Climate Change and impact assessment (IA) for development cooperation

Wendy Emerton
Department of Foreign Affairs and Trade
John McEwen Crescent, Barton, ACT, Australia

Introduction

In 2010 the OECD suggested that impact assessment was best placed to incorporate climate change impact and adaptation considerations (Agrawala et al. 2010) and in 2012, the International Association of Impact Assessors (IAIA) provided guidance in the form of international best practice principles for assessing climate change in impact assessment, including principles for incorporating mitigation and adaptation (Byer at al. 2012).

This paper considers the incorporation of climate risk in an environmental impact assessment and management plan for a donor funded community development project in Timor Leste in 2012. The paper shows how the impact assessment was improved by the inclusion of climate change; how this went on to improve the design of the project; and the sustainability of the project's outcomes. Furthermore the impact assessment demonstrates that a simple methodology, using national level climate projections and a quantitative system, combined with local consultation, can improve the utility of impact assessment as a tool for both educating communities and implementing sustainable climate change adaptation.

Methodology

The author conducted a desk review of the environmental impact assessment and management plan for a donor funded community development project in Timor Leste in 2012. The impact assessment was reviewed against the IAIA guidance (Byer et al. 2012); the Australian Government's Environment Protection Policy for the aid program (Government of Australia 2014); and multi-lateral donor safeguard policies including those of the Asian Development Bank (ADB 2009) and World Bank (WB 1999).

The Climate Change in a Secure Environment project

As part of Australia's commitment to taking strong domestic and international action to adapt to the impacts of climate change, the Australian aid program managed by the Department of Foreign Affairs and Trade (DFAT) is working to support our partner countries develop innovative practical approaches to tackling climate change by investing in sustainable growth and building resilience.

From 2012-15 the Australian aid program supported the Climate Change in a Secure Environment/ Mudansa Klimatika iha Ambiente Seguru (MAKA'AS) project run by CARE and WaterAid and implemented through four local NGOs: Centro do Desenvolvimento da Economia Popular, Hafoun Timor Lorosa'e, Naroman Timor Foun, and Maladoi. This project was funded under the Community-based Climate Change Action Grants. The project promoted climate-resilient livelihoods, improved access to safe drinking water and sanitation, improved land use practices, and enabled broader village plans for climate change adaptation amongst 33 villages in Timor-Leste's Liquiçá district.

The project took an integrated approach to climate change adaptation, working to improve food security as well as implementing comprehensive water, sanitation and hygiene activities. The overall objective of the project was the increased resilience of vulnerable communities to the unavoidable impacts of climate change with the following three project outcomes:

1. Vulnerable households are implementing water management and water resource protection strategies;
2. Vulnerable households are implementing integrated climate resilient land management practices;
3. Communities, partners and local government have enhanced understanding of climate change adaptation that informs local planning processes.

The project is a Category B project under Timor Leste's Decree-Law no. 5/2011 – Environmental Licensing, which requires an initial environmental examination. DFAT's Environment Management Guide (now Environment Protection Policy) recommended environment analysis for all projects that might be impacted by climate risks and an environmental impact assessment if the analysis identifies a significant negative impact on the environment from the project. While no significant impact was identified in the initial screening of the project, the project team considered the project's scope of improving vulnerable communities' resilience to climate risks and proceeded with an environmental impact assessment. This is consistent with the IAIA best practice principles on climate change in impact assessment (Byer et al. 2012.

Climate change in impact assessment

While the OECD suggested that the impact assessment process represented the most feasible method of applying climate change tools, they also urge consideration for variability in climate predictions, the need for technical capacity to identify and use climate information and the resources to cover these issues:

> "*Greater investment in generating reliable climate change projections at a local level would not only facilitate the integration of climate change adaptation within EIA but would also facilitate the implementation of a variety of other adaptation measures*" (Agrawala et al. 2010 p. 34).

This is particularly relevant in the context of least developed countries that may not have the resources to undertake effective scenario mapping. The Fourth Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC) in 2007 revealed a significant gap in global understanding of how the dynamic climate systems in the Pacific might change in the future (Pachauri & Reisinger 2007). In order to address this gap the Australian aid program supported the Pacific Climate Change Science Program[1] which delivered research and country level climate change projections. This support continued with the Pacific Australia Climate Change Science and Adaptation Planning program[2] which built an adaptation science and research base to assist Pacific countries to better manage future climate risk.

[1] Pacific Climate Change Science Program (PCCSP) $20 million 2009-11.
[2] Pacific Australia Climate Change Science and Adaptation Planning program (PACCSAP) $32 million 2011-14.

Climate change in the Timor Leste region

The data produced by the Australian funded Pacific climate change programs was used by Katzfey et al. for their regional climate change projection report in 2010. The report's main projection was that rainfall events are expected to become less frequent but more intense[3]. This projection remains current according to the IPCC Fifth Assessment Report (2014) which identified increased riverine, coastal, and urban flooding as a key risk to infrastructure, livelihoods, and settlements in Asia (Hijioka et al. 2014).

In 2010, the Government of Timor Leste's Strategic Development Plan 2011-2030 committed to developing a National Adaptation Programme of Action (NAPA) to identify national priorities to address climate change adaption and to monitor the implementation of adaption measures. The Timor Leste NAPA describes the impacts of climate change that can be predicted with maximum consensus for the Indonesian archipelago using the Katzfey et al. report. As a least developed country, the focus of the Timor Leste NAPA was primarily on identifying measures to reduce climate change vulnerability for vulnerable communities, especially those dependent on the environment for their livelihoods (GoTL 2010).

The project impact assessment

Consistent with IAIA principles (Byer et al. 2012) the impact assessment team, Oasis Sustainable Projects, included the adaptation objectives outlined in the NAPA in the impact classification methodology for the Climate Change in a Secure Environment project. The severity of each potential environmental impact was assessed using three criteria suggested by the Australian Government *Significant Impact Guidelines 1.2* (Government of Australia 2013): intensity, duration and scale, and a fourth project driven criteria: climate change phenomena. The climate change phenomena drawn from the Timor Leste NAPA included water scarcity, reduced livestock productivity and increased degradation and loss of agricultural land. In order to apply the criteria in a practical manner Oasis assigned numerical values to each of the criteria as outlined in Table 1 and developed a formula to quantify the severity of the impact in relation to climate risk:

$$\text{Severity} = (\text{Intensity} + \text{Duration} + \text{Scale}) \times \text{Related CC phenomena}$$

Table 1: Criteria for Environmental Impacts classification

Criteria for Environmental Impacts classification	
Scale	**Intensity**
3 – Medium/large	3 – High
2 – Medium	2 – Moderate
1 – Localised/small	1 - Low
Duration	**Related with CC phenomena**
3 – Permanent/irreversible	4 – Directly related
2 – Long term (>5 years)	1 – Not related/irrelevant
1 – Short term (0-5 years)	

(Pereira C. 2012 p. 10)

[3] Using AK-2010 analysis of the CSIRO-CCAM regional simulations models, the Katzfey report indicated that in the Indonesia region by 2050, 7-day or 30-day heat wave events can be expected to increase by up to 2.3°C and that the length of such events can be expected to increase by two days. Rainfall is also expected to increase, in relation to the 1961-1990 reference period, by 2%, 4% and 6% by 2020, 2050 and 2080, respectively, but there will be a mild drying effect over the June-August period by 2080.

The maximum value for severity was 36 points, with potential negative environmental impacts rated as >32 Severe; 8-32 Moderate; 3-7 Minor. With this rating system, project impacts which were related to climate change phenomena were assessed as more relevant to be managed and mitigated. Impacts that would have previously had only a minor severity increased to moderate, for example impacts on water usage and scarcity, and impacts on nearby wildlife and forestry. The multiplier effect also meant that no impacts were classified as moderate that were not related to climate change phenomena. In this way the impact assessment methodology placed clear emphasis on those project impacts that were related to climate risks that had been identified by the national level climate change plan, the Timor Leste NAPA. Following this classification the main project activities with a potential impact on the environment were water resource management: water wells, ponds, spring fed catchments, latrines, septic tanks and community water taps; and land management and agriculture practices: forestry, agro-forestry, crop production, livestock husbandry, irrigation, aquaculture and sloping agriculture land technologies.

The inclusion of climate risks in the methodology led to recommendations in the environment management plan (EMP) under each of the three project objectives. In order to improve vulnerable households water management the EMP recommended the development of water conservation measures and water use efficiencies, sediment retention and balancing of water run-off. With regard to supporting climate resilient land management practices it recommended the rehabilitation of degraded lands with fuel wood plantations and degraded soils with crop diversification, rotation and mulching. Underlying these practical recommendations was the involvement of the community in the transfer of knowledge and management of climate resilient practices which contributed to outcome three of enhancing community capacity for climate change adaptation and strengthened coping strategies.

The inclusion of climate risks in the methodology also led to one of the main impact assessment recommendations incorporated in the project: to consider the cumulative impacts of the project at the watershed level, with particular consideration of further intensification of the hydrological cycle due to global warming. The project was designed so that short term gains from reduced risks at the micro level could lead to long term benefits and increased resilience at the catchment level. For example the adoption of drought-tolerant crops, water ponds and distribution of air-tight drums for seed storage brought immediate benefits but also reduced sensitivity to long-term risks of irregular rain and rising temperatures.

Following Australian Government (2014) and IAIA principles (Byer et al. 2012), the impact assessment also used stakeholder consultation to assess local vulnerability to climate change, engagement and commitment on mitigation measures. This is important because different groups in a community will often have different vulnerabilities and skills and can sometimes find it difficult to engage through traditional decision-making processes. Also, depending on where they live, people can have very different livelihood strategies and face different climate hazards. In this way the project impact assessment was able to support women's empowerment through engaging women in the management structures and in particular provide practical recommendations on how the project should address climate risks in its implementation. The communities were able to consolidate new knowledge with extensive local knowhow to identify options and to test options and new technologies for reducing climate change risks and building resilience (Duggan 2015 p. iv). For example the project increased bio-engineering in the uplands such as revegetation and improved drainage which brought immediate benefits in the prevention of land-slippage but also helped reduce disaster

risk in the midlands and lowlands where sediment from the upland settles increasing the risk of flooding (Eucker et al. 2015 p.32).

The project evaluation report found that the positive impacts of the project on livelihoods, water, sanitation, health and community capacity, combined with the raised community awareness of climate change risks and knowledge of climate resilient practices led to an overall increase in adaptive capacity (Eucker et al. 2015 p. iv). This was confirmed in the evaluation of the Community Based Climate Change Action Grants (CBCCAG) Program which found that the short term benefits of *no regret* measures such as livelihood support and food security encouraged more adaptive behaviours (Duggan 2015 p. 4)

Conclusion

Impact assessment is a suitable tool to translate climate risks. The Project demonstrates that impact assessment can be used to apply climate change tools and that by doing so the impact assessment can be improved as well as the sustainability of development assistance outcomes.

Detailed resolution of climate change projections is not necessary. While the CBCCAG evaluation report found that getting access to climate change information is difficult for communities and where it is available it is not tailored to audiences at local levels, the project impact assessment demonstrates that the resolution of climate risks does not have to be detailed. National level climate projections with an intermediate level of data are enough to facilitate practical considerations for environmental management plans.

Local context is strongly informed by consultation. The project combined complex technical information that was used to inform regional level climate change reports, with local knowledge gained from consultation to translate the impact assessment into a tool relevant to the local context. The project's focus on community participation in its implementation reinforced the sustainability of outcomes because of the strong sense of local ownership.

Quantitative systems are useful where decision makers have limited experience in applying value judgements to climate risks. The simple methodology used in the project impact assessment shows how a quantitative system can be used where decision makers have limited experience in evaluating climate risks in impact assessment. The methodology clearly emphasises the relevance of climate risks and their impact.

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