
**University of Cape Town**
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# Towards zero emissions and zero poverty in the Global South:

## A comparative analysis of South Africa, India and Mexico's approach to development and climate change mitigation

**By:**

**Heather Mahachi**

**MHCHEA001**

**Supervisor:**

**Harald Winkler**

**PLAGIARISM DECLARATION**

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**ABSTRACT**

Among the foremost challenges of the 21st century are sustainable development and climate change mitigation. In light of these challenges, this thesis seeks to analyse and compare the extent to which development and climate change mitigation are aligned on a policy level in three countries in the global south, namely South Africa, India and Mexico. These three middle-income countries are plagued by high levels of poverty and large inequality gaps, and address the challenge of reducing GHG emissions in this context. The objectives of this study are fourfold: (1) an analysis of each country's climate change policies mainly its Nationally Determined Contributions and climate response strategies and assesses to which extent development is addressed; (2) analysis of each country's national development plans and the extent to which climate change mitigation is addressed; (3) based on the initial analysis, assessing the overall extent to which the development and climate policies are aligned; and (4) a comparative analysis of how each country performed in this regard.

The study found that South Africa, India and Mexico are in pursuit of lower carbon development in the years to come. Targets for reducing their emissions in light of climate change considerations have been set and sectoral approaches to low carbon development are illustrated to varying degrees. South Africa was found to have done relatively well in integrating development and poverty alleviation into its national climate policy. The detailed analysis presented in the thesis found this at national scale, while a focus on co-benefits was particularly well integrated in Mexico's and India's climate policy.

Thus the thesis shows that each country could learn or adopt some approaches to alignment from the other – and that there are several benefits associated with aligning development and climate policies. More research would need to be conducted at a finer scale to identify the trade-offs of certain mitigation actions and this information should be used in future national and sectoral development.

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**LIST OF ABBREVIATIONS**

CDMs – Clean Development Mechanisms

DEA – Department of Environmental Affairs (of South Africa)

DEROs – Desired emissions reduction outcomes (of South Africa)

GDP – Gross Domestic Product

GHG – Greenhouse Gas

GoI – Government of India

HDI – Human Development Index

IEP – Integrated Energy Plan

IRP - Integrated Resource Plan

IPAP – Industrial Policy Action Plan

IPCC – Intergovernmental Panel on Climate Change

INDC – Intended Nationally Determined Contribution

LCD – Low carbon development

MDG – Millennium Development Goals

MIC – Middle income countries

MPI – Multidimensional Poverty Index

MtCO2 - Meric tonnes of carbon dioxide equivalent

NAPCC – National Action Plan on Climate Change (of India)

NCCRP - National Climate Change Response White Paper (of South Africa)

NCCS – National Climate Change Strategy (of Mexico)

NDC - Nationally determined contribution

NDP – National Development Plan

NEP – National Energy Policy (of India)

NGP – New Growth Plan

NICs – Newly Industrialised Countries

PPD – Peak Plateau Decline

RE – Renewable energy

RSA – Republic of South Africa

R & D – Research and Development

R & M- Repair and Maintenance

SERMANAT - Secretariat of Environment and Natural Resources (translation- of Mexico)

SDGs – Sustainable Development Goals

UNFCCC – United Nations Framework Convention on Climate Change

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# Chapter 1: Introduction

## 1.1 Background

Climate change poses a threat to societies and systems worldwide and particularly to sustainable development. According to the Fifth Assessment Report (IPCC, 2014), limiting the effects of climate change is essential to achieve sustainable development and greater equity as well as the eradication of poverty. Although current international climate mitigation efforts strive for the stabilization and reduction of GHG levels in the atmosphere, Matthews and Caldeira (2008) suggest that future anthropogenic emissions would need to be nearly zero in order to stabilize global average temperatures. Historically, there has been an understanding that economic growth and development are related to emissions (Rennkamp et al, 2012). High carbon dioxide emitting activities, such as burning fossil fuel for the provision of electricity has long supported many economies in the world, from the industrial revolution until now. The international climate policy regime has focused on developing a 'long term cooperative action', where there has been mounting pressure on less developed countries to contribute towards the global movement aimed at reducing Greenhouse gas (GHG) emissions (Rennkamp et al, 2012). However, as highlighted by its inclusion as the first Sustainable Developmental Goals (SDGs), it is most crucial to eradicate worldwide poverty. In light of climate change and its impacts, governments now have to aim at reducing emissions without jeopardizing socio-economic development (Rennkamp et al, 2012). With the evolution of multi-lateral agreements and treaties over the past two decades which aim at the reduction of these gases and their emissions into the atmosphere, the Paris Agreement in 2015 being the most recent, many governments particularly in the low and middle-income countries seek to ensure that the incorporation of these agreements into national policies will be of an inclusive, fair and effective nature.

According to Urama (2012), managing the linkage between climate change mitigation and economic development is one of the most complex policy challenges of this century. The Fifth Assessment Report (IPCC, 2014) suggests that the major drivers of GHG emissions globally are economic growth, population, energy intensity of Gross domestic product (GDP) and the carbon intensity of current energy systems. In light of this information, mitigation policies could either positively or negatively influence economic development and societal goals such as poverty eradication and inequality reduction. This influence is often referred to as the trade-off or win-win between climate change mitigation and socio-economic development (Wlokas et al, 2012). With regards to climate change mitigation, international climate policy has gradually shifted from a bifurcated notion that divided the world into Annex 1 and non-Annex

countries, the former being developed countries and the latter being developing countries. Common but differentiated responsibilities governed the way in which countries approached climate change mitigation with developing countries arguing that they would be economically disadvantaged if they were to focus on mitigation and not the needs of the people, which is economic development. However, in recent years there has been an emergence of certain countries transitioning out of the developing country bracket. China in particular, has developed one of the most notable industrialized economies of this century and has also become the largest emitters of GHGs contributing to 25% of global emissions in 2012. South Africa has now become the world's 13$^{th}$ highest emitter of GHGs per capita, mostly carbon dioxide due its coal reliant economy (Boden et al, 2011). What these middle income countries (MICs) also have in common however, are large proportions of their populations in poverty and high inequality. Sumner (2010) suggests that the majority of the world's poorest people now live in MICs where due to high emissions, mitigation is necessary. Wlokas et al (2012) further adds that although mitigation is necessary it cannot compromise their economies competitiveness Wlokas et al, (2012) suggests that the potentials of pro-poor mitigation activities have been weakly explored and that mitigation can be one effective mechanism in which to address poverty and potentially inequality.

The Sustainable Development Goals United Nations, 2015) have built on the well-known Millennium Development Goals that expressed extensive concern about the high levels of hunger, poverty, limited education and environmental degradation (UN, 2015). Due to increasing awareness of climate change and how it may affect livelihoods globally, there has been a greater understanding that worldwide environmental objectives need a greater profile beside poverty-reduction objectives. In broader terms, the SDGs encompass three main categories and these are economic development, environmental sustainability as well as social inclusion and as such these goals provide a framework for successful climate mitigation and adaptation policy (Urama, 2012). The SDGs highlight the complex nature of sustainable development and the complex linkages and overlapping of its various components. Among these goals are the goals to completely eradicate poverty, to encourage climate action as well as provide affordable and clean energy to the world's populations. Fleurbaey et al (2014) suggests that development can neither be sustainable or just without an effective response to climate change, this response being a combination of opportune mitigation and proactive adaptation. Therefore, an ideal approach to the future would be where development and climate change are addressed simultaneously.

The Paris Agreement from the Conference of Parties 21 is the most recent international agreement in the climate policy regime. The main long term goal can be found in its Article 2 and it agrees to aim to

keep average surface temperatures below 2°C. Article 2 also agrees to foster climate resilience and low GHG emissions development without threatening food production. Another highlight of the Paris Agreement is the National Determined Contributions (NDCs) which Urama (2012) refers to as the engine of the agreement. These NDCs were nations expected annual greenhouse gas emissions after 2020 as well as their mitigation targets (Boyd et al, 2015). These targeted emissions aimed to diverge of the business-as-usual emissions trajectory that ultimately results in temperature increases above an undesired 4°C (UNEP, 2016). In the pursuit of reduced emissions and achievement of the temperature target, the Paris Agreement in Article 4 says that Parties should aim to reach their peak emissions as soon as possible. The Paris Agreement continues to make reference to the concurrent action of achieving a balance in anthropogenic emissions and removals by sinks (mitigation) on the basis of equity as well as in the combined context of sustainable development and poverty eradication efforts (UNFCCC, 2015).

Over the years there has been a development of various mitigation approaches worldwide operating at various scales and magnitudes. With the Paris Agreement stating a clear objective of keeping future temperature increases below 2°C there are going to be further advancements in mitigation actions. This research seeks to provide a reasoned argument on how a vision of reducing poverty and emissions can be achieved from a developing country perspective and whether eradicating poverty has been integrated into short to medium term climate change response strategies, paying particular attention to middle income countries South Africa, Mexico and India.

## 1.2 Research question and Objectives

With growing interest in combining climate change mitigation and poverty eradication particularly in middle income countries, this research asks 'to what extent is reducing poverty integrated into short term low greenhouse gas development strategies and to what extent is climate change mitigation integrated into development plans in three countries in the Global South?'

### Aim

With the research question in mind, the aim of this thesis is to analyse and compare the extent of alignment of national development plans and climate change policies for South Africa, Mexico and India.

### Objectives

To achieve our research aim, these objectives below shall guide this research.

a) Content analysis of the three countries' NDC and climate strategies to determine to what extent these climate policies address poverty and development

b) Content analysis of the three countries' development plans to determine to what extent these plans address climate change mitigation
c) Illustrate the extent of alignment of the key development and climate policies analysed
d) To compare the findings for each country

## 1.3 Thesis outline

This paragraph briefly summarises the structure of this thesis. Chapter 1 introduces the thesis providing background information on the topic. Provided in this introduction is the thesis' research aim, research question and its main objectives. Chapter 2 consists of a literature review of the literature available on the main topic of the thesis which is climate change mitigation and poverty alleviation. The main themes, such as the relationships between poverty alleviation and climate change, economic growth and greenhouse gas emissions and lastly the trade-offs and co-benefits of mitigation approaches are also reviewed in this chapter. Chapter 3 provides information on the methodology used in the thesis' analysis. It offers information on the software used to guide the document analysis as well as an overview on the key documents of interest. Chapter 4 of this thesis forms part of the core of the thesis as it consists of the thorough individual country analysis in terms of mitigation and development. Chapter 5 brings the analysis together in its comparative country analysis of the main findings following the document analysis. Chapter 6 consists of a conclusion of this thesis, focusing on a summary of how the objectives were achieved and their respective findings.

# Chapter 2: Literature Review

## 2.1 Poverty, inequality and climate change

Wlokas et al (2012) suggest that climate change literature has on few occasions clearly addressed poverty. In the majority of the climate literature and text, poverty is often regarded as one of the components of the broader notion of sustainable development and little focus is made on the link between poverty and mitigation actions. Poverty is however, the first target on the MDGs as well as on the SDGs and it is necessary to understand this complex socio-economic reality that plagues societies worldwide if there is to be a pursuance of the linkages between poverty and climate change mitigation. According to Simon (2010), poverty can be classified into four main frameworks, namely income based poverty, the capabilities approach, social exclusion and vulnerability. With regards to how poverty is measured, the main measurements used are the United Nations poverty lines, Human Development Index (HDI), as well as the use of Multidimensional Poverty Index (MPI). The UNDP (2007) says that poverty lines describe poverty as the lack of income and monetary amounts associated with the international poverty line are at one and two dollars (United States Dollars) a day. According to Wlokas et al (2012) the HDI is a more insightful measure of poverty as it brings other dimensions into its measure such as living standards, health and education. The more recent MPI delves deeper into the complexities associated with poverty and consists of an inclusion of ten additional indicators to the three main ones in the HDI. The poverty measurements and their indicators are summarized in the table below (table 1).

**Table 1: Poverty Measurements (Source: UNDP, 2007)**

| Poverty line | Human Development Index (HDI) | Multidimensional Poverty Index (MPI) |
|---|---|---|
| • $1 and $2 a day | • income<br>• health<br>• education | • health (nutrition; child mortality)<br>• education (years of schooling; school attendance)<br>• living standards (cooking fuel; sanitation; water; electricity; floor and assets) |

In addition to the above, one other supplementary measure of poverty is suggested to be inequality, particularly if poverty is measured using income poverty (Wlokas et al, 2012). Inequality can be defined

as the 'relative measure for the difference between distribution of income in an economy' (Wlokas et al, 2012:13). According to Rennkamp et al, (2012) inequality is measured and known quantitatively as the Gini index and research has revealed that it is most prominent in Latin America and Africa. Inequality can be considered to be the result of poor national policies and political interventions as seen in South Africa's history of apartheid and racial segregation (Rennkamp et al, 2012).In addition to inequality resulting from poor national policies, Sachs (2012) suggests that the challenge around social inclusion and fairness, particularly in the world's economies comes as a result of increased globalization and differences in the levels of education. These differences in education opportunities have played a role in the gap in earnings which in turn has been worsened by the reality that the wages of highly educated and better trained individuals have significantly increased and the wages of the unskilled or lower skilled has decreased over time (Sachs, 2012). Understanding the possible causes of poverty, its indicators and growing inequality is important as it highlights areas most need of attention particularly when placed in context of climate change creating targeted and focused synergies between mitigation, development and poverty eradication. Against this background, this thesis will consider key developmental concerns in the global south such as poverty, inequality and poor living conditions.

## 2.2 The relationship between economic development, economic growth and greenhouse gas emissions

Relevant to the discussions on poverty, development and mitigation is the understanding of the relationship between carbon emissions and economic development based on the underlying assumption that poverty is tied to the lack of economic development. Economic development refers to qualitative improvements in the quality of life whereas economic growth refers more to increases in a countries' GDP (Malecki, 1997). Per income capital income measures refer mostly to economic growth as they measure the average income earned by per person in a designated area (Malecki, 1997). Grunewald et al (2017) suggests that economic growth lead to absolute poverty reduction only if it is not characterized by rising income inequality. A report by the World Bank (2007) revealed that in terms of country level emissions, the highest emitters were from higher income developed countries. It is important to note however that the growth of carbon dioxide emissions in particular, over time have significant variation among different countries. This report also showed that these highest emissions also came from all the G5 countries which are the five emerging economies of the 21$^{st}$ century, namely, Brazil, China, India, Mexico and South Africa. According to the World Bank (2007), the main tool for describing any relationships between emissions and changes in related factors such as economic development is referred to as 'decomposition analysis'. It is interesting to note that the emissions per capita were

moderately positively correlated with GDP per capita and showed no evidence of an eventual decline in emissions per capita at higher per capita income in developed countries. This discovery has been often referred to as the Environmental Kuznets Curve phenomenon. With regards to this phenomenon, the Fourth Assessment Report (IPCC, 2007) explains that at the earlier stages of development, pollution per capita and GDP per capita move up in the same direction but after a certain income level, emissions per capita decrease and GDP per capita continues to increase and this result in an inverted U shaped correlation between GDP and pollution, known as the Environmental Kuznets Curve also referred to by Lipford & Yandle (2010).

A study by Grunewald et al (2011) took it further and examined the relationship between income inequality and emissions and suggested that the relationship is U shaped like the one between GDP and pollution. Grunewald et al (2017) add that the relationship between income inequality and per capita emissions depends on the levels of income. Grunewald et al (2011) suggests that in high income countries the turning point is at a much lower level of inequality thereby implying that the likelihood for emission reducing pro-poor growth is more practical. In lower income countries however, there is greater possibility of a trade-off between reducing inequality and increasing per capita emissions. Rennkamp et al (2012) critique this finding and suggest that the relationship between inequality and emissions is more complex than previous literature has deduced. Overlooks in the establishment of relationships may have occurred as the findings fail to highlight the quality of development paths as well as the type economic growth involved (Rennkamp et al, 2012). One of the main findings by Grunewald et al (2011) suggests that there is an opportunity for pro-poor low carbon development for unequal middle income countries.

In its Fourth Assessment Report, the Fourth Assessment Report (IPCC, 2007) highlighted that economic activity is a key catalyst of $CO_2$ emissions however how economic growth converts into new emissions remains ambiguous. The reason for this ambiguity is that on one side, as the economy grows there is an increased demand and supply for energy and energy intensive goods which increases $CO_2$ emissions and on the other side potential outcomes of economic growth could be technological change which allows for energy efficiency and may be more conducive to emissions mitigation. The Fourth Assessment Report (2007) concludes that there is a certain amount of flexibility between economic growth and $CO_2$ emissions. In China from 1997-2001, there was a 30% increase in GDP whilst emissions remained relatively constant. This was due to the documented closing of smaller inefficient power plants and a transition to energy efficiency and tighter environmental regulations. This then asks what role policy can

do to influence emission paths (IPCC, 2007).

A study by Hossain (2011) further examines the dynamic relationships between carbon dioxide emissions, energy consumption as well as economic growth in nine newly industrialised countries (NICs) which include South Africa, Mexico, India, Thailand, China, Malaysia, Turkey, Brazil and the Philippines. The study showed that the carbon dioxide emissions from energy consumption from these NICs have gradually increased over time (1971-2007). The empirical study in the paper by Hossain (2011) placed South Africa as having the highest mean $CO_2$ emissions during that period. When it comes to releasing $CO_2$ metric tons per capita however, South Africa is the lowest. With regards to energy consumption, South Africa was found to be at the top of the list and India at the bottom of the nine countries. The study concluded that due to increased industrial input and economic growth, these middle income countries are consuming a significant amount of energy and also have a high demand for energy. The study suggests that there is a need for stricter environmental and energy policy adjustments and to reduce emissions in these countries as the countries seek to meet developmental needs (Hossain, 2011). As shown above, the relationship between development and emissions can be ambiguous and often not linear. This thesis analyses the relationship between development and emissions and how it can be altered or shaped by policies to curb emissions.

## 2.3 Mitigation approaches, trade-offs and co-benefits

Laukkonen et al (2009) suggests that climate change intensifies poverty and potentially threatens strategies aimed at reducing its prevalence. In lower middle and low income countries, climate change is believed to have a negative impact on pro-poor growth and this is because of climate change's direct effects on people's livelihoods and on assets they depend on for income. Climate change mitigation policies and actions include reducing emissions and steering energy supply from fossil fuel combustion and also through energy efficiency. These common approaches have both indirect and direct impacts on poverty, some of which can either work towards alleviating poverty and some exacerbate poverty (Barbier, 2014). Barbier (2014) suggests that there has been limited comprehensive analysis of direct and indirect impacts of mitigation policies on the poor and their abilities to alleviate poverty. Literature on poverty and climate change is often dominated by the adaptation concept of climate action where assessments of vulnerabilities are measured and elements such as adaptive capacity are focused on.

Mitigation literature and actions are dominated by information on technical and infrastructural investments that aim at improving energy efficiency. Related to poverty however, is increasing emphasis on investments aimed at improving energy security such as the Clean Development Mechanism (CDMs)

which are project based mitigation approaches (Laukkonen et al, 2009). Olsen (2007) explains that CDMs are a part of global carbon market and the Kyoto Protocol under the UNFCCC response towards to reducing emissions. The implementation of CDMs was aimed at achieving sustainable development and as mentioned above, poverty alleviation fell under this broad concept. Although energy access and security are one of the indicators of poverty, poverty itself has many characteristics and elements and mitigation action needs to address more indicators if it is to be successful. A review of CDMs role in contributing to sustainable development by Olsen (2007) suggests that there are still trade-offs which strongly favour one objective over the other, cost-efficient emission reduction over sustainable development objectives and this leads to CDM not significantly contributing to sustainable development.

A study by Urban (2010) analysed low carbon development further as a whole and aimed at understanding whether it could be pro-poor. The definition of low carbon development was viewed as green growth centred but a suggestion made was that for lower income countries, low carbon is not about reducing emissions but rather the opportunities that LCD could bring to lifting development status'. LCD could bring about green jobs and energy security and contributions to capacity building. A more critical review of LCDs success in boosting livelihoods in several contexts could provide more information on how its mechanisms contribute to poverty alleviation. Urban (2010) agrees that climate change mitigation actions need to span across all poverty reduction efforts and argues for the linkage of pro-poor development and low carbon debates. The study by Wlokas et al (2012) provided an extensive categorised analysis of various mitigation actions highlighted in Figure 1 below and assessed their actions in South Africa and Latin American countries such as Peru, Colombia, Brazil and Chile. This research seeks to develop this analysis further by looking deeper at the role that mitigation actions at the higher level have addressed poverty and inequality.

**Figure 1: Types of mitigation actions and measures for poverty alleviation (Source: Wlokas et al, 2012)**

| Typology | Poverty alleviation potential | |
|---|---|---|
| | High | Low |
| GHG reduction potential: High | Type 1: Poverty alleviating mitigation action<br><br>Poverty driven mitigation action? | Type 2: Conventional mitigation action, with no explicit focus on poverty (and possible opportunity cost)<br><br>Climate driven mitigation action? |
| GHG reduction potential: Low | Type 3: Conventional action for poverty alleviation, with no explicit focus on reducing emissions (and possible increase in emissions)<br><br>Non-climate driven poverty action? | Type 4: Failed/low impact mitigation action, failed poverty action, conventional industrial/economic/ environmental policy without explicit focus on mitigation and poverty (this will surely partly depend on the scale and cost of the action in terms of what impact it can achieve?) |

At the policy level, there is a need for a better alignment of mitigation and development and this may begin at the national policy level. The Fifth Assessment Report (IPCC, 2014) suggests that climate change is a global commons problem and that effective mitigation that seeks to alleviate poverty whilst reducing emissions cannot be achieved if there is a desire to advance personal interests and most importantly that climate policy needs to intersect with societal goals. The analysis of mitigation actions proposed by the countries of interest in this thesis will consider this intersection of climate policy needs and societal needs for development.. A study by Garibaldi et al (2014) suggests that the link between mitigation and poverty particularly in developing countries poses many analytical as well as policy questions and that the linkages are dependent on various aspects. For example, in South America there was a correlation between poverty reduction and reductions in deforestation as well as with the increased use of biofuels. In South Africa, there were found to be strong implications when it came to urban housing projects that also enhanced energy security. Kok et al (2008) suggests that there are various benefits of an integrated development and climate strategy. The benefits could include a reduction in poverty, greater job creation as well as advances in energy and food security and improvements in health. A successful example given of integration by Kok et al (2008) is of Brazil's alcohol fuel programme which focuses on substituting fossil fuels with ethanol extracted from sugarcane plantations. This programme is labour intensive in the agricultural sector and has also resulted in

improved energy security and is providing greater income particularly for the poor rural members of society. Due to the increased shift from fossil fuels by the biofuels there has been a considerable improvement in air quality thus having a positive effect on health of the citizens (Kok et al, 2008). Kok et al (2008) also acknowledge that in some cases there are more trade-offs than benefits that could arise from attempting to integrate development and climate considerations. For example designating large areas of agricultural land for developing biofuels could have a negative effect on food security and could potentially exacerbate poverty. Kok et al (2008) also suggest that the higher costs of cleaner energy systems would need to be weighed against national socio-economic benefits.

## 2.4 Implications for the thesis

South Africa, Mexico and India's economies are emissions intensive and there is an ongoing shift to decarbonise their energy supplies. In these countries, national priorities to lower poverty are not placed under those to lower GHG emissions and thus need to be tackled at the same time. In particular, South Africa's key development goals focus on economic growth and poverty reduction and these objectives would need to be considered in mitigation policy and strategies (Altieri et al, 2016). From a development perspective considering national circumstances of South Africa, Mexico and India, the most important benefits sought are reduced poverty, increased employment opportunities, improved health as well as enhanced energy and food security (Kok et al, 2008). Kok et al (2008) suggest areas of policies which may allow for the integration of climate and development. The areas alluded to are rural development and land use, energy and transport. With regards to rural development, opportunities for integration exist in the growing bioenergy market as exemplified by Brazil above. These plantations not only provide employment for farmers but also have the potential to improve renewable energy supply in the rural areas. In terms of energy, although improving access to energy and enhancing energy security are crucial for economic development, clean energy can reduce pollution whilst mitigation climate change. When it comes to transport, a developmental aspect such as increased mobility can be promoted with the establishment of improved mass transport systems whilst reducing the emissions from this sector (Kok et al, 2008).

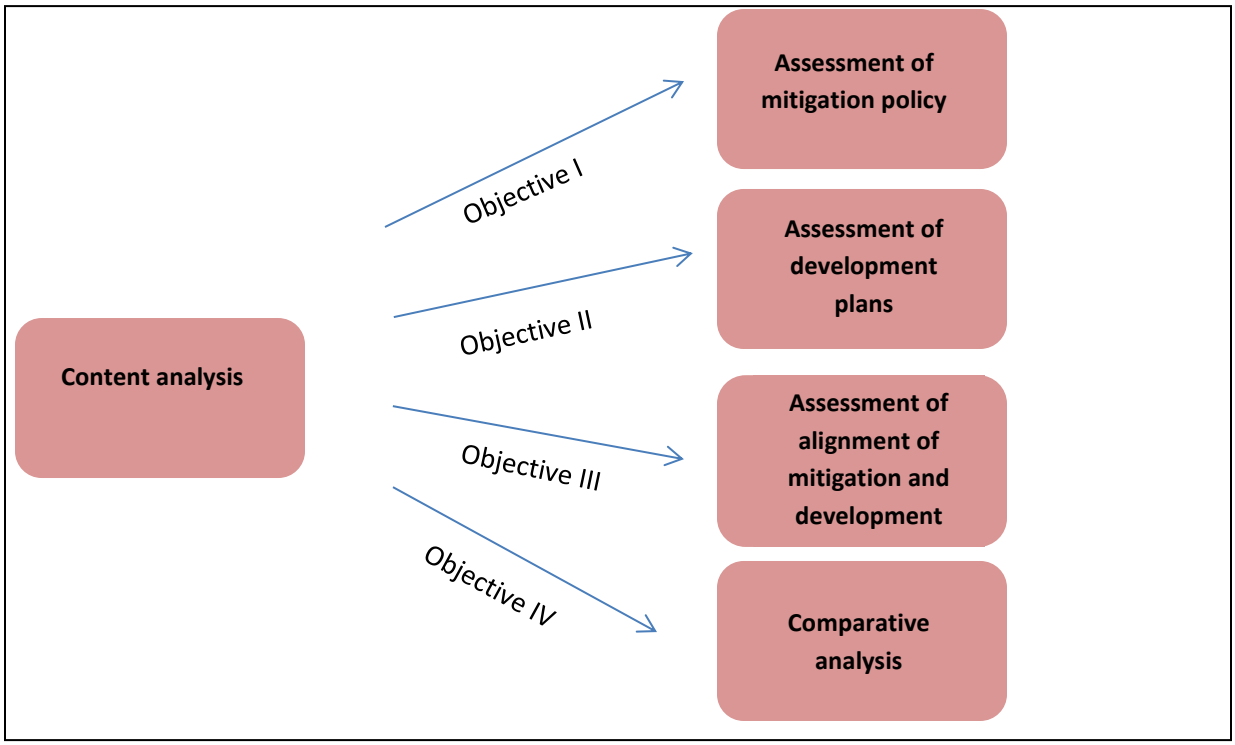
In light of the Paris Agreement, this research seeks to understand if and how South Africa, India and Mexico intend to reduce emissions without exacerbating poverty, thus seeking if there has been an alignment made between national development strategies and low GHG emission strategies.

# Chapter 3: Methodology

## 3.1 Content analysis of national documents

The methodology used to investigate the research question (see section 1.2) was a systematic qualitative content analysis of national documents. National documents on mitigation policy and development planning were analysed. Figure 2 below summarises the main objectives that guided this thesis. Based on the content analysis this research assessed the extent to which development and poverty were considered in the three countries' climate policies.

Figure 2: Summary of the analytical framework (Source: Authors own)




This research assessed the extent to which climate change mitigation is considered in the countries' development plans. Based on the first two objectives, this thesis illustrated the extent of alignment of these development and climate change policies.

The results of content analysis was undertaken in chapter 4 for each of three countries, South Africa, Mexico and India, examining the national documents for each in depth. Chapter 5 presented a comparative analysis, comparing the findings across the three countries. The comparison consisted of

firstly, a general comparison of the three countries NDCs and climate policies and how development was integrated into these documents. The general comparison considered several factors such as an acknowledgement of national priorities and the mentioning of development orientated guiding principles informing climate policy. Included in this integration of development into climate policy was an analysis of how each country treated co-benefits considering the range and type of benefits explored as well as the presence of decision framework that considered crucial aspects such as feasibility. Secondly, was a comparison of the integration of climate mitigation needs into national development plans. The general comparison considered factors such as the countries commitment to lower carbon economies and the inclusion of instruments to curb investment into fossil fuels. This comparison also included an analysis of the integration of mitigation into sectoral development plans. Details associated in this regard were how each country addressed climate change in key sectors as well as any reference to supporting policies and initiatives. The basis was thus laid for rating countries in on the degree of integration of mitigation and development, in chapter 5 and the Conclusion.

According to Leech and Onwuegbuzie (2011) useful analysis tools and programs to assist in analysing larger forms of qualitative data could be NVivo. This program presents several types of analysis such as keywords-in-context, content analysis and a useful constant comparison analysis. This thesis made use of keywords-in-context across the key documents for all three countries. The key words searched for were poverty, inequality in the climate policies and climate change and mitigation in the development policies. According to Leech and Onwuegbuzie (2011) one of the limitations of keyword-in-context as a form of content analysis is that there could be a loss of valuable content. To enhance the benefits of this analytical tool, Leech and Onwuegbuzie(2011) suggested the use of multiple words around the key words so as to not be made aware of useful content. . Figure 2 above summarises the content analysis for this research and text below explores each objective detailing its associated methodological approach. The thesis made use of Nvivo for content analysis of the documents, specified in the following section.

## 3.2 Key data sources

The key documents of interest in this research per country were as follows:

1. South Africa
    a. Climate policy: Intended Nationally Determined Contributions (South Africa, 2015); National Climate Change Response White Paper (DEA, 2011)
    b. Development plans: National Development Plan 2030 (National Planning Commission, 2012)

2. Mexico
    a. Climate policy: Intended Nationally Determined Contributions (Mexico, 2015); National Climate Change Strategy (SERMANET, 2013)
    b. Development plans: National Development Plan 2013-2018 (Republic of Mexico, 2013)
3. India
    a. Climate policy: Intended Nationally Determined Contributions (India, 2015); National Action Plan for Climate Change (India Government, 2008)
    b. Development plans: Twelfth Five Year Plan 2012-2017 (Government of India, 2012)

Nvivo will assist with a systematic document analysis by allowing for the coding and easier identification of key terms such as poverty inequality and mitigation in all the documents. The use of Nvivo will also allow for the identification of themes similar in each of the documents as well as assist in generating mind maps with these themes. The documents listed above were considered most relevant to NDCs, as submitted in 2015. More recent documents would refer to the implementation of NDCs, which was beyond the scope of this thesis but would be useful further work.

# Chapter 4: Country analysis

The focus of this chapter is to assess the extent to which key development objectives, notably poverty alleviation and inequality reduction, are integrated into short term low greenhouse gas strategies and contributions; and in turn, how much development plans integrate climate change mitigation. This chapter shall consist of an analysis of South Africa followed by India then Mexico.

## 4.1 South Africa

### 4.1.1 Introduction

This section of the thesis consists of an analysis of South Africa's mitigation strategy guided by information provided by the country's Nationally Determined Contribution (NDC; Republic of South Africa, 2015) and its alignment with the key developmental goal of reducing poverty and inequality. Countries have an obligation to submit successive NDCs[1] under Article 4.2 of the Paris Agreement and to "pursue domestic mitigation measures" (UNFCCC, 2015:4). Since the analysis focuses on both development and climate, the section also analyses two key documents - the National Climate Change Response White Paper (NCCRP; DEA, 2011) and National Development Plan (NDP; National Planning Commission, 2012).

Based on a content analysis of these key documents, the first objective is to analyse country's approach to mitigation focusing on the NDC (Republic of South Africa, 2015) and NCCRP (DEA, 2011) and capture the mention of poverty alleviation and inequality in these documents. The second objective is to analyse the country's approach to development and poverty alleviation focusing on the NDP (National Planning Commission, 2012) and capture the mention of climate change mitigation. The third objective is to illustrate the extent of alignment of the country's climate and development policies analysed.

### 4.1.2 How the climate policy addresses poverty in the Nationally Determined Contribution and National Climate Change Response Paper

#### Nationally Determined Contribution

According to South Africa's NDC (Republic of South Africa, 2015), the country is committed to making a fair contribution to global collective action to ensure that temperature increases are kept below 2°C above the pre-industrial levels. South Africa's contribution to emissions reduction also notes that global increase of 2°C could result in 4°C in the Southern African region. South Africa's mitigation approach,

[1] The INDCs submitted prior to the Paris Agreement became the country's first NDCs when that country ratified the agreement. In the future, the INDCs will be referred to NDCs

one of a Peak Plateau Decline (PPD) emissions trajectory is informed by the country's national priorities and circumstances. The PPD trajectory suggests that the country's emissions will peak from 2020-2025 followed by a plateau for the next 10 years and then finally a decline in emissions from 2036 onwards (DEA, 2011). The country faces an overriding priority to combat poverty and inequality which requires addressing challenges such as unemployment (South Africa, 2015). As South Africa is currently heavily reliant on fossil fuels, the NDC suggests that in the short-term there is limited flexibility to transitioning to a just low carbon economy. South Africa's approach to mitigation is one that acknowledges that the just transition to a planned low carbon and more climate resilience development may take time and according to the NDC (Republic of South Africa, 2015) the PPD trajectory is consistent with those realities. By deviating from the business-as-usual trajectory in its efforts to further develop their economy, the country is contributing its fair commitment to global collective action in combatting climate change. According to the NDC (Republic of South Africa, 2015), further alignment is made evident by the development of climate compatible sectoral plans such as the integrated energy and electricity plans (IEP and IRP). The 8 objectives of the IEP shown below in Table 2 further illustrate alignment as elements addressing poverty and climate change are considered as primary aims.

**Table 2: Key objectives of the IEP (Source: Department of Energy, 2016)**

| | |
|---|---|
| Objective 1: Ensure security of supply<br>Objective 2: Minimise the cost of energy<br>Objective 3: Promote the creation of jobs and localization<br>Objective 4: Minimise negative environmental impacts from the energy sector | Poverty |
| Objective 5: Promote the conservation of water<br>Objective 6: Diversify supply sources and primary sources of energy<br>Objective 7: Promote energy efficiency in economy<br>Objective 8: increase access to modern energy | Climate |

According to the NDC (Republic of South Africa, 2015) the current analysis of renewable energy projects has shown to have a positive impact on the economy and offer employment opportunities. Therefore illustrating that the upscaling of renewable energy projects as indicated by the NDC (South Africa, 2015) is an effort to address both poverty and climate change.

## National Climate Change Response Paper

The largest component of the transition is the comprehensive transformation of the country's energy mix. This involves developing cleaner efficient technologies to replace the older inefficient coal-fired power stations. The country has already started to invest in renewable energy forms. According to the

NCCRP (DEA, 2011) two higher efficiency coal stations, Kusile and Medupi are almost complete. According to the country's NCCRP, the use of a variety of mitigation approaches, measures and policies will enhance mitigation outcomes and most critically given national priorities optimize job creation and benefits of sustainable development. The mix of mitigation actions will inform sectoral desired emissions reduction outcomes (DEROs) which will ensure sector appropriate solutions and contributions to mitigation that are cost effective. DEROs lead us to the main mitigation approach towards reducing emissions and informing action which is planned to be implemented in 2017, including company-level carbon budgets. This approach is of relevance in this analysis because as suggested by the NCCRP (DEA, 2011) the carbon budget sectoral feasibility was based on an integrated analysis of firstly, current as well as future emission trends by main sectors, secondly by an analysis of the timing, costs and risks of mitigation actions for each sector and thirdly an analysis of possible economy wide implications of mitigation actions paying particular attention to jobs which are an essential component of poverty alleviation (DEA, 2011).

According to the NCCRP (DEA, 2011) one of the strategic priorities for climate change response is for policy and regulatory alignment. This priority involves three aspects, the first being prioritizing interventions and strategies that have climate change benefits as well as contribute towards socio-economic benefits such as job creation and poverty alleviation. The second aspect towards aligned policy is the review of existing national strategies with the intention of optimizing the climate change co-benefits of their planned interventions. Thirdly, this strategic priority seeks to integrate climate change response interventions that encourage new economic activities into appropriate existing policies. Under climate change, the objectives as mentioned earlier in the NCCRP (DEA, 2011) are to build climate resilience of the economy, country and people as well as transition to an equitable, internationally competitive lower carbon economy whilst simultaneously addressing national priorities such as sustainable development , job creation, public health, poverty and social inequality.

South Africa's overall approach to mitigation is informed by two circumstances; the first being its fair contribution to international efforts to reduce anthropogenic emissions and second being the country's effective management of the challenge of development and poverty eradication. However, an analysis of the NCCRP shows that poverty is more directly addressed under increasing climate resilience which falls under the climate change adaptation strategy. As noted by the NCCRP (DEA, 2011) adaptation responses have a stronger and specific local context than mitigation response and the adaptation response benefits are often more noticeable faster and efforts are focused on those most vulnerable

and poor. For example, projects aimed at improving small scale livelihoods and reducing vulnerability such as climate resistant farming practices (DEA, 2011). However mitigation efforts are tailored to development and this is evident by the set of Near-term Priority Flagship Programmes which are documented by the NCCRP.

Table 3: Mitigation Climate Change Flagship Programmes (Source: DEA, 2011)

| Programme | Programme details |
|---|---|
| **The Renewable energy flagship programme** | Driver of renewable energy technologies |
| **The Transport Flagship Programme** | Facilitate development of public transport and electric vehicles |
| **The Energy Efficiency and Energy Demand Management Flagship Programme** | Driver of energy efficiency both industrial and residential |
| **The Carbon Capture and Sequestration Flagship Programme** | Development of carbon capture plant to store process emissions |
| **The Waste Management Flagship Programme** | Establish mitigation potential of waste-energy opportunities |

The flagship programmes include building on climate change initiatives in existence and developing future ones. The programmes most linked to mitigation are summarized in the table 3 above. These mitigation programmes cover the country's higher carbon emitting sectors and are cost effective and carry co-benefits in terms of climate change and development (DEA, 2011). Therefore based on the analysis, developmental aspects are well integrated into the climate policies. The policies refer to aspects of development such as energy security and job creation particularly.

### 4.1.3 How development planning strategies in the National Development Plan address climate change mitigation

The analysis on South Africa's approach to development and poverty alleviation was based primarily on the National Development Plan (NPC, 2012). The majority of the mention of climate change and the transition to a lower carbon country appears in three main chapters, namely Chapter 3, 4 and 5 which refer to Economy and Employment, Economic infrastructure and Environmental sustainability and resilience respectively. This analysis sheds light on the country's main poverty alleviation strategies in order to ascertain to what extent climate change mitigation informs the actions noted. The principal aim of the NDP is to 'eliminate poverty and reduce inequality by 2030' (NPC, 2012: 24). The NDP suggests that this developmental goal can primarily be reached by faster economic growth that has equitable benefits to all South Africans. Slow progress to the country's development which has left the majority of

citizens in a cycle of poverty has been attributed to nine major challenges which have received priority in this development document.

### Economy and Employment

Equitable and fast economic growth is considered the biggest driver to eradicating poverty and eliminating inequality and as such the NDP (National Planning Commission, 2012) places much emphasis on the economic sectors. Of key economic strategies and objectives for improved economic growth and employment, climate change is referred to under the minerals and metals cluster. The mining cluster incorporates the mining and quarrying activities of all minerals in the country. Although the goal for the country is to exploit its mineral resources so as to create further employment opportunities and generate tax revenue, there is an awareness that benefits associated with mineral extraction is of an energy intensive nature. The focus therefore is to heavily invest in assisting the mining industry to reduce its carbon footprint, given that the Human Sciences Research Council's estimates an expansion of mining employment of 200 000 jobs by 2024 (National Planning Commission, 2012). This drive to invest in 'clean coal' is put forward in the context of climate change. The analysis under economy and infrastructure provides more detail on cleaner coal production and use.

Chapter 3 of the NDP (National Planning Commission, 2012) on Economy and Employment also makes mention of the role of the green economy which also includes shifting to a low carbon economy considered to be sustainable. According to the NDP (National Planning Commission, 2012), the country's green economy agenda arises concurrently with the country's energy shortages. The green economy supports the development of renewable energy sources and South Africa's green economy agenda is planned to promote further industrialization, energy efficiency as well as employment. The Table 4 below provides insight into the country's Green Economy Accord and further demonstrates South Africa's recognition of the need to integrate the climate change agenda into future development commitments.

**Table 4: Green economy Accord Commitments (Source: Economic Development Department, 2011)**

| | |
|---|---|
| Commitment 1 | Rollout of Solar Water Heaters (funding plan to install 1 million SWH) |
| Commitment 2 | Investment in the Green Economy |
| Commitment 3 | Rollout of Renewable Energy |
| Commitment 4 | Energy efficiency |
| Commitment 5 | Waste recycling, Re-Use and Recovery |
| Commitment 6 | Biofuels |
| Commitment 7 | Clean-coal initiatives (Carbon Sequestration Leadership Forum) |
| Commitment 8 | Retrofitting |

| | |
|---|---|
| Commitment 9 | Reducing carbon emission in transport |
| Commitment 10 | Electrification of poor communities |
| Commitment 11 | Economic development in green economy |
| Commitment 12 | International corporation |

This Accord is the fourth accord under the New Growth Path referred to in the country's NDP (National Planning Commission, 2012). Commitments listed in table 3 such as energy efficiency support key government objectives such as strengthening energy security and creating jobs which according to the national development imperative contribute to alleviating poverty.

## Economic Infrastructure

Chapter 4 of the NDP (National Planning Commission, 2012) includes a focus on the energy sector. By 2030, the plan is to, firstly, promote an integrated energy sector that empowers South Africa by encouraging economic growth and development though suitable investment in the sectors infrastructure; secondly, enhanced social equity by increased access to energy at affordable tariffs and targeted subsidies to poorer households; thirdly to promote environmental sustainability by encouraging efforts to mitigate the effects of climate change and reduce pollution. The reality is that South Africa's energy sector has been dependent on coal and the NDP makes explicit mention of this. Coal is one of the top export earners and according to the NDP (National Planning Commission, 2012) domestic coal produces over 70% of the country's primary energy and more than 90% of electricity. In light of the current energy reality the 2030 plan set outs steps and policy priorities that aim to transform the energy system and these are illustrated below in figure 3.

**Figure 3: Policy improvements for a transition away from coal (Source: NPC, 2012)**

Policy requirements for improved energy situation in South Africa

- Balance in coal export growth and domestic supply security
- Gas exploration as coal alternative
- Greater mix of energy sources and diversity of independent power producers
- Improved electricity distribution at the municipal level
- Fair electricity pricing and access
- Consideration of desirability of nuclear power

Figure 3 above illustrates South Africa's intention to further depart from fossil fuels and contribute to mitigation. The main bullet point relating to mitigation is the greater mix of energy sources. An infrastructural innovation that is informed by the climate change context is for improved and cleaner coal technologies in coal production and use. Opportunity for cleaner technology exists as old coal-fired stations are replaced by newer ones. 'Cleaner coal' technologies that the NDP suggests are technologies that allow underground coal gasification as well as carbon capture and storage. In an effort to balance energy supply security, affordability and climate change mitigation the NDP suggests that about 40 000MW of new power capacity would need to have been built by 2030. According to the NDP (National Planning, 2012) approximately half of the country's emissions come from mostly coal-fired power generation plants and if the energy sector adheres to the emissions trajectory of peak, plateau and decline suggested in the NDC, the balance of the required new power will have to come from alternative sources to coal. The sources suggested are wind, gas, solar, imported hydroelectricity and quite possible a nuclear programme from 2023. Therefore, to mitigate climate change while enhancing supply security, the NDP suggests there is a need to increase the diversity of South Africa's energy production mix. An example given is one of combined cycle gas turbines which are cleaner and also less capital intensive than coal-fired power and can also be used to improve supply security at a time when there are shortfalls from renewable energy sources.

The table 5 below summarizes the short term (2020) and medium term (2030) priorities for meeting South Africa's desired energy mix that is to an extent cognizant of climate change in its pursuit of development and poverty alleviation as pointed out in the NDP.

**Table 5: Priority actions up to 2030 (Source: Adapted from NPC, 2012)**

| Target timeline | Priority Action |
|---|---|
| 2020 | • Coal rail capacity match coal export port (Richard's Bay)<br>• Commissioning of Kusile coal power station<br>• Contracting of 7000MW renewable energy<br>• Pro-poor electricity tariffs<br>• Electrification coverage of at least 85%<br>• Natural gas infrastructure put in place to power combined-cycle gas turbines |
| 2030 | • Contraction of more than 20 000MW renewable energy and increasing share from imported hydroelectricity<br>• Further enhanced raid and port capacity to support coal exports<br>• 10 000MW of Eskom old coal powered stations decommissioned but contraction of 6000MW new coal capacity- these are subject to climate change negotiations |

| | |
|---|---|
| | • Promotion of cleaner coal technologies<br>• Economy wide carbon tax (sector exemptions) coupled with direct action (such as energy efficiency programmes and building emission standards)<br>• Grid electricity coverage of 90%<br>• Wide use of hybrid and electric vehicles<br><br>Mitigation |

Table 5 distinguishes the priority actions which focus on mitigation as shown in the NDP (National Planning Commission, 2012).

### Environmental sustainability and resilience

Chapter 5 of the NDP most prominently addresses South Africa's agenda for an environmentally friendly economic transition that takes climate change mitigation into account. The primary objective is strengthening the resilience of the country's economy and society taking into consideration that those most in poverty are most vulnerable to climate change's consequences. Given the country's dependency on coal, the NDP (NPC, 2012) suggests that this could prejudice South Africa interests as there are increasing global commitments to curb emissions.. Chapter 5 of the NDP sets out plans to enable South Africa's transition to the desired sustainable, climate change resilient, low carbon equitable economy and society by 2030. Central to this 2030 vision is overcoming the challenge to grow sustainably by decoupling resource consumption and carbon emissions from the economy.

The NDP's chapter 5 summarizes the elements of the 2030 Vision with regards to mitigation and building sustainable communities mentioned in the previous chapters of the NDP and adds proposed interventions such as refining incentives for the widespread use of solar power as well as addressing service backlog by providing rural settlements with renewable energy in off-grid electrification. Although the section on development and mitigation mentions job creation and increasing energy security, the section on development and adaptation refers more explicitly to ensuring that sectors are resilient to the negative impacts of climate change by decreasing poverty and inequality.

## 4.1.4 The extent of alignment of development and climate policies

The focus of this section of the analysis is to establish to what extent development and climate policies are aligned in South African policy. Through an analysis of the key source documents, the NDP, NCCRP

and the NDP, the analysis above finds that there are overlapping priorities and actions when it comes to climate change mitigation and poverty alleviation.

This section reviews alignment in more detail and finds instances of high integration and others of little alignment. The table 6 below summaries key examples of high and little alignment as shown in the policies.

**Table 6: Examples of the extent of alignment (Source: NPC, 2012; DEA, 2011; Republic of South Africa, 2015)**

| | NDC | NDP | NCCRP |
|---|---|---|---|
| Examples of high degree of alignment | -Trajectory shift: Business as usual to PPD (just transition)<br>-climate compatible sectoral plans (IEP, IRP) and (NGP and IPAP)<br>-RE projects benefits to economy | -Green economy agenda<br>-Integrated energy sector plans<br>-Policy improvements-gas/distribution access (poverty)<br>-Solar and off grid electrification<br>-Decline of coal-fired balanced by concurrent growth in green sector-small medium enterprises<br>-RE: promote local manufacturing flagship programmes (create employment)<br>-Equitable transition | - Green economy-limit job contraction in carbon intensive areas of economy<br>- Transport modal shift (public)<br>-Flagship programmes<br>-Sector job resilience plans |
| Examples of little alignment | -electric vehicles<br>-carbon tax | -Increasing coal rail capacity<br>-Clean coal<br>-Commissioning coal plants<br>-Carbon tax | -Carbon tax(tradeoffs) |

As shown in Table 6 there are several instances of higher alignment of the policies. The examples such as off grid electrification made possible by renewable energy could raise the living standards of those currently without access to electricity. As is shown in each document, misalignment comes most commonly in the form of cleaner coal technologies where further analysis would need to be made to assess its success in mitigating climate change and promoting development.

### 4.1.5 Conclusion

Referring back to the research question which seeks to understand, 'to what extent reducing poverty integrated into medium term low greenhouse gas development strategies and climate change mitigation integrated into development plans in South Africa in particular?' Based on the above analysis, it has become apparent that the country is to a higher extent aligned in its development and mitigation policies. It is evident that mitigation action is informed by development priorities and a significant amount of development priorities are informed by climate change.

## 4.2 India

### 4.2.1 Introduction

The focus of this chapter is to assess the extent to which poverty alleviation and inequality reduction is integrated into short term low greenhouse gas strategies and contributions; and in turn, how much development plans integrate climate change mitigation. This subchapter focuses on India and the key documents assessed are the NDC (India, 2015), the National Action Plan on Climate Change (Government of India, 2008) and India's national development strategy which comes in the form of a Twelfth Five Year Plan (2012-2017) (Government of India, 2012) comprising of volume I, II and III. Volume I, II and III focus on 'Faster, more inclusive sustainable growth', the 'Economic Sector' and 'Social Sector' respectively. The first objective is to analyse the country's approach to climate change mitigation as shown in the NDC and National Action Plan and capture the mention of poverty alleviation and inequality reduction. The second objective is to analyse the country's approach to development as shown in the Twelfth Five Year Plan and capture the mention of climate change mitigation. Based on the first two objectives this paper then seeks to illustrate the alignment and misalignment of climate and development planning as shown in the key documents.

### 4.2.2 How the mitigation policy addresses poverty alleviation as shown in Nationally Determined Contribution and National Action Plan on Climate Change

#### India's Nationally Determined Contribution

India's voluntary goal is reducing the emissions intensity of its GDP by 33 – 35% by 2020 from 2005 levels. As part of the country's contribution to the Paris Agreement, India suggests that its climate policy seeks to not only address elements of climate change such as mitigation, technology transfer, transparency of action and support but also seeks to address them appropriately considering national

needs. The NDC adds combatting climate change and 'at the same time, the genuine requirements of developing countries like India for an equitable carbon and development space to achieve sustainable development and eradication of poverty needs to be safeguarded (Government of India, 2015: 4). The NDC (Government of India, 2015) further highlights that poverty eradication is the country's foremost priority. One of the highlighted indicators of poverty in the country is energy security. India forms 24% of the world's population without access to electricity leaving the majority to rely on solid biomass for cooking and heating. India realizes that economic growth and development has to be guided by sustainability. The NDC (Government of India, 2015) suggests that the National Electricity Policy (NEP) and Integrated Energy Policy (IEP) focus on providing equitable access to electricity as well as promoting renewable energy sources. According to the NDC (Government of India, 2015), one of the main mitigation strategies is providing a clean and efficient energy system, thereby addressing energy poverty in the country. The goal is to increase the share of non-fossil fuel based electricity to 40%. To develop such an energy system, the government seeks to promote the use of renewables in the energy mix as well as implementing supercritical technologies for coal based power plants (Government of India, 2015). The Government of India considers supercritical technologies a cleaner form compared to the less-efficient ones currently in operation.

India is also running one of the biggest renewable capacity expansion programs in the world with solar and wind providing leading sources. Biomass energy constitutes 18% of energy use and the NDC indicates that due to its current inefficient usage leading to indoor pollution, the government seeks to initiate programmes that promote its cleaner and efficient use (Government of India, 2015). It is suggested that coal will continue to be the main source of electricity, therefore the government seeks to promote clean coal policies in whilst being able to secure 'reliable, adequate and affordable supply of electricity' (Government of India, 2015:10). These clean coal policies will allow for the initiation of processes such as Renovation and Modernization (R&M) and Life Extension (LE) of older power stations.

The NDC refers to a safe, smart and sustainable green transportation network that focuses on low carbon infrastructure and public transport programmes such as the Mass Transit and urban transport projects which are initiated under the National Urban Renewal Mission. In terms of afforestation, the NDC makes mention of enhancing carbon sequestration projects such as Green India Mission which in turn provides livelihood support and promotes the creation of additional carbon sinks.

NDC therefore addresses developmental issues primarily in energy and transport. The NDC also alludes to forestry and its potential to contribute to development.

### National Action Plan on Climate Change

The NAPCC suggests that sustaining a high growth rate is essential for raising living standards of the people and reducing their vulnerability to the effects of climate change. In light of this, the first principle guiding the NAPCC is to protect the 'poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to climate change' (NAPCC, Government of India, 2008:2). The NAPCC suggests the use of measures that consider co-benefits by promoting development priorities whilst addressing climate change.

The NAPCC is structured around eight missions and their associated co-benefits that are core to its implementation. The National Solar Mission sought to significantly increase the solar power contribution to the energy mix. The solar mission also sought to implement an R&D programme to enable the creation of more affordable solar power. Under the renewable energy technology programmes for power generation, the use of biomass is thought to have co-benefits in that its growth on unused rural plantations could provide employment to the rural community.

Under the National Mission on Sustainable Habitat, the NAPCC (Government of India, 2008) refers to better urban planning and a shift to improved public transport to ensure efficient and convenient commute of the citizens. Other elements of this mission such as vehicle or fuel taxes and prices could not only raise revenue for government but also offer important gains in social welfare by reducing pollutants. Under the National Mission for Enhanced Energy Efficiency in Industry, the NAPCC (Government of India, 2008) indicates that energy efficiency measures have co-benefits because they not only lead to energy conservation but also to reduced air pollutants which could improve health particularly for those living near industries.

Thus India's climate policy, NAPCC (Government of India, 2008) take development as a priority as highlighted in the key principles guiding the policy. The policy also refers to the importance of co-benefits when considering appropriate mitigation measures.

## 4.2.3 How the development planning strategies in the Twelfth Five Year Plan address climate change mitigation

The Government of India's development plans focus on a period of five years at a time. In this section, this thesis hones in on Volume I and Volume II of the Twelfth Five-year Plan, as these are the two volumes where climate change mitigation is included. Volume I focus on the more general approach to sustainable growth and Volume II focuses on sectoral approaches to economic development.

### Volume I: Faster, More Inclusive Sustainable Growth

Volume I includes chapter 4, dedicated to sustainable development. Chapter 4 suggests that the country's economic growth and development should be guided by sustainability and matters such as climate change should inform development. According to the Twelfth Five year plan (Government of India, 2012) India communicated its voluntary mitigation goal of reducing the emission intensity of its GDP by 20-25% by 2020 over its 2005 levels. This voluntary goal which was prior to the country's NDC analysed above was part of the Copenhagen Pledge and was integrated into the development plan. Chapter 4 on sustainable development refers to low carbon strategies for inclusive growth where co-benefits are possible through ensuring sustainability through its growth whilst contributing to mitigation. The Planning Commission appointed an Expert group on Low Carbon Strategies for inclusive growth. The focus of expert advice would be on the large carbon emitting sectors such as Power, industry, transport, buildings and forestry. In those key sectors, the plan highlights the twelve focus areas for the 5 year plan shown in figure 4 below. Details of these sectoral plans are found in volume II of the development plan. The National Wind and National solar mission shown in Figure 4 are also mentioned in the NAPCC (Government of India, 2012) above which highlights greater extent of integration of development and climate policy.

**Figure 4: Focus Areas for the Twelfth Plan (Source: Government of India, 2012)**

1. Advanced Coal Technologies
2. National Wind Energy Mission
3. National Solar Mission
4. Technology Improvement in Iron And Steel Industry
5. Technology Improvement in Cement Industry
6. Energy Efficiency Programmes in The Industry
7. Vehicle Efficiency Programme
8. Improving The Efficiency of Freight Transport
9. Better Urban Public and Non-Motorized Transport
10. Lighting, Labelling and Super-Efficient Equipment Programme
11. Faster Adoption of Green Building Codes
12. Improving the Stock of Forest and Tree Cover

The five year plan provides a co-benefits framework for each of the twelve focus areas where the direct effects are analysed. The co-benefits sought are economic growth which includes energy security, reduced dependence on exports and job creation potential; inclusion which refers to equality as well as improved governance (reduced centralization), local environment and carbon mitigation. Hence

development planning includes sustainability more broadly, and climate change mitigation in particular, through a co-benefits framing. The economics, social and local environmental co-benefits are summarized below in table 7, in addition to the environmental benefits of mitigation – presented in GoI's development plan.

**Table 7: Summary of benefits for low carbon strategies (Source: Adapted from Government of India, 2012)**

| CATEGORIES | ECONOMIC GROWTH | SOCIAL BENEFITS | LOCAL EVIRONMENTAL BENEFITS | GLOBALL ENVIRONMENTAL BENEFITS |
|---|---|---|---|---|
| **Categories in detail** | Energy security, Reduced dependence on imports | Inclusion | Local environment and Health benefits | Climate change Mitigation |
| **Advanced coal** | -contributes to energy security (+) | -could result in higher power costs (-) | -reduced emissions of SO and NO (+) | -reduced $CO_2$ emissions (+) |
| **Solar mission** | -substitute fossil fuels and enhance energy security, (+) | -potential for increased electricity costs (-) | - substitute for kerosene and firewood (+) | -zero emissions |
| **Wind mission** | -substitute fossil fuels and job creation (+) | -potential for increased electricity costs (-) | -land needed (-/+) | -zero emissions (+) |
| **Industry (Technology improvements and Energy Efficiency)** | -less fossil fuel consumption (+) | -potential for increased product prices due to these developments (-) | -reduction in pollution (noise and pollutants such as NO and SO) | -reduced demand for fossil fuel thus reduced emissions (+) |
| **Transport (Mass transport)** | -savings from reduced fuel expenditure (+) | -improved mobility for poor citizens (+) | -reduced local emissions (better air quality) (+) | -reduced fossil fuel consumption (+) |
| **Green Building Codes** | -decreased energy costs (higher investments) (+) | -raised costs for buildings (rentals, purchases etc) (-) | -energy efficiency improved air quality (+) | -reduced fossil fuel consumption |
| **Forest and tree** | -ecosystem | -displacement | -depends on | -carbon |

| | | | | |
|---|---|---|---|---|
| **cover** | services enhanced (+) | and loss of livelihoods potential (-) | type of forest cover (-/+) | sequestration (+) |

The table 7 above summarizes the direct effects of the focus areas and benefits illustrated are identified as positive (+) that is having benefits or (-) meaning little to none.

### Volume II: Economic Sectors

This volume goes into further detail about the key sectors mentioned in Volume I of the development plan. Chapters 13, 14, 15 and 18 which are on industry, energy, transport and urban development make mention of climate change and shall be highlighted in more detail. In chapter 13 (industry), it is suggested that throughout all subsectors such as petrochemical, mineral exploration, steel and also food processing industries focus, should be given to issues that cut across these sectors such as human resource development, land and water and environmental sustainability. According to the Twelfth Plan (Government of India, 2012) ensuring environmental sustainability in industrial growth and minimizing further harm would need to be considered at three key stages namely, in the procurement and use of natural resources, industrial processes and activities and product use and disposal. Under national investment and manufacturing zones (NIMZs) the government encourages the development and use of green technologies in processes by offering special incentives to those that make use of renewable energy appropriate technologies. There is also the incentive to obtain green rating for buildings. The Twelfth plan recognizes that the cement industry in particular is the world's most energy intensive industries and as such the plan suggests the upgrade of existing plants and research into further development technologies and use of alternative fuels. The automotive industry is considered to be a key sector for the Indian economy and it acts as one of the drivers of economic growth. The Twelfth Plan (Government of India, 2012) recognizes that the sector is undergoing transformations in light of environmental, including climate change mitigation, and energy concerns and therefore the government has decided upon developing electric mobility.

Chapter 14 of the Twelfth Plan (Government of India, 2012) on energy highlights that at the time of publication, India was the fourth largest consumer of energy in the world. The government indicates that to meet its development needs, India has to make use of all available domestic resources of coal, uranium, oil as well as other renewable resources. The Twelfth Plan expresses the aim of expanding access to energy by further developing village electrification as well as providing kerosene at affordable prices. In terms of energy demand and supply, the government suggests that energy demand will

increase as the economy grows and access in rural areas grows. The Twelfth Plan predicts that by 2022 coal will still be the dominant source of primary energy. The supply of renewables is however expected to increase rapidly particularly as policies provide stronger incentives for the development of renewables. The figure 5 below shows the trends in the domestic supply of commercial energy from the period 2000-2022. The twelfth plan suggests that new coal based thermal plants would be developed using supercritical technology which has the potential to reduce carbon dioxide emissions by 5% compared to the older plants.

**Figure 5: Trends in supply of primary domestic commercial energy (Source: Adapted from Government of India, 2012)**

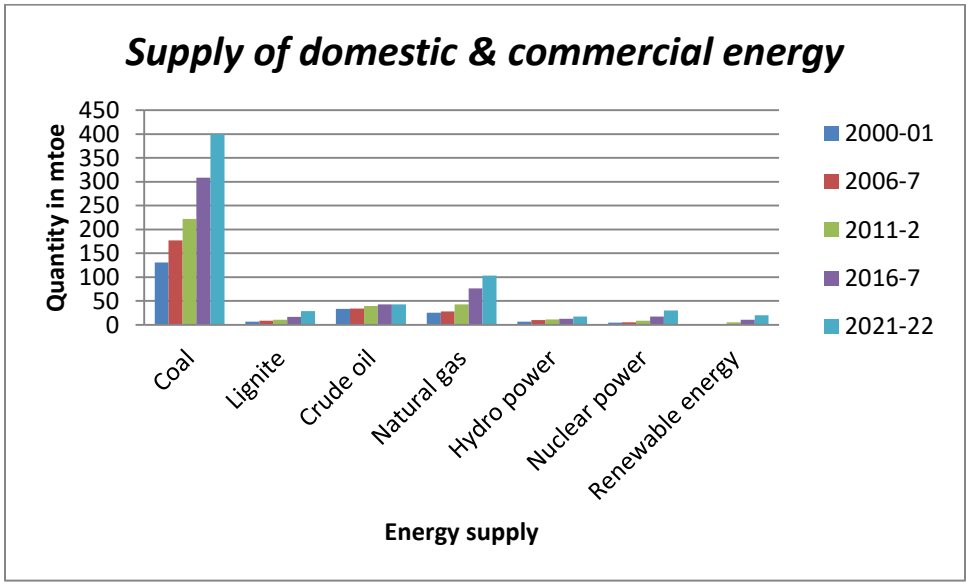



Figure 5 above shows that coal continues to be the dominant supply but there are projections of increasing development of renewables. As shown above, these developments of renewables are very small compared to coal supply.

In terms of the fuel mix for electricity, the Twelfth Plan seeks to change the structure and reduce the dependency of supply from coal as shown in table 8 below. The capacity and generation of renewables is projected to increase.

**Table 8: Changing structure of fuel for electricity (Source: Government of India, 2012)**

| | Capacity (%) | | | Generation (%) | | |
|---|---|---|---|---|---|---|
| | 2012 | 2017 | 2030 | 2012 | 2017 | 2030 |
| **Coal** | 56 | 57 | 42 | 70 | 69 | 58 |
| **Oil** | 1 | 1 | 0 | 0 | 0 | 0 |
| **Gas** | 9 | 6 | 3 | 7 | 5 | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Hydro** | 20 | 15 | 13 | 14 | 12 | 11 |
| **renewables** | 12 | 17 | 33 | 6 | 9 | 16 |
| **nuclear** | 2 | 4 | 9 | 3 | 5 | 12 |

Table 8 above shows that there is some shift in the fuel mix but as shown in Figure 5 above there is not much of a shift for energy overall. The Twelfth Plan set out some necessary policy reforms in the power sector and of the twelve mentioned, two provide policy reforms associated with renewables. The first one is for the development of a National Clean Energy Fund which would allow for 'suitable incentives for low cost transmissions, linking the renewables energy generation sources and development of smart grid for evacuation and transmission of renewable power' (Government of India, 2012: 158). The second policy reform highlighted should encourage the need to strengthen measures for the increasing share of renewable energy over time. On the same point the Twelfth Plan also suggests that State Electricity Regulatory Commissions (SERCs) should 'provide long-term trajectory for renewable purchase obligations and issue relevant regulations within a specified timeframe' (Government of India, 2012:158).

Although the Twelfth Plan reiterates the need for renewable energy and moving away from fossil fuels in the longer run due to climate change considerations, the plan highlights some potential challenges facing renewable energy (RE) power generations which need to be improved upon. The key challenges are summarized in figure 6 below.

**Figure 6: Key challenges facing renewable energy power (Source: Government of India, 2012)**

1. Regional concentration of renewable energy potential
2. Insufficiency and high cost of evacuation infrastructure
3. Regulatory issues
4. Financial barriers
5. Low penetration of renewables for urban and industrial applications

Chapter 15 of the Twelfth Plan on transport suggests that there needs to be more integrated approach to the sector as a whole. The government suggests a modal mix that will lead to an 'efficient, sustainable, economical, safe, reliable environmentally friendly and regionally balanced transportation system' (Government of India, 2012: 197). Reiterated in this chapter is the need for energy efficiency, electrification as well as mass public transportation critical for inclusive growth and economic development. Chapter 18 of the Twelfth Plan on urban development reiterates the need to promote

non-motorized transport (NMT) as well as the creation of policy to dis-incentivize the usage of private vehicles.

To summarise, as shown in the figures above, energy supply mix is projected to gradually increase in renewable energy forms but coal will remain as the dominant supply (Government of India, 2012). With regards to the Twelfth Plans approach to renewable energy, the strategy focuses primarily on developing areas such as off-grid renewable power, RE for rural application, RE for urban, industrial and commercial applications, research and design for new and RE and strengthening institutional mechanisms for enhanced deployment as well as creation of public awareness. The development plan also targets mitigation in the transport sector.

### 4.2.4 Extent of alignment of development and climate policies

The table 9 below highlights the key examples of high alignment and little alignment as shown in the key development and climate policies.

**Table 9: Examples of high and little alignment (Source: India, 2015; Government of India, 2012; Government of India, 2008)**

| | NDC | NAPCC | Twelfth Five Year plan |
|---|---|---|---|
| **Examples of high degree of alignment** | Renewables and Manufacturing of hybrid and electric vehicles (jobs creation) Green India mission | National missions (Solar, enhanced energy efficiency, Green India) -public urban transport Clean air initiatives | Major initiatives such as RE development fund; National Bioenergy Mission; National Biomass Cook Stove programme 12 focus areas as shown in Figure 5 |
| **Examples of little alignment** | Advanced clean coal technologies and policies (R&M) | -clean coal | Development of new initiatives to expand coal availability |

The Table 9 above illustrates examples of a higher degree of alignment and examples of little misalignment as evident in each of the key documents. As shown above, there are several examples of alignment in each of the documents. These examples include the expansion of renewable energy which also targets increasing electrification particularly in the more remote areas. Improved mass transport allows for greater mobility particularly for those who cannot afford individual cars. Greater alignment can also be seen in this table as there are similar examples common to both the development policies

and the climate policies. The common misalignment illustrated in the documents is commitments to clean coal following the reality that coal will remain the dominant supply of energy.

### 4.2.5 Conclusion

Through the analysis is has become apparent that poverty alleviation and inequality reductions are to an extent integrated into low GHG strategies for India. Similarly, mitigation is integrated into the development plans. Although India plans on utilizing its domestic coal and intensifying its mining sector, there is several mitigation options considered as having social, economic and environmental co-benefits and the development plan alludes to those. There is also considerable alignment between the climate and development policies.

## 4.3 Mexico

### 4.3.1 Introduction

This subchapter focuses on Mexico and the key documents assessed are the NDC (Mexico, 2015), the National Climate Change Strategy (SERMANAT, 2013) and the National Development Plan 2013-2018 (Government of Mexico, 2013).The first objective is to analyse the country's approach to climate change mitigation as shown in the NDC (Mexico, 2015), and NCCS (SERMANAT, 2013) and capture the mention of poverty alleviation and inequality reduction. The second objective is to analyse the country's approach to development as shown in the National Development Plan (Government of Mexico, 2013) and capture the mention of climate change mitigation. Based on this analysis, this thesis then seeks to illustrate the alignment and misalignment of climate and development planning as shown in the key documents.

### 4.3.2 How the mitigation policy addresses poverty alleviation and inequality

#### Mexico's Nationally Determined Contribution

According to its NDC (Mexico, 2015), Mexico is committed to climate change and it is the first developing country to have a comprehensive general law on the subject, the LGCC (in Spanish). The main mitigation target is to reduce its GHG emissions by 25% below BAU levels by 2030. The LGCC places a clear obligation on the government to give priority to the least costly mitigation actions that at the same time result in health and wellbeing co-benefits to the Mexican population. Given the emphasis on co-benefits, the climate policy in Mexico incorporates both GHG and Short Lived Climate Pollutants (SLCPs). The NDC suggests that actions to decrease SLCPs concurrently contribute to shorter term

climate change mitigation and to air quality improvement which lead to positive impacts on human health. According to the NDC (Mexico, 2015), the Mexican government seeks to establish synergies between adaptation and mitigation to help combat climate change and reduce social vulnerability but also encourage inclusive green growth in the country.

To summarize, the NDC alludes to poverty when it suggests focusing on least costly mitigation actions that also result in potential benefits to health and wellbeing.

### National Climate Change Strategy

The NCCS (SERMANAT, 2013) is considered the guiding instrument for the country aimed at promoting sustainable and equitable growth of the country as well as the use of clean and renewable energies leading to low emission development. The strategy also aims for Mexico to become a 'prosperous, competitive, socially inclusive and globally responsible country which generates enough well paid jobs for its population (SERMANAT, 2013: 9). The NCCS (SERMANAT, 2013) reiterates the need to control the emission of SLCPs such as black carbon, methane and hydrofluorocarbons in an effort to improve health and quality of life. With regards to structure and approach, the NCCS consists of a number of strategic axes and lines of action and in terms of mitigation as a whole, the strategy points out 5 mitigation axis which are illustrated below in figure 7.

**Figure 7: Strategic axis of mitigation (Source: SERMANAT, 2013)**

| | |
|---|---|
| **M1** | Accelerate the energy transition towards clean energy sources |
| **M2** | Reduce energy intensity through efficiency and responsible consumption schemes |
| **M3** | Shift towards models of sustainable cities with mobility systems, integrated waste management and low carbon footprint buildings |
| **M4** | Promote best practice in agriculture and forestry to increase and preserve natural carbon sinks |
| **M5** | Reduce emissions of SLCPs and promote co-benefits in health and well-being |

When considering the 5 mitigation axes above, under M1 the NCCS (SERMANAT, 2013) suggests a line of action that encourages power generation by the use of clean and efficient sources to replace fossil fuels minimizing not only its environmental but social impact. M2 and M3 do not target poverty alleviation directly but M3 could contribute with their improved mobility systems particularly the improvement of transport. M4 provides a line of action in the forestry and agricultural sectors that encourages emission

reduction practices but still safeguards rural livelihoods. Under M5, the NCCS (SERMANAT, 2013) seeks to promote low-black-carbon stoves in lower income households and disincentive the unsustainable use of wood. Essentially, M5 is explicitly targeted at co-benefits. M1 to M4 can potentially be well aligned to development and economic growth as well. Clean energy sources can enhance energy security. Sustainable cities with improved mobility particularly for the masses can be useful for poorer citizens.

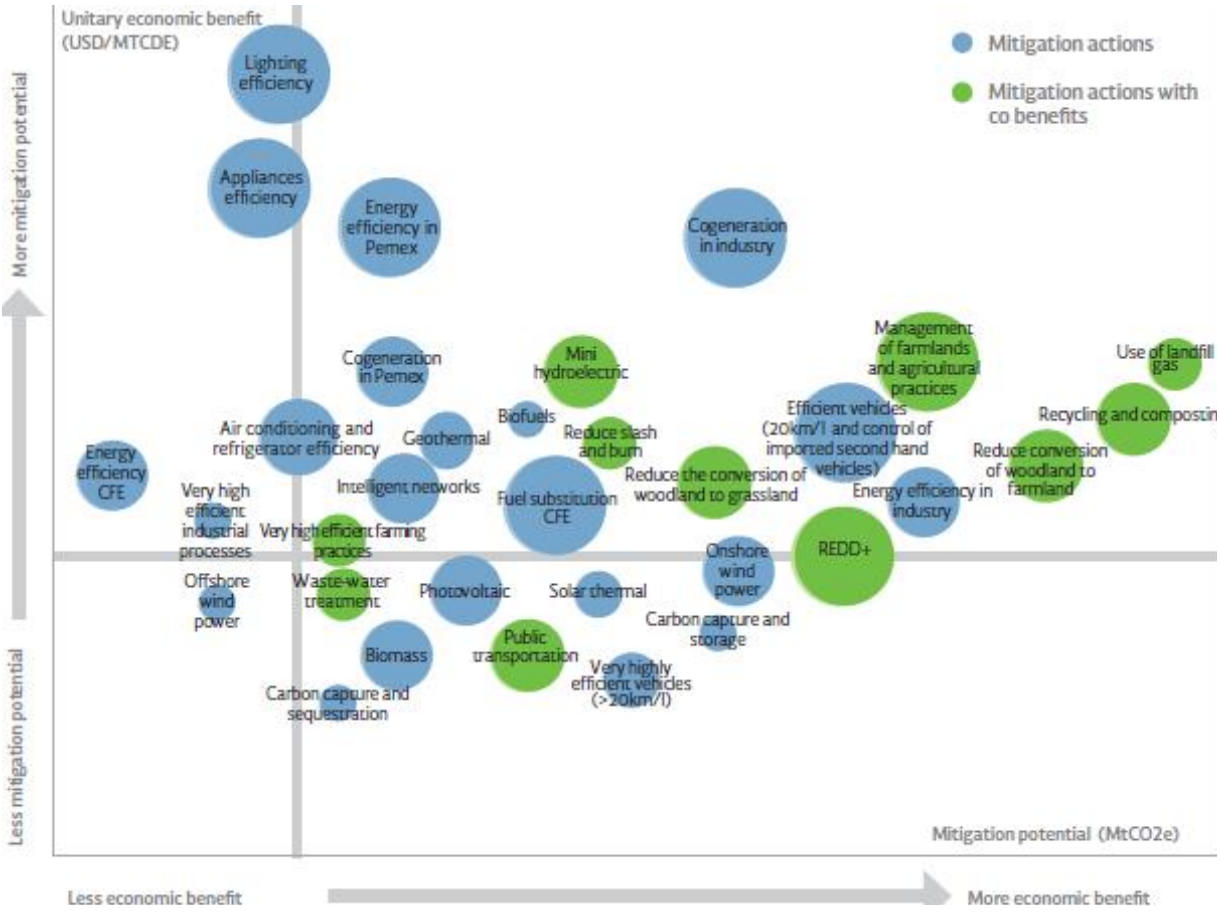
With regards to policy pillars and lines of actions in the NCCS (SERMANAT, 2013), the first policy pillar objective is for crosscutting articulated, coordinated and inclusive climate policies and actions. This inclusion element ensures the incorporation and consideration of all social groups, particularly the poor. The strategy suggests that when it comes to designing climate policies, there is the need to consider 'gender, ethnicity, disability, inequality, wellbeing and inequity in the access to public services' (SERMANAT, 2013:27). Another line of action[2] would be to align sectors such as land-use planning, urban development, energy transport and green policies whilst also reducing the carbon footprint of human settlements. The second policy pillar refers to developing climate specific economic and financial instruments. One of the lines of actions of interest for this thesis is to ensure that economic and financial resources place focus on priority climate actions that consider social and environmental safeguards. Another line of action is to encourage new economic mechanisms that incentivize nationally appropriate mitigation actions such as carbon tax and emissions trading. Successful alignment is dependent on whether revenues collected from economic instruments are used in a way that promotes socio-economic development. The third action relevant to this thesis is to adjust residential electricity prices and compensate the vulnerable groups through targeted measures over time. Lastly, an essential line of action suggested is to redirect fossil fuel subsidies in an effort to strengthen sustainable and safe public transportation (SERMANAT, 2013).

When it comes to identifying priority mitigation actions in the short, medium and long term, the NCCS provides main criteria for its identification. Elements of the criteria considered are (i) mitigation potential, (ii) marginal abatement cost, (iii) environmental and social co-benefits, (iv) health co-benefits, (v) increase in national productivity, (vi) barriers. The environmental and social co-benefits for example, considers life quality benefits on the population such as access to renewable energy in more remote marginal communities. Health co-benefits associated with reductions from the use of fossil fuels generate economic savings because of improvements in air quality. In terms of national productivity, actions such as optimized public urban transportation increase affordable mobility for citizens.

[2]The Government of Mexico in its NCCS refer to lines of actions as strategies to fulfil the main climate objectives

Immediate actions would need to consist of higher potential and economic benefits actions which offer win-win results in terms of co-benefits. Longer term action would be based on future need developments or alternatives. The diagram below (Figure 8) provided by the NCCS shows the matrix for mitigations actions from 2020 to 2050 indicating their mitigation potential and economic benefits as well as identifying which have more co-benefits.

**Figure 8: Matrix for mitigation actions (Source: SERMANAT, 2013)**




Note: the size of the circle is due to project feasibility, the larger the circle the greater the feasibility

As shown in figure 8 above, the NCCS (SERMANAT, 2013) identified and highlighted the mitigation actions with co-benefits and those without. For a developing country like Mexico such considerations are essential. Thus the strong integration of co-benefits into Mexico's climate policy shows that developmental considerations are well integrated. Not only are co-benefits alluded to in the climate

policy, emphasis is placed on the inclusion of poorer and vulnerable members of society when considering the development of future climate change mitigation policies (SERMANAT, 2013).

### 4.3.3 How Mexico's development plan address climate change mitigation

Mexico's NDP (Government of Mexico, 2013) has five main objectives namely, a Mexico in peace, an inclusive Mexico, a Mexico with education quality, a prosperous Mexico and a Mexico with Global responsibility. Of the 5 objectives elements of climate change mitigation are incorporated in an inclusive Mexico, most extensively in a prosperous Mexico and also in a Mexico with global responsibility. Those objectives that refer to mitigation are expanded upon in the following paragraphs.

#### An Inclusive Mexico (objective 2)

One of the aims of an inclusive Mexico is providing an environment that is suitable for the development of a dignified and equal life. Mexico's NDP refers to lines of actions as means to achieve the strategy that fall directly under the main objectives. One of the lines of action identified in the NDP as moving towards sustainable urban development and space is to promote sustainable urban mobility by supporting public and mass transportation projects. The NDP (Government of Mexico, 2013) also identifies promoting the use of non-motorized transport as an important line of action. This relates to mitigation in terms of curbing emissions from vehicular transport.

#### A Prosperous Mexico (objective 4)

The government recognizes that the effects of climate change have intensified over the last decade since the publication of the NDP. According to the NDP (Government of Mexico, 2013) Mexico like the rest of the world acknowledges the trends of reduced dependence on fossil fuels by growing implementations of alternative energy sources. The NDP suggests that Mexico's economic growth over the years has been closely related to the GHG emissions and excessive waste generation. In light of the above, the government is encouraging an economic growth decoupled from natural resources. The most relevant to this thesis, aim 4.4 of the NDP broadly suggests promoting and facilitating an inclusive green growth that preserves natural heritage as well as generating wealth, competitiveness and employment. Under this aim, there are a few strategies and accompanying lines of action for their successful implementation that is, the lines of action are ways of implement under the main objective. Strategy 4.4.1 suggests the implementation of a 'comprehensive development policy that links environmental sustainability with costs and benefits to society' (Government of Mexico, 2013:119). The lines of action

following this strategy are to promote the development and use of cleaner energy and to pursue low carbon economic development.

The next relevant strategy under aim 4.4 is Strategy 4.4.3 which seeks to 'strengthen the national policy of climate change and care for the environment and move towards a competitive economy, sustainable, resilient and low carbon' (Government of Mexico, 2013: 135). The lines of action suggested under strategy 4.4.3 are to further develop institutions and instruments for climate change policy and to speed up the transition to low carbon development in sectors such as industry, energy and transportation. Other lines of action are to stimulate the use of advanced technologies to produce little to no GHG emissions as well as contributing to improved air quality.

Aim 4.6 focuses on energy supply and its strategy 4.6.2 seeks to ensure the rational supply of electric energy throughout the country. Lines of action suggested under this strategy include diversifying electricity generation as well as encourages energy efficiency at the domestic level. The link to mitigation in this regard is that by diversifying the energy supply for electricity, there is less produced from fossil fuel and particularly renewable energy can be utilized in more remote areas not currently electrified by the grid.

### Mexico with Global Responsibility (objective 5)

The Mexican government acknowledges that climate change is a global challenge and therefore they commit to contributing to keeping up with international agenda on the issue. This objective is linked to the country's NDC (Mexico, 2015) analysed above.

To summarize, in Mexico's development plan for the period 2013-2018, climate change mitigation is considered in the three of five key objectives. The NDP (Government of Mexico, 2013) displays a consideration of sustainable development and lower carbon economic growth in the pursuit of national development.

## 4.3.4 Extent of alignment of development and climate policies

Table 10 below highlights the key examples of higher and little alignment as shown in the key development and climate policies.

**Table 10: Extent of alignment in Mexico's NDC, climate policy and development plan**

| | NDC (2015) | NCCS (2013) | NDP (2013) |
|---|---|---|---|
| **Examples of high alignment** | Addressing SLCPs as well as GHG | Co-benefit mitigations actions (public | Green growth<br>Cleaner energy |

| | | | |
|---|---|---|---|
| | Low carbon and green growth | transport, mini hydro-electric, REDD, recycling)<br>Policy pillar suggestions | Mass transport |
| **Examples of little alignment** | -no detail given | Carbon storage and capture<br>Electric vehicles | Promoting increase of investments in mining sector |

As shown in Table 10 above, there are a significant number of examples illustrating the alignment of development ad climate policies. Although the country's NDC (Mexico, 2015) offers very little information in terms of mitigation action, the documents highlights the coverage of mitigation actions that is the sectoral areas of interest. These sectors are energy, industrial processes and product use, agriculture, waste and land use and forestry (Mexico, 2015). The biggest identification of alignment can be found in the criteria for co-benefits. Misalignment of development and climate can be seen in the NDPs mention of increasing investments in the mining sector (Government of Mexico, 2013)

### 4.3.5 Conclusion

From the analysis in this subchapter, it has become apparent that reducing poverty and inequality is to an extent integrated into Mexico's low greenhouse gas strategies. Of particular emphasis, for more immediate action was improved human health by reducing the Short Lived Climate Pollutants in the atmosphere. The various mitigation actions were assessed in terms of co-benefits, with a particular emphasis on health benefits due to improved local air quality, as well as feasibility. As a result, the majority of actions considered for short term consideration have the greatest co-benefits to the society and the economy. With regards to the integration of climate mitigation into the development plans, the analysis showed that although the promotion of investments in mining of fossil fuels is projected to increase, there are movement towards cleaner energy and green growth. This analysis has shown that there are overlapping priorities in both the development and climate policies and poverty alleviation is one of them.

# Chapter 5: Comparative Analysis

Having considered in Chapter 4 the integration of development and climate mitigation for each country, this thesis turns to the comparative analysis of the findings. The comparative analysis seeks to determine how the middle income countries with similar national priorities perform against each other in light of increasing climate change awareness in the international community.

## 5.1 Introduction

This thesis aims to understand to what extent reducing poverty and inequality is integrated into the medium term low greenhouse gas development strategies and commitments of three countries in the global south, namely South Africa, Mexico and India. Chapter 4 has analysed the key documents in each country that focus on climate change and development. For South Africa, the documents analysed are the country's NDC (South Africa, 2015), NDP (National Panning Commission, 2012) and the NCCRP (DEA, 2011). For India, the key documents are its NDC (Government of India, 2012) the Twelfth Plan (Government of India Planning Commission, 2012) focusing on development and the NAPCC (Government of India, 2008). For Mexico, analysed is the country's NDC (Mexico, 2015), its NDP (Government of the Republic of Mexico, 2013) and the NCCS (SEMARNAT, 2013).

Chapter 5 of this thesis undertakes a comparative analysis in three parts. Part 1 analyses the differences in the extent to which development is integrated into climate policy of South Africa, Mexico and India. This part begins with an analysis of the countries' commitments in their NDCs and national climate policies. The integration of development into mitigation can further be understood by analysis of the co-benefits referred to in the key documents. Part 2 considers the extent to which mitigation is integrated into the development plans. This includes an analysis of countries' development plans on a national scale and will then proceed to look into the countries sectoral approaches. In this regard, there is an understanding that the more mitigation is incorporated in the sectoral development plans the higher the integration. The third and final part summarizes the findings from Part 1 and 2 and ranks the countries in the extent of alignment and integration.

## 5.2 Extent to which development is integrated into climate policy

This section compares the extent to which development is integrated into climate policies, comparing Mexico, India and South Africa.

### 5.2.1 A general comparison of South Africa, Mexico and India's NDC and climate policies

The three countries' NDCs each acknowledge their national priorities and circumstances. For South Africa, the NDC (South Africa, 2015) points out the country's aims to combat climate change with overriding priorities to eliminate poverty. South Africa's NDC (South Africa, 2015) also states that the country is facing severe energy challenges which have an adverse effect on economic development. In India, the NDC (Government of India, 2015) refers to potential tradeoffs associated with climate change and economic growth where poverty eradication is a leading priority. Similarly, Mexico's NDC (Mexico, 2015) takes an approach of prioritizing the least costly mitigation actions that also consider health and wellbeing co-benefits. It is clear that each country considers national priorities of poverty alleviation and development in their NDCs. Due to the national circumstances the conditional mitigation targets vary per country.

In the medium term, according to the NDC (South Africa, 2015) South Africa plans to keep its GHG emissions between 398 and 614Mt$CO_2$e from 2025 and 2030. As suggested by the NDC, India plans to reduce its emissions intensity by 20-25% by 2025 (Government of India, 2015). Mexico's emissions are indicated to reduce by 25% from its business as usual 973Mt$CO_2$e by 2030 (Mexico, 2015). Each path to emissions reduction varies per country and this section of the thesis seeks to highlight those differences.

With regards to mitigation strategies as shown in each country's NDC, South Africa and India address developmental issues mainly in energy and transport. The developmental aspect in energy is improved electrification potential due to greater energy mix. With regards to transport, the larger developmental aspect is apparent in mass public transport. According to the NDC (India, 2015) policies such as the National Electricity Policy and the Integrated Energy Policy seek to improve access to electricity countrywide as well as promote cleaner forms of energy supply to meet demand. Improved public transport systems under the National Urban Renewal Mission seek to improve mobility particularly for the poorer citizens (India, 2015). Similarly, South Africa makes mention of Integrated Energy and Electricity Plans which seek to improve energy supply and boost economic development (South Africa, 2015). In terms of development and mitigation strategies, Mexico's NDC (Mexico, 2015) offers little information on specific lines of actions that are targeted at reducing emissions and enhancing development. The NDC (Mexico, 2015) does however make mention of reducing SLCPs with the hope of improving health which shall be detailed in following paragraphs.

In addition to the national circumstances addressed in the NDCs above, the climate strategies across the three countries take development as a priority to climate change responses as indicated by the strategies key principles illustrated below in Figure 9.

**Figure 9: South Africa, Mexico and India's climate strategy development priority principles (Source: Adapted from Government of India, 2008; DEA, 2011; SERMANAT, 2013)**

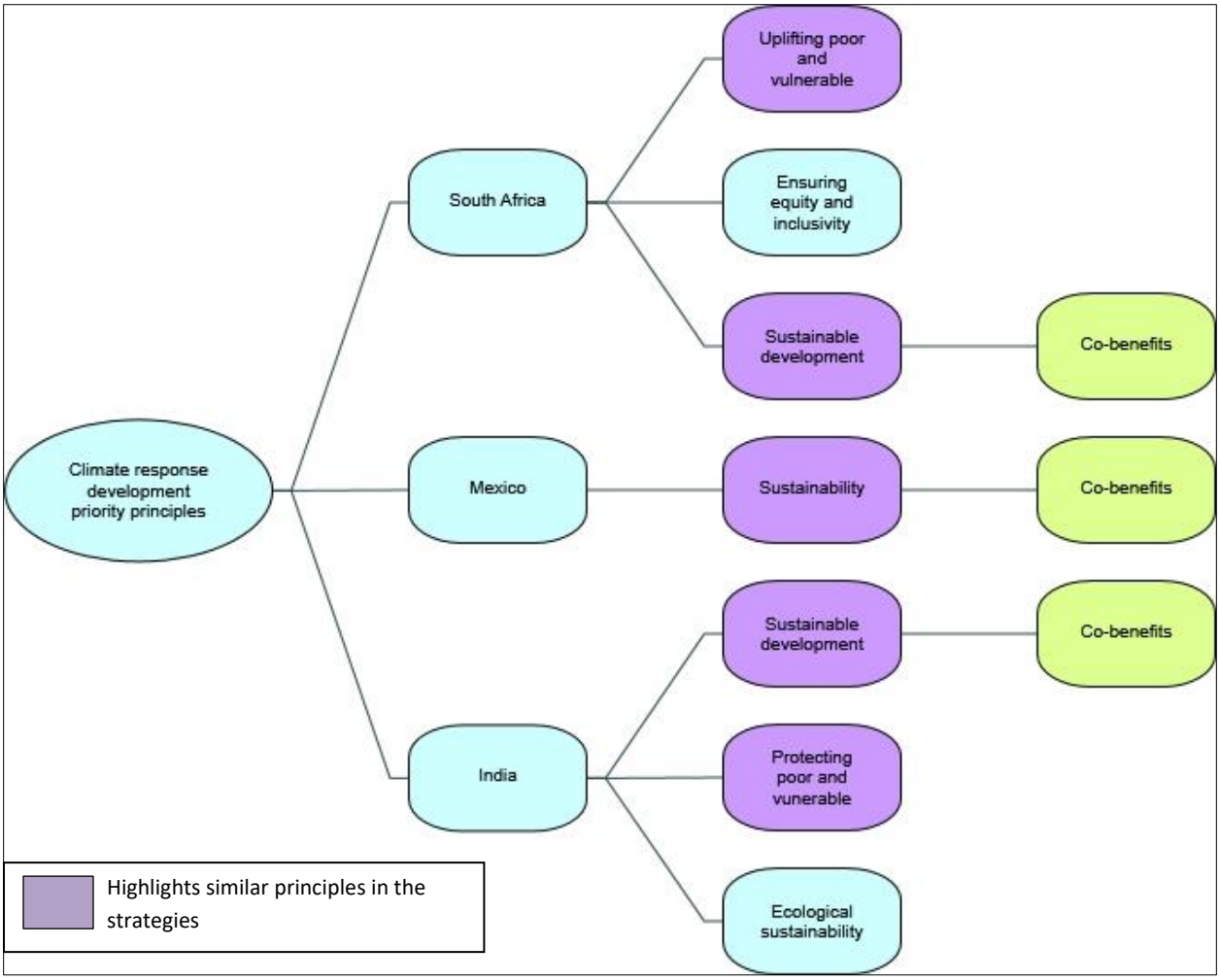
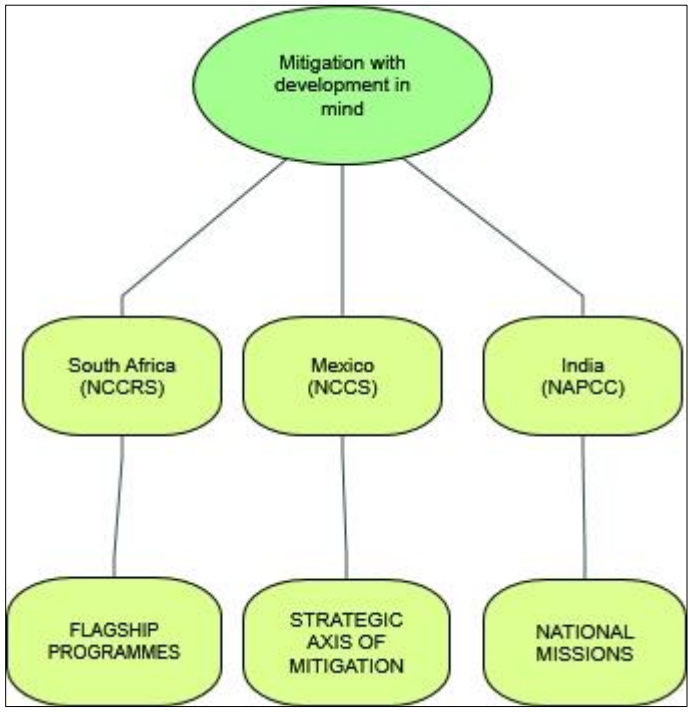



Figure 9 above illustrates some of the key principles guiding the countries respective climate response and action strategies that are targeted at poverty and development. A common principle to all three countries is ensuring a sustainable development path, highlighted in purple in the Figure. Sustainable development allows for economic growth and environmental considerations which in turn potentially achieves socially desirable co-benefits. One of South Africa's principles alludes to equity in the context of addressing the vulnerabilities of poor communities and inequalities to adverse effects of climate change (DEA, 2011). India seeks to tackle climate change through an inclusive approach protecting the poor sections of society. Based on these principles India's climate action plan suggests steps towards

simultaneously encouraging development and addressing climate change (Government of India, 2008). Mexico's guiding principles to their climate change policy do not make explicit mention of the poor or the vulnerable (SEMARNAT, 2013). The principles rather allude to effective citizenship participation and commitment to the economy and economic development (SEMARNAT, 2013). Although not explicitly mentioned as a key principle, the NCCS policy objective seeks coordinated and inclusive policies and actions (SEMARNAT, 2013). The NCCS reiterates the need for the consideration of varying genders, inequality and wellbeing when it comes to proceeding with climate change strategies which is similar to India and South Africa's consideration of the poorer and more vulnerable members of society (SEMARNAT, 2013).

Figure 10 below summarises South Africa, Mexico and India's programmes, strategies and missions that play a role in development as shown in the climate strategies. Shown for South Africa are the near-term Flagship programmes, for India the National Missions and for Mexico the broader strategic lines of action which are detailed in the previous Chapter 4. Each country's climate strategies refer to development needs and priorities.

**Figure 10: Development orientated mitigation actions (Source: based on author's analysis of DEA, 2011; SERMANAT, 2013, Government of India, 2008)**



To summarize the general analysis of the countries NDCs and climate strategies, it is apparent that firstly the NDCs acknowledge national circumstances and immediate needs such as economic growth and job creation. Secondly, Mexico's NDC (Mexico, 2015) falls short on giving relevant detail on mitigation actions in the context of development unlike South Africa and India. However, the NCCS offers more detail on lines of action for mitigation. Based on the preceding analysis, with regards to which country's national climate policies consider national circumstances, extensively prioritize poverty, consist of key principles that prioritize the poor and vulnerable, development as well as mention equality and finally offer an idea of development oriented mitigation actions, this thesis finds a ranking of integration of development in climate (mitigation) policy in documents as follows, SA (1) India (2) followed by Mexico (3).

As shown above in the climate strategies, each country makes mention of selecting mitigation actions that have significant co-benefits in terms of addressing development and climate change. The next part of this chapter shall further compare South Africa, Mexico and India's approach with regards to co-benefits, detailing if applicable, the specific benefits sought in the countries' key documents.

### 5.2.2 An analysis of treatment of co-benefits

With regards to co-benefits, that is both climate and development benefits, the understanding is that the more the climate policy mentions developmental benefits, the greater the extent of integration in the key policies. South Africa's NCCRP (DEA, 2011) makes mention of identifying Near-Term Flagship Programmes which cover both development and mitigation as shown in this thesis' Chapter 4. These near-term programmes referred to as flagship programmes identified are said to have well-known mitigation outcomes, are cost effective and have substantial co-benefits or technology development benefits (DEA, 2011). According to the NCCRP (DEA, 2011), the country's Inter-Ministerial Committee shall create a framework for each of the suggested programmes. This framework shall consist of the programme suggested, an in-depth analysis of mitigation outcomes from the programme, a proposal placing emphasis on how the programme realizes local sustainable development benefits which include employment, poverty alleviation and improvements to local air quality (DEA, 2011). Although the framework is not detailed in the country's NCCRP, the NCCRP (DEA, 2011) suggests that one of the strategic priorities in tackling climate change is policy and regulatory alignment. This alignment suggested is to allow for policies and strategies that address climate change and contribute towards the national priorities of increased employment opportunities and poverty alleviation. In terms of energy,

the NCCRP (DEA, 2011) also recognizes the need for a balanced energy supply security as well as affordability which falls under the key principle of equity and inclusivity. Therefore, there is a good plan to have co-benefits but the analysis has not been applied in detail.

In Mexico's NCCS, a criteria was developed and suggested to identify priority mitigation actions in the short, medium and long term (SEMARNAT, 2013). Elements considered in the NCCS criteria are mitigation potential, marginal abatement cost, environmental and social co-benefits, health co-benefits, increase in national productivity and barriers (SEMARNAT, 2013). Mexico's criteria offer a guide to extensively selecting mitigation actions that allow for more people centered development as well as economic growth. A noticeable difference in terms of co-benefits sought is Mexico's emphasis on Short-lived Climate Pollutants (SLCPs) and their more immediate health benefits.

With regards to co-benefits, India's development plan (Government of India, 2012) provides a Co-benefits Framework which was summarized in this thesis' Chapter 4. This framework places mitigation strategies and actions against some key benefits. The key benefits sought were energy security and reduced dependence on imports, employment, inclusivity, health benefits and ecosystem services. Similar to Mexico's criteria India's Framework weighs main mitigation actions against economic growth and development needs.

To summarize, each country places consideration on development co-benefits when addressing climate change. Mexico's NCCS (SEMARNAT, 2013) offers more extensive information on co-benefits compared to South Africa's NCCRP (DEA, 2011) and India's NAPCC (Government of India, 2008). India does however make mention of a Co-benefits framework in its development plan. Although India's Framework was very informative in that it broke down each mitigation action and attempted to highlight the benefit in each case. Mexico's explanation of each benefit making up its criteria appeared more clearly in its strategy. Mexico took their criteria a step further and used it to guide their planning for immediate to long-term actions recognizing the importance of actions with higher potential for greater benefits. Mexico's NCCS (SEMARNAT, 2013) also provided a Matrix graph as shown in this thesis' chapter 4 that clearly illustrated different mitigation actions considered and highlighted those carrying more benefits. Based on this reasoning, this thesis ranks the integration of development into climate policy as reflected in co-benefits analysis as follows; Mexico (1), India (2) followed by South Africa (3).

## 5.3 Extent to which mitigation is integrated into development plans

Section 5.1 examined how development is integrated into climate change mitigation policy. The present section turns to consider the interaction in the other direction, analyzing how much mitigation is integrated into the development plans for India, Mexico and South Africa. The section first examines NDPs and then looks at the sectoral approaches in more detail.

### 5.3.1 National scale development plans

Each of the three countries national development plans refer to climate change mitigation in one or more chapters. In the case of South Africa's NDP, Chapters 3, 4 and 5 which refer to Economy and employment, economic infrastructure and environmental sustainability and resilience respectively (Government of South Africa, 2012). In the case of India, mitigation is referred to more extensively in its Chapter 4, 13, 14, 15 and 18 which refer to sustainable development, industry, energy, transport and urban development (Government of India, 2012). In the case of Mexico, mitigation is incorporated in the NDPs chapters and objectives in its Chapter 2, 4 and 5 which refer to an Inclusive Mexico, a Prosperous Mexico and a Mexico with a Global Responsibility (Government of Mexico, 2013).

South Africa's NDP (Government of South Africa, 2012), alludes to climate change mitigation with regards to the potential for mining to provide over 200 000 jobs in the near future (by 2024). In light of this appeal in supposed job creation, the government seeks to invest in cleaner coal in the context of climate change. The same can be said for both the Mexican and Indian government where coal is regarded as the dominant energy supply in the near future thus due to the current international climate context, advances are being explored to develop cleaner coal technologies. South Africa, India and Mexico's governments make mention of the desire for a lower carbon economy which is considered to be sustainable. South Africa's NDP makes mention of a green economy agenda which fully supports the increased development of renewables (National Planning Commission, 2012). India's government makes mention of 'setting an agenda for sustainable development' (Government of India, 2012 (1): 115). Included in this agenda would be greenhouse gas emissions and emphasizing on reducing the emission intensity of the nation's GDP. In its objective for a prosperous Mexico, the country's NDP alludes to facilitating green growth which not only generates competiveness and employment but also allows for the pursuit of cleaner energy in its economic growth (Government of Mexico, 2013).

South Africa and India's development plans also mention other instruments such as carbon tax and carbon trading in light of increasing climate change concerns. According to the NDP (National Planning Commission, 2012), South Africa's government is exploring carbon tax with the hope of shifting

investment behaviour away from 'carbon-intensive power generation technologies (National Planning Commission, 2012:171). India is doing the same and experimenting with carbon tax and cap and trade as an instrument under their National Mission for Enhanced Energy Efficiency acknowledged in the NDP under the chapter on Sustainable Development (Government of India, 2012). Mexico's NDP makes no explicit mention of carbon tax but its climate policy alludes to economic instruments (SERMANAT, 2013).

With regards to the general extent to which mitigation is integrated into development plans on a national scale, this analysis considered mainly, the countries' commitments to lower carbon economies and green growth as well as the inclusion of supporting economic/financial instruments to either curb investments in fossil fuel intensive business or promote investments in renewable energy sources such as carbon tax and subsidies. For this reasoning, this places both South Africa and India joint first (1) and Mexico lacking in this regard at (2).

Some chapters of the development plans mentioned above offer more detail on the various sectoral approaches to climate change mitigation and this leads us to the next section where a comparison of these approaches in South Africa, Mexico and India shall be made.

### 5.3.2 Sectoral approaches to mitigation

Across South Africa, India and Mexico the approaches to mitigation consist of sectoral responses and strategies to allow a transition to lower carbon economies and development. The approach to the analysis in this section assumes that the more mitigation is incorporated in the sectoral development plans of a country, the higher the integration of development and climate policy.

In South Africa, the key sectors targeted are energy, industry, transport, waste management (National Planning Commission, 2012). In Mexico's approach to development with mitigation in mind, similar sectors are also targeted, namely energy, industry, transport, waste and recycling, agriculture, forestry and urban development (SEMARNAT, 2013; Government of the Republic of Mexico, 2013. For India, the development plan suggests that key sectors that recognize climate change and are addressing it are industry, energy, transport and forestry (Government of India, 2012). Table 11 below summarizes the various sectoral approaches in more detail taken in each country. The findings included in the table are sourced from the NDC (South Africa, 2015; Mexico, 2015; Government of India, 2015), National development plans (Government of the Republic of South Africa, 2012; Government of the Republic of

Mexico, 2013; Government of India, 2012) and the climate strategies (DEA, 2011; DEMARNAT, 2013; Government of India, 2008).

**Table 11*: The sectoral approaches to mitigation for South Africa, Mexico and India* (Source: Government of the Republic of South Africa, 2012; Government of the Republic of Mexico, 2013; Government of India, 2012)**

| Country / Sector | South Africa (NDC, NDP, NCCRP) | India (NDC, Twelfth Plan, NAPCC) | Mexico (NDC, NDP, NCCS) |
|---|---|---|---|
| Energy SUPPLY | Clean energy and greater energy mix<br>• Renewable energy (21 500MW by 2030)<br>- Solar<br>- Nuclear<br>- Biofuels<br>- Gas exploration<br>• Clean coal technologies (cycle and carbon capture) | Greater energy mix<br>• Renewable energy (increase-national missions)<br>- solar (+100MW by 2022)<br>- wind (+60MW by 2022),<br>- biomass (+10MW by 2022) hydropower (+46MW)<br>- nuclear (63MW by 2032)<br>• Clean coal technologies (carbon storage and capture)<br>• Renovation and modernization and life extension of thermal power plants (R&M and LE) | Energy mix to allow shift to cleaner energy<br>- Renewable energy<br>- Wind<br>- Solar<br>- Geothermal<br>- Hydroelectric<br>- Nuclear<br>- Solar thermal<br>• Carbon capture and sequestration |
| DEMAND Industry and Residential | Energy efficiency | Energy efficiency<br>- Lighting; standards and labeling<br>- Zero effect, Zero Defect (production of high quality products with clean energy) | Efficiency and responsible consumption schemes |
| Transport | - Hybrid and | - Dedicated freight | - Multimodal efficient |

| | | | |
|---|---|---|---|
| | electric vehicles<br>- Vehicle carbon tax<br>- Improved coal rail capacity<br>- Optimize freight corridors | corridors<br>- Improved railway systems<br>- Mass Rapid Transit System<br>- Vehicle Fuel Efficiency Program<br>- Hybrid & electric vehicles<br>- National Policy on Biofuels | transport systems<br>- Electric vehicles |
| Waste | - Waste recycling<br>- By 2030: waste-to-energy projects | • Waste to energy conversions<br>Clean India Missions | - Encourage waste separation and develop recycling centres |
| Agriculture and Forestry | - Expansion of forest cover<br>- Promotion of organic farming methods | - Increase forest cover (1/3 of India) | - Maximize carbon sinks- REDD Strategy |

The table 11 above shows that the sectoral approaches from South Africa, India and Mexico contain several similar elements. In summary the sectoral approaches taken by each country as shown in the key documents of interest in this thesis show that there is a commitment of policies for the advancement of access to clean energy which improves health and well as creates greater access to electricity particularly in rural communities as well as progressing development whilst mitigating climate change at the same time. Another similarity with regards to energy is the maintained higher reliance on coal in the medium term. Although the development of coal for electricity generation is suggested to be accompanied by improved carbon capture technologies, countries like India by 2022 will produce 400 Mtoe of coal compared to 20 Mtoe of renewable energy (Government of India, 2012). According to the country's NDP (National Planning Commission, 2012), South Africa by 2030 commits to decommissioning about 10 000MW of Eskom old coal stations but plan to contract about 6000MW new coal which is subject to climate change negotiations. Unlike South Africa and India, Mexico's development plan does not provide detail on coal usage for the energy generation for the medium term. Curbing energy consumption is another similar feature in each country's development plans. As shown in Table 1, the same approaches can be seen for other sectors like transport, forest and agriculture and waste.

Based on an understanding that the more mitigation considerations are integrated into sectoral development the more alignment there is of the climate change and development, it can be concluded

from this thesis' analysis that India's development policies perform better than Mexico and South Africa. India development plan provides more detail on the energy mixes and identifies targets expected of each renewable energy source (Government of India, 2012). India in particular mentions the relevant and accompanying policies where applicable. For example, the various national Missions which make up the majority of mitigation actions which also are mentioned in not only the NAPCC (Government of India) but also the NDC (India, 2015) and the development plan (Government of India, 2012). Based on the above analysis, the ranking in this thesis for the extent of integration of mitigation into national development plans taking in particular sectoral development plans into consideration is as follows India (1), South Africa (2) followed by Mexico (3).

## 5.4 Differences in the extent of alignment

The analysis in this chapter so far has illustrated and compared key components of South Africa, Mexico and India's climate policies as well as their development policies. Section 5.2 examined the extent to which development is integrated into climate policy, in key documents and by the treatment of co-benefits. Section 5.3 asked the other way around, how much mitigation is reflected in development plans, both at national and sectoral scale. For each sub-section, the thesis provided ranking the countries on the extent of integration of development and climate policy, based on the analysis. The present and final section of this chapter brings together the comparative analysis.

Table 12 below provides a summary of the key components analysed which provided the basis for the rankings.

**Table 12: Criteria used to rank South Africa, Mexico and India's policy alignment (Source: Authors own)**

| Sections | Criteria for specific sections |
|---|---|
| **5.2. Development integrated into climate policy** | **5.2.1 Integration of development into climate policies**<br>- Acknowledgement of national circumstances and priorities<br>- Development oriented guiding principles mentioned<br>- Developmental aspects of mitigation actions clearly stated<br><br>**5.2.2 Co-benefits**<br>- Benefits defined and explained<br>- Range of benefits explored<br>- Presence of a criteria or decision framework<br>- Use of criteria to plan appropriately timed implementations |
| **5.3. Mitigation integrated into development policy** | **5.3.1 Integration of mitigation into national development plans** |

| | |
|---|---|
| | - Commitment to lower carbon economies<br>- Inclusion of instruments to curb investment in fossil fuel<br>**5.3.2 Integration of mitigation into sectoral development plans**<br>- Key sectors contributing to climate change addressed<br>- Sufficient detail provided on specific sectoral plans<br>- Targets set in sectoral plans<br>- Reference to supporting policies and initiatives |

This thesis proceeded to rank each country's performance against the criteria suggested. The analysis in section 5.2.1 and using the corresponding criteria of Table 12, 5.2.1, focused on integration of development into the climate policy, as reflected in key documents. This thesis ranked South Africa first, India second and Mexico third. Similar to India and Mexico, South Africa's NDC (South Africa, 2015) and NCCRP (DEA, 2011) both acknowledge national circumstances and development priorities. Of the three countries, South Africa's climate policies guiding principles were the most development oriented, with the addition of principles such as equity and inclusivity.

With regards to co-benefits analysed in, section 5.2.2 by criteria in component 5.2.2, South Africa's policies fell short compared to India and Mexico. Mexico provided criteria that looked at 6 co-benefits in its NCCS (SEMARNAT, 2013) for mitigation actions. India provided a comprehensive Co-benefits Framework in its development plan (Government of India, 2012) that considered 5 elements and benefits. Mexico was ranked first, India second and South Africa third in this regard. Not only did Mexico's criteria consider elements such as feasibility, they took it further by providing a matrix graph that weighed out over 20 mitigation actions and highlighted those with more benefits assisting planning going forward.

Section 5.3 analysed the extent to which mitigation was integrated into South Africa, Mexico and India's development plans. Sub-section 5.3.1 applied corresponding criteria in section 5.3.1 of Table 12 to national development plans. In this section, although all three countries alluded to commitments to lower carbon and green economies, Mexico development pan fell short in terms of providing information on additional instruments to re-direct investments from fossil fuel intensive businesses. As such this analysis placed both South Africa and India in first position followed by Mexico.

The analysis then turned to the integration of mitigation in the sectoral developmental plans in section 5.3, applying corresponding criteria in component 5.3.2. With the criteria in mind, India was ranked first, South Africa second and Mexico third. Although all three countries considered key changes in sectors

that are significantly contributing to climate change, India's plans gave specific targets for changes in the energy mix such as contributions of certain alternative energy sources and their timelines for example (Government of India, 2012). India's sectoral approach also referred to supporting initiatives and policies such as the several National Missions mentioned.

Based on the analysis above, Table 13 below summarizes the results for each section of the comparison.

**Table 13: Summary of rankings for each country and subsection (Source: Authors own)**

| | | India | Mexico | South Africa |
|---|---|---|---|---|
| 5.2.1 | Development integrated into climate policy - national | 2 | 3 | 1 |
| 5.2.2 | Development integrated into climate policy - treatment of co-benefits | 2 | 1 | 3 |
| 5.3.1 | Mitigation integrated into development policy - national scale | 1 | 2 | 1 |
| 5.3.2 | Mitigation integrated into development policy - sectoral scale | 1 | 3 | 2 |

Table 13 shows that each of the three countries was ranked, based on the analysis in this thesis, higher than the others on some aspects of integration of climate change mitigation and development. Each country is ranked first in at least one respect. The rankings have been supported by the careful analysis in this chapter, which in turn draws on the preceding detailed content analysis of key documents on development and climate policy. However, there is subjective judgement involved and other researchers might find different rankings. Furthermore, the rankings are only ordinal. This thesis therefore does not 'add up' the rankings for each sub-component nor suggest that any of the countries has more fully integrated climate change mitigation and development. Rather, it finds that each of the three countries has integrated better than the others in some respects, but could learn from others in relation to other aspects.

Bearing in mind that the rankings given are only ordinal, it must be acknowledged that further work could advance the results methodologically. These advances could shed more light on the varying institutional capacities of the three countries.

# Chapter 6: Conclusion

## 6.1 Introduction

This chapter firstly highlights the main findings of this thesis in exploring its research question and the main objectives and secondly, offers concluding remarks to the thesis as a whole. The aim of this thesis was to assess and compare the extent of alignment of key development and climate policies in three countries in the global south, namely, South Africa, India and Mexico. The thesis reviewed relevant literature in chapter 2 and outlined the methodology of content analysis and introduced key documents in chapter 3. Chapter 4 consisted of the individual country analysis with regards to the main objectives and Chapter 5 proceeded to compare the findings from the country analysis.

## 6.2 Summary of findings

The research question as outlined in section 1.2 asks 'to what extent is reducing poverty integrated into medium term low greenhouse gas development strategies and to what extent is climate mitigation integrated into development plans in three countries in the Global South?' This section summarises the results found from the analysis of the countries key documents, mainly the countries climate policies and national development plans.

### 6.2.1 Objective I: The extent to which climate policies address poverty and development

The thesis found that the South African government immediately acknowledged national circumstances in their climate policies. Although the policies express the need for climate change mitigation, the policies express the need for mitigation that places poverty alleviation at the forefront. The key principles guiding climate policies allude to ensuring that the wellbeing of the poorer and more vulnerable communities is not compromised when considering mitigation actions. South Africa supports the just transition to low carbon by following its peak plateau and decline emissions trajectory that allows the country some development space since it will take some time to become less reliant on fossil fuels. South Africa's climate policy refers to Flagship Programmes which are believed to carry co-benefits in terms of climate change and development.

India's voluntary goal of reducing the emissions intensity of its GDP by 2020 allows for a large developmental space. This is because the implementation of energy policy adjustments in key emitting sectors can allow for economic growth whilst keeping carbon emissions low. India's climate policy developmental focus can be seen in terms of plans for enhancing energy security and developing the transport sector. The climate policies also allude to improving local indoor pollution thus improving the

health of poorer households without current access to electricity. As shown in this thesis, India's climate policies also refer to the eight national missions which offer developmental advantages.

Mexico's climate policies largely consider development and poverty in their co-benefits criteria provided. The criteria are also followed by a matrix where mitigation actions have been assessed in terms of economic benefits, mitigation potential as well as feasibility. Mexico also considers SLCPs which neither South Africa nor India do. The focus on SLCPs is for improved health benefits in the shorter term.

### 6.2.2 Objective II: The extent to which the development plans address climate change mitigation

In this regard, South Africa's development plans refer to shifting to cleaner energy as well as increasing the role of renewables in the energy mix. The country's government acknowledges that its energy shortages hampering development can be addressed by renewables which enhance energy security. The development plans also suggest policy improvements which could allow for the guided gradual transition away from fossil fuel dependability. Although priority actions for the years 2020 and 2030 consist of commissioning of coal plants, there are many mitigation targeted priority actions also included in the national document.

The largest integration of climate change in India's development can be seen in their Co-benefits framework where carbon mitigation is recognized along with economic growth. Integration is also apparent in the sectoral approaches to development where low carbon is referred to regularly. India's development plan alludes to Twelve Focus Areas for sustainable development and Plans such as Solar Missions, Wind Missions and energy efficiency programmes which relate to mitigation feature.

Mexico's NDP does not offer as much detail in terms of climate change mitigation approaches but it does allude to Mexico being aware of its global responsibility to combat climate change. The Mexican Government also alludes to sustainable urban development and reducing dependence on fossil fuels. Mexico understands that to implement a development policy that links environmental sustainability to societal benefits requires the increased promotion of cleaner energy.

### 6.2.3 Objective III: The extent of alignment of the development and climate policies

From this thesis' analysis it is apparent that there were overlapping priorities and actions with regards to climate change mitigation and development in the key documents for the three countries which were explored in more detail in objective IV. As evident by the examples given, the policies considered national circumstances and needs as well as international climate negotiations in their unique way.

### 6.2.4 Objective IV: Comparative analysis

This section compared the findings to the first three objectives and subjectively ranked the three countries with guidance from section specific criteria. The criteria consisted of details regarding the general integration of development into climate policies such as the acknowledgment of national circumstances; the inclusion of development oriented guiding principle, as well as details regarding co-benefits. The criteria also consisted of details regarding the integration of mitigation into national developmental plans and into sectoral development plans.

By using the criteria, this thesis managed to rank the three countries in terms of the subsections analysed. For the integration of development into climate policy at a national scale, South Africa was ranked first, India second and Mexico third. For the treatment of benefits which were part of the integration of development into climate policy, the analysis ranked Mexico first, India second and South Africa third. With regards to the integration of mitigation into development policy on a national scale, this analysis ranked India and South Africa joint first and Mexico second. With regards to the integration of mitigation into sectoral development this analysis ranked India first, South Africa second and Mexico third.

This section concluded that each country performed better than the others in certain sub-sections and the countries could each consider adapting successful approaches shown in the other individual countries. The implication of the comparative analysis can be further acknowledged and explored. For instance, India is found to be better at including climate change in its development plans, than at including development in its climate plans. This is interesting in terms of the effectiveness of the signaling of India's climate change actions internationally. For Mexico, it does rather well on co-benefits but not on its development narrative neither in its climate plans nor on its sectoral climate plans. This raises the question of how useful the co-benefits emphasis is if it doesn't translate to sectoral or development strategies. For South Africa, there is parity in the inclusion of development in climate plans and climate in development plans, but without a complementary assessment of co-benefits. In these results, each finding presents areas where the countries can push further, towards the potential ideal case where each test result per country is aligned.

## 6.3 Concluding remarks

In light of climate change, it can be concluded that South Africa, India and Mexico’s policies are heading in the right direction. These middle-income countries are plagued by high levels of poverty and large

inequality gaps and it can be seen that development is shifting from conventional fossil fuel intensive development to lower-emissions development. This thesis has shown that there are several benefits associated with aligning development and climate policies. These benefits include the promotion of cleaner mass public transport and improved mobility, greater access to cleaner energy forms to poorer households currently without electricity which could in turn improve health and improve energy security as well as the creation of employment that is brought about with technological advancements in promoting cleaner energy. More research would need to be conducted at a finer scale to identify the trade-offs of certain mitigation actions and this information should be used in future national and sectoral development.

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