climate variability and the near-term impacts of climate change. A cost-benefit analysis was undertaken to help prioritise, looking at a number of possible options.

As an example, for coffee, favourable options included the introduction of mulching and cover crops (climate smart agriculture). These improve productivity through enhanced soil and water management, as well as reducing the sensitivity to weather variability. It also included the introduction of shade trees or banana inter-cropping in the hotter areas of the country, as these trees reduce local temperatures: this prevents the risks of heat damage to the crops and also tends to increase quality. These trees also have additional co-benefits, for example by reducing greenhouse gas emissions and providing additional income streams. These options all showed high benefit to cost ratios in the economic appraisal and were also found to perform well under a case of future climate change.

ii) Climate-smart planning. The second area of analysis focused on longer-term planning, i.e. near-term decisions around land-use. This focused on the expansion plans, as these involve long life-times (decades). A particular focus was to assess which small-holder areas should be encouraged to enter into production, trying to identify those that would continue to provide high financial returns under a changing climate.

The adaptation analysis combined data on possible production expansion areas (current elevation and temperatures) with climate model projections, to build risk maps. This identified which areas would be unsuitable for producing higher quality tea. A robust finding was that planting new production areas at lower altitudes today (e.g. at the lower end of current production ranges) did not make financial sense, even though the main impacts arise in the future.

The analysis also shows that planting at higher altitudes today, which will become more optimal in the future, can also make sense. However, this is a more complex decision because of the uncertainty around the level and timing of the climatic shift. Further work is currently underway to look at a portfolio approach for the more suitable expansion areas, i.e. to provide a hedging strategy to maximise returns given future climate uncertainty.

iii) Early planning for the future. The final category looked at the future risks of climate change and sought to identify early opportunities for learning. An economic analysis was undertaken to look at the value of information, i.e. to see where there would be a value in starting initiatives today to improve decisions or actions in the future.

Shade trees

One option identified was around the future risks of coffee pests and diseases, as these could significantly impact the sector under climate change, reducing productivity and quality. There is, however, a lack of information on the prevalence of many diseases and especially how these might change with the warming climate (necessitating management responses in new areas).

The study therefore undertook an economic analysis to consider investments in enhanced monitoring and surveillance of pests and diseases. The project identified that such a programme would have high economic benefits, especially if combined with a future risk mapping exercise and a subsequent scale-up of pest management in new areas.

Overall, the economic analysis demonstrated that the portfolio across all three areas had a high benefit to cost ratio. The economic analysis and costing was used subsequently to build the case for climate finance funding and was a key part of the successful funding proposal. The project is now entering into the implementation.

The ECONADAPT project commenced in October 2013 and will run for 36 months. This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 603906.

ECONADAPT is co-ordinated by the University of Bath (UK) and involves 14 teams across Europe. This project case study was undertaken by Paul Watkiss Associates and the University of Bath.

Paul Watkiss Associates

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To find out more about the ECONADAPT project, please visit the web-site: www.econadapt.eu.
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