International development projects - An application to coffee production and tea plantation in Rwanda

Key Messages

- The research highlighted that, while cost-benefit analysis are likely be appropriate for early low regret options, other approaches that have more sophisticated treatments of uncertainty are needed for longer-term decisions.
- In both cases, data and information was a limiting factor in the analysis, i.e. there was very sparse climate risk information (downscaled) for the projects/programmes, and there was significant additional investment needed to collect and build the baseline information for the analysis.
- A further finding was the need to undertake both an economic and financial appraisal, in order to provide the necessary information for subsequent climate finance applications (which required both). Both studies showed that there was a strong economic case for low-regret adaptation.

Introduction

One of the largest areas of adaptation investment in the next few years will be associated with European international development assistance (from the European Union and Member States) to developing countries, in line with international climate agreements. Recent analysis of existing European climate funds and current flows reports that these adaptation finance flows will be considerable, i.e. €billions/year (UNEP, 2016).

Better consideration of adaptation in international development assistance involves improving a number of adopted practices in existing economic appraisals. Adaptation appraisal would involve greater clarity regarding the benefits of dealing with existing adaptation deficits as opposed to securing the effectiveness of future adaptation. It also would improve the consideration of future benefits as current use of discount rate in developing countries is much higher than in developed countries.

In Rwanda, the case study undertook an economic and financial analysis to investigate the justification for adaptation. The case study applied a policy-orientated iterative climate risk management (ICRM) approach, with an economic and financial analysis to analyse options. The application focused on the option identification and financing steps of the policy-led framework. It first identified the current and future climate risks and the types of early policy decisions, and from this, identified two areas of adaptation to consider in the overall plan.

Defining the adaptation problem

The first area considered was to identify possible low-regret options that could help address the current impacts of weather and extreme events. These were built around options that improved current productivity and/or quality for tea and coffee by addressing the impacts of current climate variability. A key focus was on options for enhancing coffee production. The second area of analysis considered early decisions with a long life-time, focusing on the Rwanda national tea expansion plans. This is an example of climate smart land-use planning, in order to address the question of where (i.e. which areas) to expand new tea production.

Option identification, sequencing and prioritisation

The study identified relevant areas across the three types of early policy decisions for addressing

short, medium and long-term climate change under uncertainty:

- Early low regret options to address current variability and build future resilience, focusing on capacity building and climate smart agriculture;
- Including flexible and robust actions into near-term decisions with a long life-time, primarily around land-use plans and agricultural expansion; and
- Early actions and learning, as part of an iterative approach, to start preparing for future major climate change, centred on major future risks.

Application of economic rules for decision-making under uncertainty

The case study adopted a number of decision-making under uncertainty concepts.

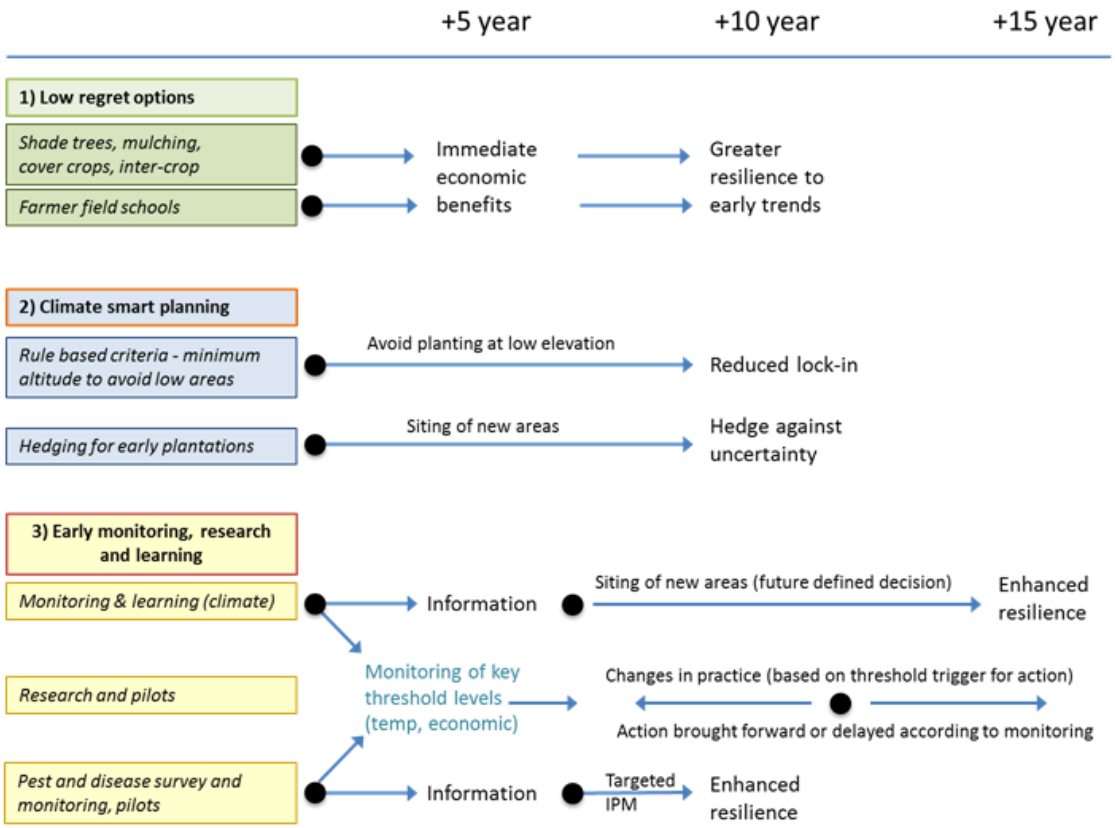
• First, it adopted a rule based criteria to determine elevation thresholds for tea production under current and future climate e.g. to identify areas likely to be unsuitable given the lowest level of future climate change. This minimises the risk of lock-in. The threshold set was a threshold (a minimal level) of 1800 metres (above mean sea level) for new tea areas, noting this rules out some areas that have been potentially selected as being suitable for new tea expansion. The rule was based on an economic analysis.

• Second, the study started to analysis the potential for a portfolio based approach to hedge against future risks. This involved a balanced portfolio of planting across different elevation zones - for each expansion area. This minimises the risks of planting in a narrow elevation zone that subsequently turns out to be poorly suited to the future climate, and thus helps maximise the return on investment. It also helps hedge against the dynamic nature of the shift in climate over time, as the optimal suitability shifts with gradual warming.

• Finally, the analysis considered longer-term adaptive management options. It considered the potential benefits of investing in monitoring and surveillance to provide information to improve future decisions. This recognises that such information has an economic benefit as it allows different (informed) actions in the future, which in turn generate higher benefits or lower costs. This is often referred to as the value of information. The study considered two such examples, looking at how the costs of producing enhanced information compares to the subsequent benefits.

The case study showed that the application of a policy-orientated ICRM framework was extremely useful in developing the timing and phasing of adaptation, and translating this through to practical interventions that could form the basis for the adaptation strategy. It showed that a portfolio of interventions is needed, to address the different (temporal) risks and different types of decisions, with a combination of methodological approaches. The portfolio is summarised below.

The study found high economic benefits from investing in early low-regret options that address current weather risks, especially climate-smart options whose benefits increase with climate change. These options had high benefit to cost ratios and high internal rates of return, and are an immediate priority for early adaptation.



In relation to future orientated risks, the study found economic benefits from some options - but importantly not all. A robust finding was that planting new production areas at very low altitudes today (e.g. towards the lower end of current production ranges) would not make economic sense. The analysis also showed that planting at higher altitudes, which will become better suited in the future, involves a more complex trade-off, and the choice of strategy is important. Early indicative analysis suggests a portfolio approach, which looks to hedge against uncertainty, would be a more robust strategy.

However, a further finding is that given the long planting periods, there is time to learn, and investing in early monitoring and risk information to help to improve future siting decisions. This highlights a key finding of the study, i.e. with the application of an adaptive management framework and investments in early monitoring, research and learning.

Financing, programming and implementation

The case study found there was a greater need for capacity building, institutional strengthening and soft options (non-technical) in the developing country context, to enable efficient and effective adaptation. This led to a greater focus on building complementary portfolios of options, even to address specific risks. As an example, the policy case study identified the need for capacity building for farm level interventions (e.g. farmer field schools) and institutional strengthening and support (e.g. international technical assistance support for adaptation to government ministries), alongside climate smart farm-level options. Many of these additional activities are associated with implementation, and importantly they are often omitted in many technical or academic studies.

Climate smart agriculture options need to factor in the opportunity costs from labour and land, and there is a need to factor in the additional costs of capacity building (e.g. farmer field schools) to ensure the uptake and effectiveness of practice. Similarly, an option focused on ecosystem based adaptation will need to factor in the necessary institutional and governance arrangements and costs (e.g. enforcement or community based involvement) to ensure the option is effectively maintained.

Bibliography

UNEP (2016). The Adaptation Gap Report. United Nations Environment Programme (UNEP), Nairobi, Kenya.
http://web.unep.org/adaptationgapreport/sites/unep.org.adaptationgapreport/files/documents/agr2016.pdf

Econadapt insights
Prioritisation of adaptation in the development context: Zanzibar
Prioritisation of adaptation in the development context: Rwanda
Uncertainties and causes of uncertainties in climate change adaptation
Uncertainties and risk analysis in climate change adaption
Sourcing and using climate information for economic assessments of adaptation