



Mitigation Action Plans & Scenarios

WORKING PAPER

**Reflections and learnings from co-impacts  
assessment under the MAPS Programme**

ISSUE NO. 33

Developing  
countries exploring  
pathways to climate  
compatibility

# Reflections and learnings from co-impacts assessment under the MAPS Programme

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**Date:** 24/11/2015

**Country:** South Africa

**Authors:**

Brett Cohen, Energy Research Centre, University of Cape Town

Marta Torres Gunfaus, Energy Research Centre, University of Cape Town

Emily Tyler, Energy Research Centre, University of Cape Town

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The following citation should be used for this document:

Cohen, B., Torres Gunfaus, M. & Tyler, E., 2015. Reflections and learnings from co-impacts assessment under the MAPS programme. South Africa. MAPS.

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## ABSTRACT

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The MAPS Programme ([www.mapsprogramme.org](http://www.mapsprogramme.org)) has been active over the past four years in supporting developing countries in building an evidence base to inform climate mitigation policy-making processes. In recognition of the critical need to include consideration of the developmental context and agenda in climate policy making, the projects undertaken under this programme have included conducting a number of different types of co-impacts assessments. These assessments can broadly be classed as those at the micro-level, which are associated with individual sectoral level mitigation actions, and the macro-level impacts that are associated with cross-sectoral action. Given that no definitive guidance exists regarding how to conduct such assessments, the MAPS participant countries tried a range of different approaches to the assessments.

In this paper the authors reflect on the challenges encountered by the MAPS country teams and the value of the assessments conducted to date (given that the publication thereof is relatively recent). On the basis of these reflections, the beginnings of a framework for future work is presented, which is intended to serve as a starting point for practitioners undertaking such assessments in the future. This framework considers aspects such as the purpose of the assessment, the audience and the types of co-impacts to be assessed. A selection of assessment tools is also identified.

In presenting the analysis, the authors acknowledge two key underlying contextual considerations or 'lenses' that frame the work that underpins this paper. Firstly, the existence of a dominant approach to climate mitigation work in developing countries which implicitly places the non-climate benefits of any action as secondary to the primary benefit of climate change mitigation, and secondly, the artificial separation of policy formulation and implementation. Practitioners are encouraged to reflect on the implications of these considerations moving into the future.



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## KEYWORDS

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Co-impacts, climate mitigation, development, MAPS, climate policy

# 1. INTRODUCTION AND CONTEXT

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Over the past four years the MAPS Programme ([www.mapsprogramme.org](http://www.mapsprogramme.org)) has supported developing countries in building an evidence base to inform climate mitigation policy-making processes. In Chile, Colombia, Brazil and Peru, MAPS has produced and analysed a set of nationally relevant scenarios that include different portfolios of mitigation options. This evidence base has been developed through a process of extensive stakeholder participation, and has been used to inform national emissions goals and sector level plans that have fed into the international negotiations. The Programme has also been active in related work in India, and to a lesser extent China, through the work under the BASIC Expert Group on Climate Change.

In advancing domestic climate mitigation policy in developing countries, it has become increasingly evident that the development context and agenda needs to be taken into account, and there is an evolving body of literature on this topic (for example Boyd, Grist, Juhola & Nelson, 2009 Chakravarty & Tavoni, 2013 Huq, Reid, & Murray, 2006; Jooste, Tyler, Coetzee, Boyd & Boule, 2014; Metz, 2010; Tyler & Du Toit, 2014 Winkler, Boyd, Torres Gunfaus, & Raubenheimer, 2015; Winkler, Spalding-Fecher, Mwakasonda & Davidson, 2002; Wlokas, Rennkamp, Torres, Winkler, Boyd, Tyler & Fedorsky, 2012). The assessment of ‘co-impacts’ (or what has until recently been termed ‘co-benefits’, perhaps revealing an optimism on behalf of the climate mitigation community!) has been the focus in the literature for practically advancing climate mitigation in a development context. Co-impacts are defined here as the positive and negative environmental and developmental impacts resulting from, or anticipated to result from, climate actions and policies.

In response to the need for including co-impacts considerations into climate policy, the MAPS countries have applied a wide range of approaches, ranging from strongly quantitative assessments to combining quantitative assessments with qualitative approaches (Cohen et al, 2015a). All four countries were observed to have undertaken broadly similar analyses, engaging on one hand with economy-wide modelling of mitigation action, termed here ‘macro-level’ assessment, and on the other with consideration of co-impacts of individual sectoral level mitigation technologies and policies, termed here ‘micro-level’ assessment. The two types of analyses are not necessarily mutually independent: the understanding of social, environmental and economic impacts of individual actions can be used to package mitigation actions to move towards particular futures. Micro-level assessments can explore a macro level pathway in more detail. A detailed description of the processes used in each of the individual countries, along with a review of the co-impacts literature, appears in a separate paper (Cohen et al. 2015a).

The experience from the co-impacts work performed by the MAPS teams in Latin America and India has provoked the three authors of this paper, members of the MAPS International team based in South Africa, to reflect here on what has been challenging and what has proved valuable to date on how the co-impacts assessment work has been done in the context of climate mitigation policy work in developing countries. From this reflection, the authors suggest the beginnings of a framework to support further co-impacts work in the future. In presenting this analysis, the authors note that it is premature to evaluate the impact of co-impacts analysis on implementation outcomes based on the MAPS Programme experience, given its short time-lapse since completion. However, the Long Term Mitigation Scenario (LTMS) experience in South Africa on which the MAPS process is based, does provides some insights about the challenges of implementation given that it is almost a decade since the process was completed (Tyler & Torres Gunfaus, 2015).

## 1.1 Two contextual considerations

At the higher-level discussion on conceptual approaches to climate mitigation policy work in developing countries, two ‘lenses’ are apparent which have bearing on the discussion in this paper. These lenses operate at the paradigmatic level, and have been brought to the authors’ attention through reflective work being undertaken under MAPS and within the MAPS International team. Firstly, there remains an underlying assumption within the dominant framing of climate mitigation work in developing countries that the non-climate benefits of any action are secondary to the primary benefit of climate change mitigation. Such language implies a tacit hierarchy of needs where climate change comes first and developmental policy objectives (such as poverty reduction or basic needs infrastructure) come second. This approach has been critiqued in the literature on climate mitigation and development (Tyler, 2015; Winkler, Spalding-Fecher, Mwakasonda, & Davidson, 2002), and debunked as being unrealistic in much of the developing country experience. Recent MAPS team research has also been asking whether even the ‘development first’ conceptual approach is adequate, proposing that a ‘both, together’ framing would be more productive (Tyler & Du Toit, 2014; Winkler et al., 2015). The climate-first lens has found its way into the co-impacts discussion in that co-impacts are traditionally described as the developmental co-impacts of climate mitigation policy. Only Indian researchers, as far as the authors are aware, have experimented with a version of the alternative: climate co-impacts of development policy.

The second ‘lens’ pertains to the implementation of either climate or development actions. Policy literature shows clearly that the distinction between policy formulation and implementation is an artificial construct (Najam, 1995) that is not found in actual policy processes. Policy intentions change in their implementation, and (Mosse, 2004) even argues that policy is formulated to justify particular implemented results. This speaks to the importance of considering how co-impact analysis may be relevant beyond the policy formulation level. It would appear that co-impact analysis may serve to enhance the design of how policy and projects are implemented and potentially also to advance the policy agenda of both climate mitigation and development in future projects. There was no experience of this within the MAPS processes in Latin America, and the literature on climate mitigation action implementation is equally sparse (Boyd & Coetzee, 2013). However, Trollip, Torres Gunfaus and du Toit (2015) engage with this issue, identifying that it would clearly benefit from further research and practical experimentation, perhaps drawing on the project design, management and implementation literatures in engineering and management studies.

Despite the limitations of co-impacts analysis implied by these lenses, we argue here that there is value in continuing with such analyses which consider the development co-impacts of mitigation action as has been undertaken under the MAPS Programme to date, but that the process of doing so can certainly be refined. We therefore consciously put these concerns to one side for the purposes of the remainder of this paper. We do, however, revisit these in the conclusions of this paper.

## 2. CHALLENGES ENCOUNTERED IN CO-IMPACTS ASSESSMENT IN THE MAPS PROGRAMME

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Given the complexity of the broader mitigation/development challenge, and the relative “newness” of research on co-impacts analysis, there is not an extensive body of research to help guide practitioners, both in terms of what the purpose of the analyses are and also how such analyses can be conducted. This is reflected in the substantially different approaches to co-impacts analysis trialled in the different MAPS countries, as well as the fact that researchers often changed the approaches that they used for co-impacts analysis during the process.

As indicated previously, much of the emerging co-impacts literature is focused on micro-level quantification of co-impacts of individual sectoral mitigation actions, with a smaller set looking at macro-level analyses. The latter is almost exclusively achieved through modelling of the economic impacts of implementing cross-sectoral mitigation interventions (such as carbon taxes or cap-and-trade), and of implementing cross-sectoral baskets of mitigation actions packaged as scenarios.

Both types of analysis were found to be challenging to undertake during the MAPS Programme, and proved to be very time and resource intensive. From early on it became apparent that the numerical data required for assessments of individual sectoral level mitigation actions was either not available, or would require the investment of significant resources to collect from prior local research, international research (with local relevance needing to be assessed) or expert input. The vast number of micro-level mitigation actions that the teams hoped to assess, along with the challenge of reaching consensus within the teams, exacerbated this challenge. The lack of data was dealt with either through making assumptions, or through using rating scales with ratings being based on expert opinion. For example, in Peru stakeholders were asked to respond to the question “What is the relationship that exists between each mitigation action and the co-impacts included in the matrix?” by providing a score of -2 to +2. In Colombia, scales using ‘very positive’, ‘positive’, ‘neutral’, ‘negative’ and ‘very negative’ descriptors were used in certain rankings, and scales of ‘very high’, ‘high’, ‘moderate’, ‘low’, and ‘very low’ used in others. While such rating approaches can be useful in engaging with stakeholders and starting the conversation, experience in the field of decision sciences has shown them to have a number of limitations (see Cohen et al, 2015b).

A challenge specific to micro-level assessment was one of context specificity. It was found that full quantification of the magnitude of co-impacts of mitigation measures is only relevant to a specific context and influenced by variables that typically are only chosen closer to implementation stages, and therefore, not known at the time of analysis. The Chilean team turned this challenge into an opportunity to discuss the interrelations between implementation design choices in specific contexts and potential co-impacts.

In Chile, as well as in India, it became apparent during the analysis that a large number of specialist inputs were essential to conduct these assessments. Once these were engaged, the additional challenges of multi-disciplinary and cross-sectoral work came into play.

Challenges at the macro-level of analysis were somewhat different. The primary challenge being the development of a modelling framework fit for the task. All four MAPS countries pursued cutting-edge approaches towards the combination of energy, economic, and to some extent land-use models. Linking these, and in some cases expanding models with rich sector-level technology information, was both intellectually challenging and time-intensive.



### 3. VALUE OF CO-IMPACTS ASSESSMENT

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Upon consideration we suggest that there has been mixed value obtained from the assessment of co-impacts as part of the MAPS processes. The perception among some members of the country teams is that the willingness to consider the developmental agendas of mitigation resulted in the particular narratives emerging (in the form of scenarios) that have been key to the overall success of the processes. It looks likely that the process, as opposed to the detailed analysis that it generates, has had a number of positive benefits. The first of these is that the inclusion of a co-impacts assessment was used to obtain the processes mandate in Brazil, Peru and Colombia, which may not have been granted to a study focusing on mitigation alone. Co-impacts assessment was also mentioned in the project design for Chile. The second benefit is that of engaging a wider range of stakeholders than would have been involved in purely mitigation focused processes. In Peru, the co-impact arguments were used as a hook to engage stakeholders early on. Both Chile and Colombia found that the different ministries would not be inclined to assess mitigation action for the country unless sector relevant priorities would be integrated in the assessment. Thirdly, the process of attempting to quantify co-impacts, albeit that in some cases the processes may have been flawed, allowed stakeholders to grapple with the real implications of implementing climate mitigation. The latter proved to be of great interest in the Chilean process, where the analysis of co-impacts actually turned into information which informed potential implementation roadmaps. Finally, it can be argued that the discourse that evolves during the processes is useful in taking climate mitigation from being a stand-alone activity, to understanding that it has implications across the entire economy.

Experience is varied as to the extent to which the specific, detailed results of the co-impacts assessments have been used by policy-makers to date. Peru and Colombia used the micro-level co-impacts assessments for packaging mitigation actions into scenarios or sectoral plans for further analysis, while all of the MAPS countries used co-impacts to inform the prioritisation of mitigation actions. In Colombia, this was explicitly built into the methodology for developing sector plans. However, co-impacts analysis does not seem to have been sufficient to motivate sectors towards the adoption of transformative strategies by sectors to systematically de-carbonise. This may be a limitation of the conceptual 'lens' within which the current 'climate-first' approach to co-impacts analysis resides. The climate-first approach looks exclusively at interventions that can reduce GHG emissions within a sector, instead of looking at the entire set of 'development' interventions available to the sector. It does not enable sectors to understand the full GHG emissions implications of their entire portfolio. This would require comparing all 'development' interventions that contribute to the sector priorities for emissions implications, at least a 'development-first' approach, although arguably a 'multiple-benefits approach' would be even more appropriate (Tyler & Du Toit, 2014).

In addition to the use of micro-level analyses, there is also evidence that project developers, in particular those developing Nationally Appropriate Mitigation Actions (NAMAs), found the information to be useful. The macro-economic assessments are reported to have been used by all four countries in determining their Intended Nationally Determined Contributions (INDCs) to be put forward ahead of the Paris Conference of the Parties in 2015. Anecdotal evidence further suggests that government decision makers have requested the outputs of these analyses to provide confidence that the INDCs will not negatively impact on the countries' economies.

As a final note on this specific topic, significant consideration has been given to the potential role of monetisation of co-impacts in the literature (in economics co-impacts are referred to as 'externalities' and environmental economics has developed a number of techniques to value these). This provides an approach for quantifying co-impacts that enables a richer cost-benefit analysis of individual actions, by incorporating other sources of monetary flows over time. The idea of adding positive 'revenues' emerging from positive

co-impacts that can 'offset' the costs of these interventions seems to make sense. In this way, interventions that have a cost become 'cost-neutral' or 'revenue-generating' interventions.

Although this seems reasonable, these analyses usually neglect the additional 'costs' of negative co-impacts of the interventions. In addition, monetisation relies on the availability of methodologies for quantification of the biophysical or social impact, and thereafter methodologies for the valuation thereof. Some co-impacts are thus easier to monetise than others and, for a number of co-impacts, a monetary value will thus not adequately capture the complexity or adequately represent the true value of the impact. There are also ethical considerations relating to monetisation of externalities. Colombia undertook a pioneering exercise to monetise co-impacts for a sub-set of the mitigation actions portfolio. This work contributed to the generation of a methodology that could be broadly applied to monetise any impacts for any of the mitigation actions. However, again there is no evidence of the use of the emerging results in specific decision-making processes to date.

## 4. DRAWING ON THE MAPS LEARNINGS FOR FUTURE PROCESSES

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Given in particular the high resource commitment required by the current approaches to assessing co-impacts identified by both the growing body of literature and the MAPS experience, it appears important to reflect on the motivation, approaches to, and value of undertaking these assessments to help guide any practitioners undertaking such analyses in the future. In the MAPS countries upwards of 70 mitigation actions are considered across the sectors in each country. Attempting to quantify even five co-impacts for each is a daunting task.

The importance and value of effective problem structuring prior to embarking on any complex decision-making process and analyses is well documented in the decision sciences literature (see for example (Keeney, 1992; Basson, 2004; Belton & Stewart, 2002)). This literature identifies that defining the problem early on helps to ensure that stakeholders are in agreement upfront about what the purpose of the analysis is (or where consensus cannot be achieved identify different perspectives from which an analysis should be undertaken), how the results are to be used, what information needs to be collected and from whom, how the collection will take place and what data gaps could be anticipated. Checking in on the 'how', 'why' and 'when' becomes an important research design requirement to understand how and when stakeholders engage with co-impacts information, and leads to considerations of the type, policy purpose and level of detail of the information required. It may also lead to a greater alignment of practice with the evolving conceptual literature.

In response to this realisation, this paper now attempts to draw on the experiences from the MAPS Programme, informed by the literature, to scope out a framing for thinking about co-impacts analysis for climate mitigation in developing countries. It is hoped that this framing will provide both "food for thought" and something of a guide for climate and development practitioners, allowing them to design their analyses in such a way as to obtain the maximum possible benefit therefrom and avoid conducting analyses that are not ultimately fit for purpose.

The framing considers three key components:

- The purpose of the analysis;
- The target audience for the outcomes of the co-impacts analysis; and
- What is to be analysed.

### 4.1 Identifying the purpose of the analysis

While initially the high-level purpose of the analysis may be considered to be self-evident (such as "to demonstrate the co-impacts of mitigation action to get buy-in"), experience has shown that once stakeholders are asked to think more deeply about the question, it is quickly realised that the problem is not as clear as initially imagined, that an alternative framing may be more useful, or that the problem should be split into two or more separate problems. For example, an extensive assessment of pre-defined co-impacts covering the social, economic and environmental dimensions of climate mitigation actions was used to inform the development of sectoral mitigation action plans in Colombia. With hindsight, the team realized that decision-makers within particular sector Ministries were mostly interested in the co-impacts of mitigation actions that fall within their mandates to implement, implying that only a sub-set of the mitigation actions required co-impacts analysis. Understanding the purpose of the analysis, and how results are likely to be used would have helped avoid unnecessary information being collected or analysis being undertaken.

In reflecting on MAPS experiences and the emerging literature, the authors have identified three distinct areas where co-impacts analysis as it has currently been approached is likely to find application, which may be used to guide practitioners. These are:

1. **Setting high-level goals or commitments** related to climate change mitigation. Such goals may relate to international negotiations, national mitigation goals expressed in climate policies, sectoral or city level goals. Such goals or commitments may or may not include details of how these are to be achieved. The value of co-impacts assessment here might be to make the case to the decision makers that achieving such goals will not have significant negative impacts on society or the economy. Where the goals are defined at country-level, economy-wide impacts will be most relevant.
2. Co-impacts assessments can be used to inform both national, sub-national level and sectorial **policies and plans** including those relating directly to climate mitigation and those addressing other developmental considerations with GHG emissions effects. Co-impacts arguments can be used to make the case for selecting one policy direction over another, or for how a particular policy is structured. Given budget and capacity limitations, a hierarchy of interventions is usually helpful to decision-makers. This prioritization and ranking seems to make sense at sector-wide level, including all the set of interventions within the sector – not just those ones with positive effect in terms of mitigation.
3. Informing on the ground **implementation**. Here the information on climate mitigation potential and co-impacts of a particular option can be used to tweak the design of an option: can a particular design choice be made to increase the mitigation or co-impact benefit of an option?

## 4.2 Defining the target audience

A critical consideration before embarking on a co-impacts analysis is to identify who will be using the results, and to understand how this audience works to achieve its objectives. The focus audience of the abovementioned framework is public policy makers and bureaucrats. A clear distinction should be made here within the different sub-categories/audiences: Ministry of Environment, Ministry of Foreign Affairs, Planning Agencies, sector-based implementing agencies, and other sub-national authorities, including local authorities. How these different entities work to achieve their objectives, their capacity, networks and influence differ, and all should be understood and considered in informing the type of co-impacts analysis that would be useful.

### 4.3 Deciding on what is to be analysed

In serving any one of the above purposes, a decision needs to be reached as to what co-impacts need to be analysed. As indicated previously, here a distinction is drawn between:

- Micro-level co-impacts of individual mitigation actions, such as air pollution, health impacts, water pollution and direct job creation.
- Macro-economic impacts such as GDP, employment levels, social welfare implications, investment rates etc.

Each of these types of co-impact analyses require different tools and approaches, and a decision will need to be made as to whether qualitative, semi-quantitative or fully quantitative assessments are to be conducted. This decision will be guided by availability of data, complexity of the analysis and of course the purpose for which the analysis is to be used. A mix of methods may be required to ensure that impacts that are not easily quantified are adequately represented.

A summary of the framing for co-impacts analysis is presented in Figure 1.

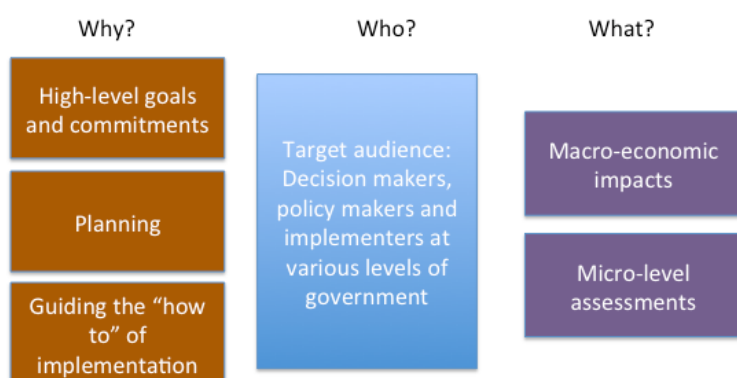


Figure 1: Framing for co-impacts analysis

### 4.4 Towards a co-impacts toolbox

Once these three issues have been thought through, the research team will then need to decide on the most appropriate tools for conducting the co-impacts analyses. Some examples of these tools are shown in Table 1. Also shown in Table 1 are the countries in which these MAPS tools were trialled (see Cohen 2015a). As discussed previously, expanding the conceptual frame for doing climate mitigation policy work in a developing country context may lead to a substantially larger toolbox.

Table 1: Examples of tools used for co-impacts analysis

	Macro	Micro
Qualitative		Identification of key co-impacts generally (Colombia, Peru), per sector (Colombia) or per action (Chile)
	Identification of co-impacts to be assessed at macro level	Mapping co-relation and interactions among co-impacts (Chile)
		Qualification of co-impacts (positive/negative) per action (Peru)
		Expert ranking (Peru, Colombia)
Quantitative	Labour models (Chile, South Africa)	Multi Criteria Decision Analysis (MCDA) processes (India)
	Micro-simulation for income distribution (Brazil, Chile)	Quantification of individual co-impacts (range of specific methods and models) (Chile)
	CGE and CGE-variations (Peru, Brazil, Colombia)	Monetisation (Colombia)
	DSGE (Chile)	

## 5. CONCLUSION

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The MAPS processes in Latin America have pioneered conceptual approaches to working on climate mitigation policy in developing countries. The resultant experience as regards co-impact analysis has provided a rich area for reflection by the authors, who have observed first-hand and often participated in the frustrations, disappointments and successes of the MAPS country teams.

Experience has shown that there have been instances in the countries' experiences where it has clearly been valuable to focus on the development implications of climate mitigation actions through these types of assessments, at both macro and micro-levels. The role of economic modelling in persuading politicians that commitment to INDCs was significant, and important stakeholders outside of the climate mitigation community were engaged on the basis of co-impact analysis. However, much of this work has been time and resource extensive, and there is no evidence yet of the outputs having influenced political priorities, strategy or implementation in the MAPS countries.

This calls into question firstly whether the suite of co-impact assessment tools were 'fit for purpose'. The authors suggest that this will depend on the context, specifically the detailed purpose of looking at co-impacts, the intended audience and how it works, and the nature of the underlying evidence base. Undertaking a problem-structuring exercise up-front appears likely to assist in avoiding wasted time and effort and resources, a significant issue in a problem as urgent as climate mitigation in developing countries.

Our reflection must also refer back to the two 'lenses' highlighted at the beginning of the paper. The conceptual approach to undertaking climate mitigation work in developing countries itself has evolved considerably during the period over which the MAPS Programme has run, not least as a result of these experiences. The hangovers of an outdated mitigation-centric approach were still evident in how the problem was initially framed: to analyse the co-benefits of climate mitigation policy. Through the MAPS country experiences, the term evolved to co-impacts, acknowledging that these can be both negative and positive. But further, the experience of an approach that started with mitigation as the frame of reference (only considering mitigation actions, not the full suite of sectoral developmental impacts) can be argued to have had profound limitations with regard to real transformational impact. And increasingly we are realising that considering the full suite of developmental impacts is what is required of developed and developing countries alike to adequately respond to the climate change problem.

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