

Sustainable development and climate action: thoughts on an integrated approach to SDG and climate policy implementation

Andrea Hurtado Epstein¹ and Stephanie La Hoz Theuer²

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Abstract

2015 was a landmark year for international sustainable development regimes: the 2030 Agenda and the Paris Agreement have established regulatory conditions and institutional frameworks that aim to deliver on the promise of a low-carbon future that is sustainable and inclusive for all. Yet despite their interactions, formal links between these processes are tenuous and their communities of practice usually work in isolation. National implementation processes present a unique opportunity for countries to identify and promote synergies, as well as to acknowledge and actively address potential trade-offs.

Adapting a methodology developed by the Stockholm Environment Institute, this paper categorises the typical relationship between individual targets of the Sustainable Development Goals (SDGs) and climate mitigation & adaptation, identifying and further explaining those interactions (positive or negative) which are found to be particularly strong. Where relevant, sectoral and country examples are provided, in order to illustrate how these relationships can be or have been addressed through policy in concrete cases, with varying results.

Since the implementation of both SDGs and NDCs is inevitably local, the interactions identified as the strongest are then reviewed in the particular case of Mexico, thereby testing their relevance in a specific policy environment. While the relationship between SDGs and climate action is highly context-specific, we find that the general reference framework can help identify areas of opportunity. The overall conclusion is that a more coherent policy design, which considers all the possible interactions between sustainable development and climate action, can increase the effectiveness of the implementation of both the SDGs and climate mitigation and adaptation commitments.

¹ Email: andrea.hurtado@cantab.net

² Email: slahoztheuer@cantab.net

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1. Introduction³

Linkages between the 2030 Agenda, climate change and climate policy occur at two broad levels: first, a changing climate affects the conditions under which development occurs, often increasing challenges and constraints. Second, policies for the achievement of development and of climate goals interact with each other, presenting both synergies and tradeoffs. This paper explores potential policy-level interactions between the implementation of the sustainable development goals (SDGs) and of climate responses. In so doing, the paper aims to help policymakers identify issues and sectors of particular importance for integrated national implementation.

Building on the methodology applied by Nilsson, Griggs, & Visback (2016), we categorize the interactions between each of the SDG targets against climate change mitigation and adaptation, along five ratings. We do so at a general and qualitative level, looking mainly at best-practice policies and justifying judgements made. This paper aims to address four research questions:

1. How can the framework for categorization of relationships across policy goals developed by Nilsson et al be implemented? (see sections 2.1 and 5.1);
2. What are the typical important synergies and tradeoffs across individual targets and mitigation / adaptation? (see section 3 and the annex).
3. What are the strongest interactions to and from SDG targets and climate action, and what are the main points raised by the literature? (see section 3)
4. How do the 'general' expectations compare to a specific country example, namely Mexico? (see section 4).

2. Methodology

This paper implements an adjusted version of the rating system developed by Nilsson et al. (2016) to assess the interactions between SDG targets against mitigation and adaptation action. It does so in four main steps: (a) scale definition and calibration; (b) application to all targets; (c) discussion of key interactions; and (d) case study.

2.1 Scale definition and calibration

Nilsson et al define a 7-point scale to map interactions between the SDGs. As our focus lies on strong positive and negative interactions, the "middle cases" were bundled in a single category. This was considered more appropriate also given that the differentiation across the -1/0/+1 categories would have required a level of elaboration that falls outside the scope of this paper. Figure 1 presents the rating scale.

³ The authors would like to thank Kimberly Nicholas for her insights and comments in preparing this paper.

Figure 1 - Rating scale. Source: adapted from Nilsson et al. (2016)

Interaction	Name	Explanation	Example
+3	Indivisible	Inextricably linked to the achievement of another goal.	Ending all forms of discrimination against women and girls is indivisible from ensuring women's full and effective participation and equal opportunities for leadership.
+2	Reinforcing	Aids the achievement of another goal.	Providing access to electricity reinforces water-pumping and irrigation systems. Strengthening the capacity to adapt to climate-related hazards reduces losses caused by disasters.
-1 / 0 / +1 or "neutral"	+1	Enabling	Creates conditions that further another goal.
	0	Consistent	No significant positive or negative interactions.
	-1	Constraining	Limits options on another goal.
-2	Counteracting	Clashes with another goal.	Boosting consumption for growth can counteract waste reduction and climate mitigation.
-3	Cancelling	Makes it impossible to reach another goal.	Fully ensuring public transparency and democratic accountability cannot be combined with national-security goals. Full protection of natural reserves excludes public access for recreation.

Where interactions are rated in a specific direction, (e.g. if the interaction of target 1.2 towards adaptation is rated +3), the classification refers to the importance of achieving the former in implementing the latter. In this example, we mean that, in general terms, reducing poverty is a necessary condition to achieve successful adaptation. Once in possession of an adapted rating scale for our purposes, the understanding of each element was calibrated between the authors through non-climate examples.

The assessment is qualitative; in the attempt to identify trends and draw general conclusions, this paper relies heavily on expert judgement. To provide for transparency on the level of confidence of each assessment, ratings are accompanied by self-reported information on the authors' expertise: between "*" (limited expertise) and "***" (high expertise).

2.2 Application to all targets

Nilsson et al highlight four main considerations in applying the scale: direction (i.e. does the interaction go in both directions?); strength (i.e. negative interactions can be tolerable if they are weak); certainty (i.e. is there evidence that the interaction will definitely happen?); and reversibility (i.e. is the interaction reversible or not?). To this list we also add the possibility of multiple (and possibly contradicting) interactions. We address these aspects as follows: 'direction' is addressed by separating ratings; 'strength' is assumed to be captured primarily through the rating itself⁴; 'certainty' and 'reversibility' are not a focus of this assessment, as explained further below; multiple interactions are addressed by relying on the use of text with examples from the literature to explain each rating. Certain interactions are also rated as "variable", indicating that the nature of the interaction could vary strongly depending on the circumstances and the concrete policies put in place to achieve both climate commitments and the SDGs.

⁴ A strong positive interaction would receive a rating of +2 or +3, whereas a weaker one would receive a rating of +1 (i.e. neutral).

Ratings are applied to characterize the interaction between SDG targets (excluding those related to means of implementation) and climate change mitigation and adaptation. We do not analyse targets under SDG 13, since this goal is specifically about taking urgent action to address climate change— instead, we rely on the more precise and well-known formulations used under the climate regime to define a “typical approach” to mitigation and adaptation. The focus of the analysis lies on direct, local impacts of individual policies –as opposed to long-term, global impacts of aggregate actions. This is particularly important for mitigation; for example, while aggregate ambitious mitigation action could reduce ocean acidification effects, an individual mitigation policy would be very unlikely to do so.

Both mitigation and adaptation action are context specific, and no single set of actions is relevant for all countries. In an attempt to provide a meaningful assessment with policy relevance, we compare best practice mitigation and adaptation actions with those to implement the SDG targets. Climate policy instruments are drawn primarily from experience and from the literature, mainly Edenhofer et al., (2014); Höhne, Fekete, Kuramochi, Jacobuta, & Prinz (2015); and Field et al. (2014). For the SDGs we rely on the agreed SDG indicators (IAEG, 2017), as well as on dedicated literature for each.

Assessments were first done independently by each author, in two steps: first, interactions between each target against mitigation and adaptation were classified broadly as negative, neutral or positive; these were then refined into the 5-point scale in comparison to each other. Individual ratings were then consolidated and differences reconciled. This stepwise approach facilitated consistency in ratings, as well as the capturing of different elements and viewpoints.

2.3 Discussion of key interactions for each goal

This step focused on targets with the strongest interactions under each SDG. Ratings obtained in step 2.2 were further refined with respect to the direction of the interaction, i.e. from the target towards mitigation (“SD -> Mit”), from mitigation towards the target (“Mit -> SD”), from the target towards adaptation (“SD -> Adpt”) and from adaptation towards the target (“Adpt -> SD”).

We acknowledge that the topics discussed here are extremely complex; each of the short sub-chapters of section 3 deserves lengthy analyses of their own. We do not presume to be exhaustive, although an attempt is made to cover the main interactions. Rather than attempting to provide a “final answer” on each interaction, this study aims to lay out some of the most important considerations – hoping that it will contribute to an on-going conversation about policy synergies and tradeoffs.

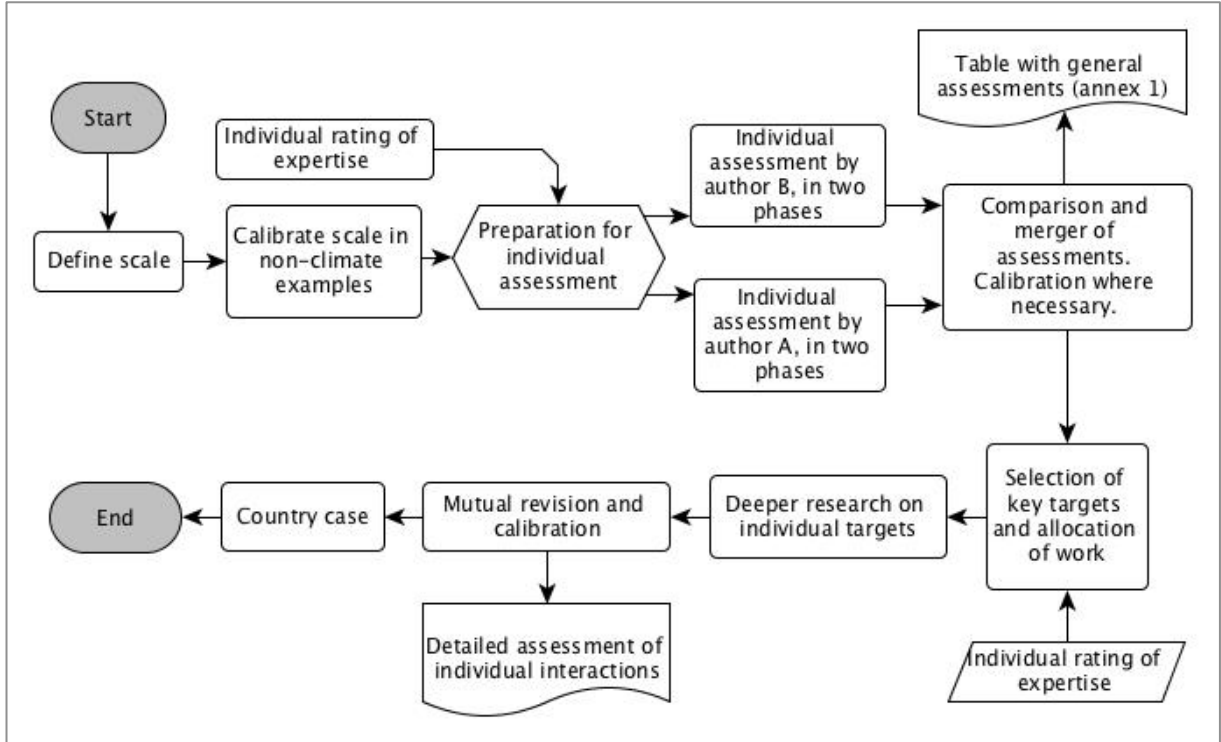
2.4 Case study

The final segment of the paper takes a brief look at the case of Mexico, in order to outline what these particularly relevant interactions can mean in a national context, and draw some general conclusions as to the factors that must be taken into account in the analysis. This section does not review every single interaction within the Mexican context, but highlights particular examples that help illustrate how synergies and tradeoffs appear at the country level. Also, it does not attempt to produce specific policy recommendations for Mexico, but rather to show the potential usefulness of the paper’s analysis to help policymakers pinpoint the areas and sectors requiring special attention for an integrated implementation of the SDGs and climate policy. Relevant climate policies are particularly drawn from Mexico’s Nationally Determined Contribution (NDC) for the achievement of the Paris Agreement. It does so by providing some

elements of the Mexican context and institutional framework, and identifying policies in which some of the expected interactions are already visible. It also discusses some specific challenges that might be tackled by introducing policy coherence instruments to promote inter-institutional coordination and inter-sectorial dialogue.

The methodological process is outlined in Figure 2 below.

Figure 2 - Methodological process



3. Results

This section discusses key policy interactions for each SDG, focusing on the strongest interacting targets. Each section presents a brief introduction to the SDG, a table with the strongest ratings in all four directions, and a brief discussion on the key elements of the interaction. A table with (direction independent) ratings on all targets is contained in the Annex.

3.1 SDG 1 - End poverty in all its forms everywhere

Poverty eradication is at the heart of Agenda 2030, and accomplishing SDG 1 underpins the achievement of most other goals. Climate change is an acute aggravating factor of poverty: under a business as usual scenario, by 2030 an additional 100 million people could be living in extreme poverty as a result of climate-related impacts (Hallegatte et al, 2016; UNEP, 2016). Climate change affects the poor disproportionately, making global-scale ambitious mitigation action fundamental for the achievement of SDG 1. At the local level, efforts under SDG 1 are also key elements of adaptation, reducing the exposure and vulnerability of the poorest, and contributing

to reduced impacts and increased resilience.

Going beyond the global impacts of successful climate mitigation (see section 2.2 above), three targets under SDG 1 are found to have indivisible relationships with adaptation:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
1.2. By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions.	-1/0/+1	-1/0/+1	+3	+2
1.3. Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.	-1/0/+1	-1/0/+1	+3	+3
1.5. By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.	-1/0/+1	-1/0/+1	+3	+3

3.1.1 Interactions with adaptation

Targets 1.2, 1.3 and 1.5 aim to, respectively, reduce poverty in all its dimensions, implement social protection systems, and build the resilience of the poor to face climate change and other shocks. These targets are indivisible from adaptation because of their importance in reducing vulnerability and exposure to the impacts of a changing climate, since the poor are usually the least capable of facing climate hazards and are also the most impacted by successive events (IPCC, 2014a, p. 797).

Synergies from *Target 1.2* towards adaptation can be maximized where countries' definitions of multidimensional poverty⁵ appropriately consider aspects of poverty that are affected by climate change. For example, the Colombian Multidimensional Poverty Index includes elements fundamental to household exposure to climate extremes, such as firm floors and firm outer walls (DANE/Colombia, 2015).

Social protection systems called for by *Target 1.3* contribute the most to adaptation where they are climate-responsive in terms of climate-aware planning, interventions centred on livelihoods, and a focus on building adaptive capacity (Kuriakose et al., 2012). Social protection programs are most important during crises, as they help absorb shocks and reduce intervention costs, effectively preventing humanitarian emergencies (Hallegatte, Vogt-Schilb, Bangalore, & Rozenberg, 2017). The Productive Safety Net Program in Ethiopia, for example, helped households affected by the 2008 drought improve caloric consumption by 30% as compared to non-beneficiary households (Kuriakose et al., 2012). Nevertheless, it is important to consider the limitations of certain social protection systems, such as cash transfer schemes, in addressing systemic vulnerabilities and building long-term adaptive behaviour (IPCC, 2014a).

⁵ Target 1.2 recognizes poverty as a multidimensional phenomenon, making it more suitable than target 1.1 in addressing the different avenues through which climate change and poverty interact.

Target 1.5 is explicitly aimed at building the resilience of the poor to climate-related extreme events, by which they are disproportionately affected. They are more exposed and more often impacted, their livelihoods are based on fewer assets that are more dependent on environmental conditions, and they receive less support to recover (Hallegatte et al., 2017). To increase positive impact, action under this target should address the perverse incentive embedded in disaster risk assessments focused on the value of avoided damages, which favour investing in the protection of richer areas and people.

In addition to reducing exposure, a comprehensive adaptation strategy should help build long-term adaptive capacity for the poorest, through a combination of instruments including revenue diversification, financial inclusion, market insurance and social protection programs. Moreover, access to financial services and microfinance (as mentioned in target 1.4) can play an important role in facilitating post-disaster rehabilitation and rebuilding of household assets.

Adaptation measures are also necessary for the achievement of the targets. Reducing vulnerability and increasing resilience can be directly linked to poverty alleviation efforts. Most importantly, successful adaptation should reduce the damage caused by climate impacts, thereby minimizing their effect on poverty in the first place. This makes the relationship between targets 1.2, 1.3 and 1.5 and adaptation either reinforcing or indivisible.

3.1.2 Interactions with mitigation

Interactions with mitigation also exist, albeit less prominently. Achieving Target 1.2 could increase GHG emissions, although the environmental impact of eradicating poverty is likely to be low. Yet generalizing modern living standards with current development patterns and technologies would result in much higher GHG emissions (Hallegatte et al., 2016). Efforts aimed at producing shared prosperity thus need to promote a sustainable development model, implemented with policies seeking the decarbonisation of economic growth. Positive effects towards mitigation also exist, e.g. where broadening the access of the poor to property rights produces changes in land tenure regimes, leading to better management of natural resources. For example, communal tenure of land in Vietnam and Nepal has helped ensure the livelihoods of vulnerable communities while improving the management of forests, which are important carbon sinks (Andersen, 2011). Interactions from mitigation towards targets 1.2, 1.3 and 1.5 should safeguard against potential regressive impacts, e.g. where mitigation measures lead to increases in energy prices that disproportionately affect the poor.

3.2 SDG 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture

SDG 2 is deeply interconnected to both mitigation and adaptation. The agriculture, forestry and other land-uses (AFOLU) sector is an important source of GHG, accounting for 25% of global annual emissions (UNEP, 2016). At the same time, the effects of climate change are expected to have severe impacts upon food production, and therefore on hunger and vulnerability.

Three targets under SDG 2 are found to have indivisible relationships with climate action:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
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2.1. By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.	-2	-1/0/+1	+3	+2
2.3. By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.	Variable	Variable	+3	+3
2.4. By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.	+2	-1/0/+1	+3	+3

3.2.1 Interactions with adaptation

Nearly 800 million people still suffer from hunger (UNEP, 2016). The food insecure are among the most vulnerable to climate change impacts, due to their dependency on the land and their high exposure to hunger and malnutrition due to climate-related impacts. *Target 2.1* is thus rated +3 towards adaptation action. Similarly, *Targets 2.3* and *2.4* are also found to be indivisible from adaptation, since one of the most direct channels through which climate change impacts livelihoods and wellbeing is through agricultural systems. On the one hand, increasing the incomes and access to productive resources of the most vulnerable -including small-scale food producers, indigenous communities, and women-, is essential to boost resilience. On the other hand, food production systems must themselves be adapted to climate change in order to reduce its impacts on productivity and food security. In order to maximize positive effects on the adaptive capacity of both agricultural systems and the people dependent on them, the implementation of these targets should explicitly aim to a) increase the income of the poorest; b) increase the value of land for poor landowners; and c) increase the resilience of farmers, especially the land-dispossessed, and reduce the risk of large income fluctuations (Granoff et al., 2015).

In the opposite direction, adaptation also contributes to the achievement of the three targets, especially where it addresses the effects of climate change on crop failure, water shortages, declining agricultural yields, lower land productivity and market instability, especially among the poorest. They are thus indivisible from or reinforcing to the achievement of all three targets. In particular, contributions of adaptation to Target 2.3 can be achieved through a wide range of measures, such as planting date adjustment, irrigation and fertilizer optimization, investments in infrastructure, crop insurance (with subsidized premiums for the most vulnerable groups) and improved market access (Granoff et al., 2015). The latter can be an important way to deal with shocks, but it is dependent on the reduction of trade barriers and transportation costs. Investing

in climate-resilient rural road development, for example, can help boost market access for small-scale farmers: in Ethiopia, “the incidence of poverty decreased by 6.7 percent after farmers gained access to all-weather roads” (Hallegatte et al., 2016, p. 66).

3.2.2 Interactions with mitigation

An increase in food production (Target 2.1), alongside population growth, is likely to increase GHG emissions. However, although the negative impact exists, it is likely to be smaller than the impact of structural changes in diets at a global scale: the number of people living in countries with an average per capita consumption of 3000 kilocalories per day is expected to grow from its current 1.9 billion, to 4.7 billion by 2050 (UNEP, 2016). Improved agricultural productivity (Target 2.3) can help reduce the negative impact, making use of practices that contribute to mitigation – such as cropland management (improved crop varieties, crop rotation, soil management, agroforestry, etc.), grazing land management (including re-vegetation, restoration of degraded soils and fire management), and livestock management (including improved livestock feeding and manure management) (IPCC, 2014b). Emissions can also be reduced by promoting changes in food demand, including by changing to plant-based diets, and reducing overconsumption in developed countries and regions (IPCC, 2014b).

Mitigation action can have positive and negative impacts on these targets. For example, mitigation measures aimed at reducing emissions from food waste (see Target 12.3) will have a positive impact on food security and the sustainability of agricultural systems. On the other hand, land-related mitigation, such as biofuel production, as well as conservation and reforestation action (see SDG 15) can increase competition for land and natural resources such as water, undermining food security (IPCC, 2014b). These measures should thus be accompanied by complementary policies that provide alternatives for economic diversification, and/or increased agricultural productivity that can reduce the need for agricultural land expansion.

3.3 SDG 3 - Ensure healthy lives and promote well-being for all at all ages

Targets under SDG 3 aim to improve health in various population groups, and many of its targets are directly or indirectly affected by climate change. For example, increasing temperatures have a direct impact on the incidence and geographical range of diseases such as malaria (Target 3.3), which is responsible for almost 600,000 deaths annually (WHO, 2016). The effects of climate-related extremes present further challenges, especially in the absence of solid response systems (Target 3.8). Combined with pre-existing structural vulnerabilities, such as weak public health systems and a lack of broad health insurance coverage, climate change has the potential to deter and even reverse development gains under SDG 3, and it is expected to cause 250,000 additional deaths per year by 2030 (WHO & UNFCCC, 2015).

In general terms, the achievement of SDG 3 is enabling towards adaptation, not only because healthy communities are more resilient to climate impacts, but also because the sick are often among the most vulnerable and the least able to respond to environmental change. Conversely, the adaptation of health systems, as well as the adoption of preventive measures both at the community and the individual level (such as installing mosquito nets), enables the achievement of SDG 3 under increasingly severe circumstances relating to climate change. Health must be a cross-cutting consideration for adaptation policies in order to prevent unintended effects: in Barbados for example, a policy aimed at addressing water shortages promoted uncovered water storage facilities which led to an outbreak of dengue (WHO, 2013).

In terms of immediate policy implications at the local level, climate mitigation was found to have

a reinforcing relationship towards Target 3.9:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
3.9. By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	-1/0/+1	+2	-1/0/+1	-1/0/+1

3.3.1 Interactions with mitigation

The World Health Organisation (WHO) highlights that air pollution causes over 7 million deaths each year, and considers that the “close connection between actions that drive climate change, and those that cause local air pollution, call for an integrated approach to address both sets of risks” (WHO & UNFCCC, 2015, p. 4). This is particularly true in urban settings, as “90% of the global urban population is exposed to air which does not meet WHO air quality standards” (WHO & UNFCCC, 2015, p. 12). See also SDGs 7 and 11.

Mitigation policies can have a significant effect in reducing air pollution and its associated costs. For example, setting carbon prices that adequately reflect the health impacts of emissions could halve deaths related to outdoor air pollution, while raising approximately \$3 trillion per year in revenue (WHO, 2016). Such mitigation policies could be complemented with targeted measures to address short lived climate pollutants, as some countries have already included in their NDCs, and which could save about 2.4 million lives annually (WHO, 2016). There is thus a reinforcing contribution of mitigation action towards the achievement of this target, as well as an enabling relationship in the opposite direction. In some cases the relationship may be even stronger: a study on particulate matter reduction in China concluded that even the most advanced scrubbing and end-of-pipe technologies can only generate basic air quality standards in about 50% of Chinese cities by 2030, making it necessary to adopt more drastic measures to replace fossil fuels in electricity generation (NCE, 2014).

3.3.2 Interactions with adaptation

Adaptation of health systems to address air pollution might include surveillance and monitoring systems to trigger early warnings on pollution levels and reduce people’s exposure. In Albania, for example, the installation of an air quality monitoring system in the capital created capacities for communication mechanisms regarding air quality to be developed at the local level (WHO, 2015).

3.4 SDG 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Education is key to promote a new conception of the relationship between humans and the environment, and to foster preparedness and effective responses to increasing uncertainties under a changing climate. Although none of the targets under SDG 4 explicitly recognize the importance of education for climate action, they cover relevant aspects of it. For example, increasing the number of women and youth who have relevant technical skills (under Targets 4.3 and 4.4) could help create the workforce conditions for the development of green economies, while also ensuring the inclusion of traditionally marginalized groups.

Target 4.7 is found to have an indivisible relationship towards climate action, particularly adaptation:

SDG 4	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.	+2	-1/0/+1	+3	+2

3.4.1 Interactions with adaptation

Education can “provide the knowledge and skills needed for making informed decisions about how to adapt individual lives and livelihoods as well as ecological, social or economic systems in a changing environment” (Anderson, 2012, p. 193). In addition to information and capacities, education can also foster leadership abilities to prevent and respond to hazards at the community level (Kagawa & Selby, 2012). For example, a study conducted in South African showed that students who received environmental education were not only more aware of climate risks, but they could also identify the relationship between these risks and the future wellbeing of their communities (Nkoana, Komendantova, & Jardandhan, 2016).

Education, training and awareness raising are also essential for disaster risk reduction. For example, a study on how farmers in Ethiopia select adaptation options found a positive relationship between the education level of the household head and the adoption of improved technologies and adaptation to climate change (IPCC, 2014a, p. 847). Education is thus important both to provide information on adaptation options, and to build social capital and resilience. It should be noted that education is not limited to formal schooling; other forms of knowledge and knowledge transmission, such as indigenous knowledge, also play an important role in promoting social learning and building adaptive capacity (IPCC, 2014a). Target 4.7 is thus considered to have an indivisible relationship towards adaptation.

Conversely, adaptation efforts have a reinforcing effect towards this target. Adaptation measures can reduce the effect of climate impacts that threaten the physical safety of schools as well as educational continuity (Anderson, 2012). Disasters can have serious negative effects on education and school enrolment, as poor households are forced to withdraw children from school to help sustain livelihoods. Forced displacement relating to climate impacts can also result in children taken out of school, as documented in cases in Malawi and Ethiopia (Latek, 2015). Adaptation measures that explicitly reduce the impacts of climate change upon school desertion can have stronger positive impacts onto this target.

3.4.2 Interactions with mitigation

Education for sustainable development can help transmit content knowledge and skills that are relevant to mitigation, including “climate change and scientific literacy; education for sustainable lifestyles and consumption [...]; and green technical and vocational education and training”

(Anderson, 2012, p. 194). Accomplishing this target thus enables and reinforces mitigation action in at least three ways. Firstly, education can trigger individual and societal behavioural change towards more sustainable lifestyles and help raise consumer awareness towards sustainable consumption choices (see also SDG 12). Second, it is essential to create the capacities necessary to transition to a green economy, especially since limited education and skill levels are among the most important barriers for low-carbon development in key sectors, such as energy (IPCC, 2014b). Third, it helps build support for government policies on mitigation, which may be politically sensitive without a proper understanding of their long-term benefits. Mitigation action, in turn, has little impact on the achievement of this target.

3.5 SDG 5 - Achieve gender equality and empower all women and girls

Interactions between gender and climate change relate mainly to its disproportionate impacts over women. Socially embedded gender roles –such as women being responsible for water and fuel collection- are impacted by climate change, and other gendered dynamics (e.g. climate related out-migration is mostly male), result in increased vulnerability. Women usually have less control over productive resources, their livelihoods are more closely dependent on climate conditions, and they often lack the knowledge or the skills to effectively respond to emergencies (IPCC, 2014a).

Therefore, target 5.5 is found to have a reinforcing interaction with adaptation:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
5.5. Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.	-1/0/+1	-1/0/+1	+2	Variable

3.5.1 Interactions with adaptation

The empowerment of women under this target has a reinforcing relationship towards adaptation, since it can simultaneously reduce their vulnerability to climate change and help them become effective drivers of adaptive capacity building. Empowering women to have a greater role in decision-making, for example, in the selection of seeds and crops, and to access updated information, could increase agricultural productivity and enhance food security (Bathge, 2010). There are also many cost-effective opportunities to help women take part in new activities that can enhance their individual and community resilience. Generally, improving their access to productive resources, to education and training, to financial services, and to markets, can have a multiplying positive effect on adaptive capacity. Additionally, their political empowerment can help veer policies towards more community-centred resilience. We therefore rate the relationship from Target 5.5 towards adaptation as +2.

Adaptation policies can have a reinforcing relationship towards this target, provided they are sensitive to the drivers of gender inequalities (IPCC, 2014a). Absent proper consideration of the gendered dimensions of climate impacts, “climate policies can systematically reinforce and exacerbate inequalities along with other drivers that amplify vulnerability. Gender impacts can be reinforced leading to differential access to social and environmental adaptation resources and exclusion from decision making and planning” (Hallegatte et al., 2016, p. 163).

3.5.2 Interactions with mitigation

A mounting body of evidence shows that empowering women and ensuring their full participation in political and economic decision-making multiplies development gains, as women tend to be more community-focused and to reinvest more on improving household conditions. Among others, increasing gender equality “is linked to a higher GDP per capita; (...) [and] equal access for women to the land and other agricultural inputs increases agricultural productivity by 20 percent to 30 percent” (UN Women, 2012). Target 5.5 is thus understood to have an enabling relationship towards mitigation.

Mitigation action with gender perspective, on the other hand, can produce significant development co-benefits in a cost-effective way. Consciously including women in mitigation activities has positive effects both on their own empowerment and on a project’s success and sustainability. For example, the Barefoot College solar electrification program in India trains senior women from rural communities as solar engineers. Not only has this helped electrify over 50,000 rural households with renewable energy, but the choice to focus on women has helped ensure the project’s continuity, since men usually leave their villages to work in nearby cities (Smith, 2015). Unfortunately, this approach is not the norm in traditional mitigation action. Maximizing this positive interaction will require the consideration of the differential impacts of mitigation on women. For example, considering that most small-scale farmers are women (IPCC, 2014a), land-based mitigation actions should be designed to reduce competition with lands which are already scarcely owned by them.

3.6 SDG 6 - Ensure availability and sustainable management of water and sanitation for all

SDG 6 relates to climate change in two key ways. At the global level, climate change disturbs water pattern behaviours – producing droughts, floods and creating water insecurity, among others. At local level, the achievement of this goal is essential to adaptation: water stress is a driver of climate vulnerability, not only because of the need for safe drinking water for personal consumption, but also because of its role in productive systems (particularly agriculture). Access to sanitation is also important for adaptation because the lack of it greatly increases the likelihood of disease, as seen in SDG 3, and therefore exacerbates vulnerability. Water and sanitation provision systems, as well as water treatment facilities, must themselves undergo serious adjustments to adapt to forecasted climate impacts. On the other hand, some of the targets under SDG 6 (notably 6.1 and 6.2) could have a negative impact on mitigation through increased energy demand related to water pumping, distribution and treatment.

Under the criteria of direct and local policy relevance though, one target is found to be indivisible from adaptation:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
6.6. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.	+2	Variable	+3	+2

Interactions with adaptation

Achievement of Target 6.6 is considered indivisible from adaptation, since water-related ecosystems act as natural protections against some of the impacts of climate change. For example, the conservation of forests has been proven to help “conserve water resources and prevent flooding, reduce runoff, control erosion, reduce siltation of rivers, and protect fisheries” (Bates, Kundzewicz, Wu, & Palutikof, 2008). Adaptation efforts, mainly under the variety of ecosystem-based adaptation, have a reinforcing effect: adaptation measures aimed at improving water governance may also lead to better management of water catchments (Ansuategi et al., 2015) and enhanced valuing of the services provided by water-related ecosystems. It must be noted, however, that adaptation policies that affect stream-flow variability, such as the construction of dykes and dams to reduce flood risk, can have a negative effect on water quality and therefore on water-related ecosystems (IPCC, 2014a).

3.6.1 Interactions with mitigation

Target 6.6 has a reinforcing impact on mitigation because these ecosystems are important carbon sinks. Peatlands, for example, are important sinks for CO₂ and other GHGs. Carbon storage in Southeast Asian peatlands alone is estimated at around 58 Gt (IPS, 2008), and the rapid depletion of peat swamp forests in the region, mostly for palm oil and timber plantations, is a major source of land-use change related emissions. Water-related ecosystems can also be important for mitigation beyond their function as carbon sinks: for example, wetlands provide a less energy intensive solution for municipal wastewater treatment (IPCC, 2014b).

The impact of mitigation measures on Target 6.6 could vary: while measures such as payment for ecosystem services programs could contribute to the conservation of water-related ecosystems (see SDG 15), measures such as bioenergy crops could increase water demand from the agricultural sector. Carbon capture and storage can undermine groundwater quality, and a number of renewable energy sources (such as geothermal and concentrating solar power) can increase both the consumption and pollution of water (IPCC, 2014b).

3.7 SDG 7 - Ensure access to affordable, reliable, sustainable and modern energy for all

Energy is crucial for achieving almost all SDGs as it is a necessary service for many advancements in health, education, water supply and industrialization (UN-DESA, 2017b). SDG 7 aims at achieving universal energy access, as well as increasing the use of renewable energy and improving energy efficiency. All targets were found to have strong interactions with climate policy:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	-1/0/+1	Variable	+3	+2
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	+3	+3	+2	-1/0/+1
7.3 By 2030, double the global rate of improvement in energy efficiency	+3	+3	-1/0/+1	-1/0/+1

Interactions with adaptation

One in six people lack access to modern electricity services, and two in five lack access to modern cooking services (IEA & World Bank, 2015). Interactions between Target 7.1 and adaptation are positive: energy access is a fundamental pillar in reducing vulnerability and exposure, and is a necessary service for many other adaptation and resilience elements such as water, sanitation and health. The relationship is thus rated as indivisible. Adaptation action designed to reduce vulnerability and exposure could target energy access, although the connection here is less prominent than the one in the opposite direction.

The relationships of Targets 7.2 and 7.3 with climate adaptation are not as relevant, although reinforcing effects could be found from 7.2 towards adaptation, as renewable energy (especially distributed systems) could reduce vulnerability and boost resilience (e.g. centralized energy systems can magnify the impacts of localized extreme events) (Field et al., 2014). Energy-consuming adaptation and resilience measures could make use of renewable energy technologies, although that is dependent on the local context, on finance and on the availability of cost-effective technology. Energy efficiency measures could lead to more free income and therefore higher adaptive capacity, although this effect is likely to be small for vulnerable groups.

Interactions with mitigation

Although the implementation of Target 7.1 will result in an increase in total energy consumption, achieving the target will not have material implications for global emissions: according to the International Energy Agency, the impact would be an increase in GHG emissions of 0.7% even if carbon intensive technologies are employed (IEA, 2011). Moreover, indicator 7.1.2 focuses specifically on the proportion of the population with primary reliance on clean fuels and technology, and low-carbon distributed energy is now cost effective also for small, off-grid installations appropriate to the rural areas where most of those lacking access today live (Power for All, 2016).

Mitigation policies have a variable effect on the achievement of Target 7.1: policies that increase the cost of energy could have regressive effects and constrain access of the poor (IPCC, 2014b), and some energy types (such as large hydropower) can have detrimental local development consequences. Well-designed mitigation policy, however, can help increase access (Ottmar Edenhofer et al., 2014b, fig. TS.4) and increase energy security (IPCC, 2014b). Energy-related emissions (Targets 7.2 and 7.3) account for more than three-quarters of global GHG emissions, therefore, cost-effective mitigation pathways necessarily involve increasing the use of low-carbon energy in energy supply and reducing energy demand by improving energy efficiency (Ottmar Edenhofer et al., 2014b). The relationship between these targets and climate change mitigation is thus considered to be indivisible in both directions.

3.8 SDG 8 - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

SDG 8 aims at promoting growth, employment, innovation, and decent work, as well as to strengthen the capacity of financial institutions. Sustained, inclusive economic growth is necessary for achieving sustainable development (UN-DESA, 2017c), as it creates the economic conditions under which the necessary investments can take place. Decent employment and income sustain livelihoods and increase resilience. Yet important tradeoffs exist, in particular with regards to whether or not the targets under this goal are pursued with consideration of

sustainability standards. Interactions with mitigation, as further explored below, are highly dependent on policy choices.

Four of the targets under SDG 8 were found to interact strongly with mitigation action:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
8.1 - Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries	Variable	+2	Variable	+2
8.2 - Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	Variable	+2	Variable	-1/0/+1
8.4 - Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead	+3	+2	-1/0/+1	-1/0/+1
8.5 - By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Variable	+2	+2	+2

3.8.1 Interactions with mitigation

Historically, economic growth has been strongly correlated with GHG emissions. And while the link between economic output and GHG emissions has weakened in the global average (IEA, 2015), such decoupling has not taken place in developing countries – partly due to the exporting of high-emission activities from developed to developing countries (NCE, 2014). The current model of development carries with it a growing risk of locking in a high pollution path, making the implications of Target 8.1 highly dependent on the pathway by which these goals are achieved.

While the text of SDG 8 makes reference to sustainability, neither of Targets 8.1, 8.2 or 8.5 refer to it; and the wording "in accordance with national circumstances" of 8.1 is a known shorthand for traditional development paradigms, particularly in low and middle income countries. While Target 8.4 is highly relevant for mitigation (e.g. through energy efficiency and waste management - see SDGs 7, 11 and 12), none of the 231 SDG indicators monitor GHG per capita. Very similar considerations apply to Targets 8.2 and 8.5: their impact on mitigation depends on what is produced, which technologies are developed, and how employment is fostered. A high-carbon approach to the achievement of Targets 8.1, 8.2 and 8.5 could carry catastrophic climate consequences, and the compatibility of these targets with mitigation objectives hinges mainly on the ability of growing economies to accelerate the decoupling of economic output from GHG

emissions (UNEP, 2016). According to NCE, (2014), at least 50% – and potentially up to 90% – of the actions needed to get onto a 2°C pathway are "win-win" climate and development solutions that could boost national development, equitable growth and broadly shared improvements in living standards. These include sustainable infrastructure development (see SDG 9) and structural economic changes to less energy-intensive productive sectors.

Low-carbon mitigation technologies bring opportunities for economic diversification as sought by Target 8.2. At the same time, their impact on established high-carbon industries is significant and brings disruption – calling for innovation in economic transformation as well as a just transition of the workforce, e.g. through complementary social protection (see SDG 1). The overall balance is positive, but it requires deliberate shifts from the status quo. The emphasis of mitigation on energy efficiency contributes to the achievement of Target 8.4. Mitigation can also have positive effects on employment: the UNEP Green Economy report (UNEP, 2011) showed the potential for pro-poor job creation as a significant co-benefit of the transition to the green economy in sub-Saharan Africa; and personal preferences of certain world-leaders notwithstanding, solar power alone employs more people in the US than coal, gas and oil – combined (US Department of Energy, 2017).

3.8.2 Interactions with adaptation

Interactions to and from adaptation also exist. Positive effects towards adaptation can occur if and where economic growth, increased productivity and resource efficiency trickle down to actually reflect on improved incomes for the most vulnerable; given the growing inequality rates in most countries, this impact is not to be taken for granted (see SDG 10). Employment and decent work contribute to improved adaptive capacity through poverty reduction and income increase. Adaptation also generally benefits the achievement of these targets: it can help sustain economic growth by reducing the economic costs of dealing with climate change impacts, create business opportunities, and contribute to transitions of the workforce, among others.

3.9 SDG 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 9 encompasses infrastructure, industrialization and innovation, which impact all of sustainable development, as well as mitigation and adaptation. Infrastructure provides physical systems and structures essential to the operation of society and the economy: it aggregates important GHG emissions sources and is subject to climate pressures that require adaptation and resilience. Industrialization drives economic growth and is an important element of every country's emissions trajectory over time. Industrialization also creates jobs and reduces income poverty, but can contribute to detrimental health effects and to natural resource depletion - all of which impact adaptation action. Innovation underpins the technological capabilities of industrial sectors, influencing not only what is produced, how and how much - but also the ability of societies to alter mitigation pathways and to adapt to climate change.

Within goal 9, the strongest interactions identified with climate policy relate to infrastructure:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder	+3	+2	+3	+2

infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all				
9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	+3	+2	+2	+2

Target 9.1 is drafted broadly, although both indicators relate to roads and transportation infrastructure. Target 9.4 is widely encompassing, and its indicator measures CO₂ emissions per units of value added. Taken together, we regard the targets as encompassing all infrastructure – noting also the overlaps with targets under SDG 11, particularly housing and transport.

Poor choices in the implementation of Targets 9.1 and 9.4 could have a double effect: on mitigation, this could lead to a high-carbon lock-in for decades to come; on adaptation, poor choices could lead not only to ineffective adaptation, but also to infrastructure that is not resilient to climate pressures – such that the investment is lost.

3.9.1 Interactions with mitigation

Interactions between Targets 9.1 and 9.4 towards mitigation relate to mitigation-relevant infrastructure and related policy instruments, such as power stations, factories, buildings and transportation, among others (see also SDGs 7 and 11). The existing stock and use of infrastructure is associated with more than 60% of the world’s GHG emissions, and massive investments in infrastructure will be needed in the next 20 years, driven by aging infrastructure in advanced economies, higher growth of emerging developing countries, and rapid urbanization worldwide (NCE, 2016). Necessary investments amount to approx. US\$90 trillion, which is more than the entire current stock. Therefore, this is a once in history transition that is crucial for successful mitigation worldwide (NCE, 2016). The relationship is thus indivisible.

The relationship from mitigation towards the targets is reinforcing; positive interactions can be strengthened where strong, long-term and consistent mitigation policy signals incentivize the right type of infrastructure and prevent stranded assets (NCE, 2014). There is also an urgent need to reduce capital costs for low carbon infrastructure, which could be achieved, at least in part, through mitigation-related economic instruments.

3.9.2 Interactions with adaptation

Interactions towards adaptation relate, among others, to the resilience of the same infrastructural elements to the effects of climate change; to infrastructure designed specifically for adaptation purposes (such as coastal walls and dykes); and to the provision of basic services necessary for vulnerability reduction and increased adaptive capacity. Moreover, the targets’ focus on "affordable and equitable access for all" increases the contribution to resilience. Infrastructure is therefore considered indivisible from adaptation. The Flood River Protection Programme in the Netherlands, for example, combines many goals of flood protection, urban planning and economic diversification (Vallejo & Mullan, 2017).

Adaptation policies also reinforce action towards the implementation of Targets 9.1 and 9.4, albeit to a lesser degree. They would, for example, be less likely to focus on increasing access -

hence the +2 rating from adaptation towards both targets. Interactions are stronger where adaptation policies specifically target the adaptation of strategic infrastructure.

3.10 SDG 10 - Inequality - Reduce inequality within and among countries

The interconnections between inequality and climate change are multiple and complex. While we have already addressed some forms of inequality and their relationship to climate change separately (e.g. income inequality in SDG 1, gender inequality in SDG 5), in practice these inequalities overlap and are mutually reinforcing, creating deeply rooted conditions of vulnerability.

Three targets were found to be indivisible from climate action, especially adaptation:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
10.1. By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average.	-1/0/+1	Variable	+3	+2
10.2. By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.	Variable	Variable	+3	+2
10.7. Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies.	-1/0/+1	-1/0/+1	+3	Variable

3.10.1 Interactions with adaptation

Targets 10.1 and 10.2 address different but often overlapping aspects of vulnerability. They are both indivisible from adaptation, since the poor and the marginalized are disproportionately affected by climate impacts, and thus increasing their resilience is crucial for overall adaptive capacity. Rising income inequality (with the top quintile of the world’s population receiving 83% of total income while the bottom quintile takes in 1%) (IPCC, 2014a) exacerbates the multiple vulnerabilities of the poor, as seen in SDG 1, while marginalized groups may face particular challenges that must be specifically addressed (e.g. how climate change affects the availability of traditional food sources for indigenous communities) (IPCC, 2014a). Furthermore, a growing literature on income inequality has supported the proposition presented by Alesina & Perotti (1996): that the more unequal a society, the more politically unstable. If stable societies are more resilient, then adaptation will be most efficient where societies are more equal and prosperity is shared among its members.

On the other hand, adaptation efforts are enabling to the achievement of these targets, in so far as they focus on particularly disadvantaged groups (e.g. community-based adaptation). However, adaptation policies can be ineffective if inequalities are not properly considered. For

example, certain insurance mechanisms might have prohibitive premiums, preventing the poor from accessing them (IPCC, 2014a).

Given that the number of people displaced by climate-related impacts is expected to be high (although there is no agreement on global estimates), Target 10.7 is also considered indivisible from adaptation. For many people, migration is (or will become) the only viable way to face climate change, and “there is significant evidence that planning and increased mobility can reduce the human security costs of displacement” (IPCC, 2014a, p. 768). However, for this target to truly contribute to adaptation, two factors must be taken into consideration: first, due to the costs associated with migration, the most vulnerable might be unable to move unless facilitated mobility policies are in place; second, planning must cover comprehensive assessments of the possible destinations, otherwise migrants can end up in situations of even higher risk (e.g. clustered in high-density urban areas exposed to flooding and landslides) (IPCC, 2014a). Whether adaptation efforts specifically aimed at facilitating migration (namely planned relocation) contribute to this target’s achievement will depend on execution: most evidence portrays resettlement “as a failure of adaptation and a policy of last resort” (IPCC, 2014a, p. 771), except for the few cases where it is actually community driven and supported under the conditions of those displaced.

Interactions with mitigation

As discussed in SDG 1, raising people’s income under SDG 10 might result in greater emissions; however, since there are such significant emission differentials between the rich and the poor both within and between countries (i.e. Rwanda’s emissions per capita are estimated at 0.1 metric tons of CO₂ yearly, while Qatar’s amount to 40.5) (World Bank, 2017), distributive policies could help reduce emissions. The relationship between Targets 10.1 and 10.2 mitigation can thus be seen as enabling. Conversely, the impact of mitigation policies on their achievement is contingent upon the consideration of distributional effects: for example, policies that result in higher electricity prices, without any in-built compensatory measures, would disproportionately affect the poor, who spend a larger share of their income on electricity (IPCC, 2014b). Regarding Target 10.7, it is important to take into account that large renewable or clean energy projects (such as hydropower plants) can result in local inhabitants being forcefully displaced.

3.11 SDG 11 - Make cities and human settlements inclusive, safe, resilient and sustainable

More than half the world’s population lives in cities, and it is projected that 6 out of 10 people will be urban dwellers by 2030 (UN-DESA, 2017a); they generate around 80% of global economic output and most energy-related GHG emissions (NCE, 2014). Cities provide both the environment and the conditions for development and adaptation action, as well as for economic growth and mitigation, so their development is critical. Yet much urban growth today is unplanned and unstructured, with significant economic, social and environmental costs (NCE, 2014). SDG 11 emphasises measures that increase resource efficiency, improve access to basic services, raise quality of life and reduce losses.

Four out of the seven targets of SDG 11 were found to strongly interact with climate policy:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
11.1 - By 2030, ensure access for all to adequate, safe	-1/0/+1	-1/0/+1	+3	+3

and affordable housing and basic services and upgrade slums				
11.2 - By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	+3	+2	-1/0/+1	-1/0/+1
11.5 - By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	-1/0/+1	-1/0/+1	+3	+3
11.6 - By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	+3	+3	-1/0/+1	-1/0/+1

3.11.1 Interactions with mitigation

Targets 11.2 and 11.6 have a strong relationship with mitigation: cities consume 60–70% of the world’s energy supply, and account for 70–80% of total CO₂ emissions due to energy generation, transport, industry, and biomass use (UNEP, 2016). In 2010, the transport sector accounted for 27% of final energy use (UNEP, 2016); assuming "sustainable transport systems" includes mainly low carbon ones, Target 11.2 is considered indivisible from climate change mitigation, although high-carbon transportation options would increase GHG emissions. The TransMilenio bus rapid transit system in Colombia, for example, increased access to and quality of public transportation while also reducing GHG emissions (UNFCCC, 2010). Target 11.6 addresses specifically the environmental impact of cities, with indicators related to waste management and particulate matter air pollution – both of which contribute to reducing GHG emissions, directly and indirectly respectively.

The relationship from mitigation towards Targets 11.2 and 11.6 is also positive, albeit with caveats. On transport, mitigation policies such as carbon taxes and the removal of fossil fuel subsidies may increase the price of fuel and of means of transportation; there is thus a need to offset possible regressive effects onto the poor and vulnerable, e.g. through revenue-neutral policies that neutralize negative effects on the poor. Mitigation action also directly addresses waste management and strongly contributes to improvements in air pollution, and is therefore indivisible from Target 11.6. Initiatives have sprung up worldwide to seize the mitigation opportunity of cities: in 2014, 228 cities committed to reducing their emissions – amounting to more than 6Gt of reduced emissions by 2030 (ARUP & C40 Cities, 2014). Measures being implemented by participating cities include the introduction of low-carbon vehicle fleets by Shenzhen and London, as well as bus-rapid transport systems in Rio de Janeiro – contributing to

climate change mitigation and increasing access to sustainable transport.

Target 11.1 has the potential to increase GHG emissions both of housing and of transportation (in the case of dispersed housing). Renewable energy supply and energy efficiency regulations, alongside urban planning and sustainable transport, can significantly reduce the emissions impact. The local impacts of mitigation actions towards Targets 11.1 and 11.5 seem to be limited; e.g. measures to increase energy efficiency could increase the quality of housing, but are expected to have little impact on access to housing per se.

3.11.2 Interactions with adaptation

Towards adaptation, Targets 11.2 and 11.6 have enabling effects, particularly where they target vulnerable groups and contribute to more stable and sustainable cities. Adaptation policies also have enabling effects, e.g. by increasing resilience of transportation infrastructure.

Targets 11.1 and 11.5 have strong links with adaptation and resilience. According to (Field et al., 2014), poor quality and inappropriately located housing is often most vulnerable to extreme events. Reducing basic service deficits, improving housing, and building resilient infrastructure systems could significantly reduce vulnerability and exposure in urban areas (Field et al., 2014). Adequate and participatory urban planning - through Target 11.3 - plays an important role here: increased capacity, voice, and influence of low-income groups and vulnerable communities and their partnerships with local governments also benefit adaptation. These interactions are particularly important for regions at high risk of extreme weather events (such as floods and storms) and sea level rise; risks are amplified for those lacking essential infrastructure and services or living in poor-quality housing and exposed areas (Field et al., 2014). Rapidly growing cities, or those rebuilding after a disaster, have particular opportunities to increase resilience; yet without adaptation, risks of economic losses from extreme events are substantial in cities with high-value infrastructure and housing assets, with broader economic effects possible (Field et al., 2014).

A key challenge here is to reconcile the short-term demand with longer-term sustainability requirements. Implementation of these targets must be undertaken holistically to avoid perverse outcomes, such as building affordable homes in areas vulnerable to climate impacts like rising seas or extreme weather events (UNEP, 2016). Target 11.5 and adaptation are found to be indivisible in both directions: typical tools include disaster risk reduction measures and early warning systems. An example here is the disaster prevention system implemented by the city of Porto Alegre as part of the 100 Resilient Cities initiative: it aims to address risks of floods and landslides by preventing settlements in risk areas, helping families protect their belongings, and prevent accidents that could harm the environment (Porto Alegre, 2016).

3.12 SDG 12 - Sustainable consumption and production - Ensure sustainable consumption and production patterns

Sustainable consumption and production (SCP) refers to the “efficient management of resources at all stages of value chains of goods and services” (UNEP, 2012a, p. 2), through processes that require fewer inputs and generate less waste, while possibly generating economic gains. Its central idea is the decoupling of economic growth from environmental degradation (UNEP, 2012b), and therefore it is deeply related to mitigation.

Practically all targets under SDG 12 are relevant to mitigation – assuming, importantly, that the adjective “sustainable” also means low-carbon –, i.e. sustainable management and efficient use of

natural resources (Target 12.2), sustainable public procurement (Target 12.7), information for sustainable lifestyles (Target 12.8, also relating to Target 4.7). Additionally, although targets relating to means of implementation are not within the scope of this paper, it is important to note the critical relevance of Target 12c –on rationalizing inefficient fossil-fuel subsidies while minimizing adverse impacts on the poor- for efficient mitigation worldwide. Out of all these relevant targets of SDG 12, three were found to be indivisible from climate action:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
12.3. By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply.	+3	+2	-1/0/+1	-1/0/+1
12.4. By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	+3	+2	-1/0/+1	-1/0/+1
12.5. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	+3	+2	-1/0/+1	-1/0/+1

Interactions with mitigation

Targets 12.3, 12.4 and 12.5 are related to the waste sector, which is an important global source of emissions. Although there could be interesting interactions with adaptation (i.e. better waste management could help prevent certain climate impacts from escalating, such as floods in urban environments), these targets are mostly connected to mitigation.

Target 12.3 addresses an often overlooked, but hugely important source of emissions, both from the consumption and the production perspective: food waste. Globally, 30% to 40% of food produced is wasted at different stages of the supply chain (IPCC, 2014b). This is estimated to represent “about 8% of total anthropogenic GHG emissions [...] [meaning] that the contribution of food wastage emissions to global warming is almost equivalent (87%) to global road transport emissions” (FAO, 2015, p. 1). Therefore, the achievement of this target is indivisible from mitigation.

Targets 12.4 and 12.5 are also indivisible from mitigation given the importance of the waste sector as a source of emissions, which almost doubled between 1970 and 2010 (IPCC, 2014b). Waste prevention and reduction are thus essential for mitigation, as is the sound management of that which cannot be avoided: globally, “only 20% of municipal solid waste (MSW) is recycled and approximately 13.5% is treated with energy recovery while the rest is deposited in open dumpsites or landfills” (IPCC, 2014b). Mitigation policies can also be reinforcing on these targets’ achievement, since there are numerous efforts aimed specifically at reducing emissions from waste, and/or using it more efficiently (i.e. for energy generation), in all stages of the life cycle of a product: design; natural resource use and extraction; manufacturing; distribution and

marketing; consumption and use; reduction, reuse and recycling; and disposal (UNEP, 2012a).

3.13 SDG 14 - Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Oceans are a predominantly international public good which relate to nearly all other SDGs (Nilsson, 2016). There are multiple interactions with climate change. First, oceans and coastal systems are particularly sensitive to three key climate change impacts to which societies need to adapt, namely sea level, ocean temperature, and ocean acidity (IPCC, 2014a, Chapter 5). Second, oceans are the livelihood of many vulnerable communities, and are an important source of nutrition for billions of people worldwide (FAO, 2016). Finally, oceans are an important carbon sink.

Among the targets under SDG 14, one was found to have an indivisible connection with adaptation.

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
14.2 - By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	-1/0/+1	-1/0/+1	+3	+3

3.13.1 Interactions with adaptation

While coastal systems are subject to several climate-related risks (and therefore in need of ecosystem-based adaptation measures), they also provide opportunities for adaptation to other impacts of climate change. In particular, coastal ecosystems such as salt marshes, coastal vegetation, and coral reefs can act as barriers and buffers against sea level rise and storm surges (IPCC, 2014a), in addition to providing biodiversity co-benefits. Coastal use protection and planning is therefore an important aspect of climate change adaptation - making Target 14.2 indivisible in both directions. The community-based coral aquaculture and reef restoration programme in Puerto Rico, for example, contributes to protecting shore communities from storm surges, creating and maintaining habitats for fisheries, and generating income for local communities through the tourism industry (UNEP, 2017).

3.13.2 Interactions with mitigation

Interactions with mitigation are less strong, but still positive, as certain coastal ecosystems (such as mangroves) can be important carbon sinks.

3.14 SDG 15 - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

These ecosystems protected under SDG 15 are essential for our societies and economies, be it for food production or as providers of countless environmental services such as carbon sequestration, water, air purification, protection from extreme weather events and others. At the same time, competitions for land use can create adverse impacts on resilience and adaptation. Terrestrial ecosystems thus interact strongly with our livelihoods in many facets, including with

climate policy.

Two targets have indivisible relationships with mitigation and adaptation respectively:

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
15.2 - By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	+3	+3	Variable	Variable
15.3 - By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	+2	+2	+3	+2

3.14.1 Interactions with mitigation

Target 15.2 promotes the sustainable management of forests, increasing afforestation and reforestation globally. Deforestation and forest degradation accounted for around 12% of global GHG emissions between 2000 and 2010, stemming particularly from developing countries (Ottmar Edenhofer et al., 2014a). This target is thus indivisible from mitigation action in both directions, as mitigation efforts place strong emphasis on reducing net deforestation and increasing carbon stocks. Moreover, carbon sinks such as forests could be key to achieving net-zero emissions in the second half of the century. Finally, the aim of achieving this target by 2020 – a decade earlier than most SDGs – could provide important positive mitigation effects, due to the importance of early mitigation action (UNEP, 2016). For example, efforts by the government of Zambia to reduce emissions from deforestation and forest degradation and increase the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+), have contributed to significantly reducing the country's GHG emissions, in addition to providing ecosystem services (such as erosion control, ecotourism and pollination) valued at 2.5% of the country's GDP (Turpie, Warr, & Ingram, 2015).

Soil restoration measures (Target 15.3) also bring positive mitigation impacts, as they usually lead to an enhancement in soil carbon stocks. Mitigation practices implemented locally for soil carbon sequestration contribute to this target, increasing the ability of soils to hold soil moisture and to better withstand erosion, droughts and floods. (IPCC, 2014b)

3.14.2 Interactions with adaptation

Relationships of Target 15.2 with adaptation and resilience vary. Positive interactions stem mainly from forest-related environmental services that are necessary for vulnerability and exposure reduction: providing water, purifying the air, protecting from extreme weather events, promoting the conservation of biological diversity and providing products that can contribute to the livelihoods of forest communities, among others. Adaptation measures also contribute to the protection of forests, among others through drought and pest resistance in commercial tree species, adoption of sustainable forest management and increasing protected areas (IPCC, 2014b).

Yet negative interactions between Target 15.2 and adaptation also exist in both directions,

mainly due to competing pressures on land. Important aspects include the expansion of agricultural land for food crops, issues of land tenure and accompanying poverty impacts (see SDGs 1 and 2). These measures can also have negative impacts on water resources, e.g. where secondary forests deplete groundwater or surface catchments, as well as on biodiversity (e.g. in the case of monocultures). Positive and adverse impacts depend on multiple factors; among others (from IPCC, 2014b): the *policy measure* (e.g. reforestation of monocultures could lead to more adverse effects than avoiding reforestation of primary forests); *the scale* (e.g. large conservation projects may bring about large land tenure impacts that would not be present in small conservation initiatives); and *alternative uses of the land* (for plantations in particular, the impact is dependent on the land-use system they replace). Moreover, primary forests tend to be more resilient to climate change than secondary forests and plantations. Forest and biodiversity conservation, protected area formation, and mixed-species forestry-based afforestation are practices that can help to maintain or enhance carbon stocks, while also providing adaptation options to enhance resilience of forest ecosystems to climate change (IPCC, 2014b).

Desertification and degraded land (Target 15.3) reduce agricultural productivity, affecting food security and the livelihood of those who depend on soil quality, such as farmers and herders. Target 15.3 is therefore found to be indivisible from climate change adaptation, both due to its impact on vulnerability and to its potential as an adaptation measure. Improved soil management practices in the Mediterranean region, for example, were found to build crop resilience to climate change while also sequestering carbon (Aguilera, Lassaletta, Gattinger, & Gimeno, 2013).

3.15 SDG 16 - Peace and institutions - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

There are a number of elements in SDG 16 that are related to climate action in one way or another. For example, efforts to implement Target 16.1 on reducing all forms of violence will need to take into account that the impacts of climate change are expected to aggravate the drivers of conflict (Espinosa, 2017). However, there is one target that is considered indivisible from climate action, given that it underpins the majority of adaptation and mitigation efforts.

	SD -> Mit	Mit -> SD	SD -> Adpt	Adpt -> SD
16.6. Develop effective, accountable and transparent institutions at all levels	+3	+2	+3	+2

Target 16.6.

Institutions are “the formal and informal organizations through which society structures shared decision-making and takes collective action” (McGray & Sokona, 2012). Combatting climate change will require profound transformations in almost all aspects of human life, and institutions will be crucial to guide countries and communities through the difficult social decisions this will entail. However, institutions can be either enablers or barriers for change. In order for institutions to be effective, accountable and transparent, as this target mandates, and for them to become the framework that fosters and promotes ambitious mitigation and

adaptation action, many institutional lock-ins and a general path dependency must be overcome.

Interactions with mitigation

The achievement of this target is seen as indivisible from mitigation, because effective institutions are essential for the national implementation of countries' emissions reduction targets in all their stages, and because their design "affects the choice and feasibility of policy options as well as the sustainable financing of climate change mitigation measures" (IPCC, 2014b, p. 1147). The nature, scope and ambition of mitigation measures is thus defined by the institutional setup that produces and executes them. For example, the relative strength of central government institutions might affect the choice between economy-wide policies and sector-specific policies. Weak institutions will produce ineffective policies (e.g. cap and trade systems where the caps have been set too high and participation is not binding), whereas strong institutions can spur action at a lower cost (e.g. getting the industrial sector to reduce their emissions through voluntary agreements instead of command-and-control regulation) (IPCC, 2014b).

Interactions with adaptation

One of the most important challenges for effective adaptation, especially in developing countries, is the weakness of their institutions (or their complete absence) (McGray & Sokona, 2012). Institutions are needed to perform a number of crucial functions for adaptation, such as collecting and disseminating information, mobilizing and allocating resources, building capacity, providing leadership and brokering external support (Agrawal, Kononen, & Perrin, 2009). Since adaptation is inevitably local, institutions at this level are particularly important, both the formal and the informal ones. Local institutions can help broaden a community's access to resources, technology and knowledge that are relevant for adaptation, they can improve the social networks that produce collective responses to climate change (e.g. communal resource polling), and they can heighten the effectiveness of external interventions (e.g. local NGOs can help channel the allocation of external assistance where it is most needed in a post-disaster recovery process) (Agrawal et al., 2009). Therefore, the achievement of this target is also indivisible for adaptation, as institutions can be the catalysers of much of what has been mentioned throughout this paper as essential elements of adaptive capacity.

4. Country case: Mexico

This section looks at how the interactions identified throughout this paper are concretely taking place in Mexico. It is not an exhaustive review of each interaction, but rather a brief analysis highlighting how some of them are being considered or should be considered within this particular policy environment. It presents relevant elements of Mexico's context and institutional arrangements, then some interesting best practices, and finally some areas of opportunity that, as shown by this paper's analysis, could be important considerations for an integrated approach to the implementation of both agendas at the national level.

4.1 Context

Mexico is the twelfth largest global economy (CIA, 2017), one of 17 megadiverse countries in the world (World Atlas, 2017), and also one of the most populated (around 120 million inhabitants) (INEGI, 2015). It is highly vulnerable to climate change, resulting from both its physical exposure (given its great variety of geographic and topographic features) and its challenging social conditions (with 55.3 million people living in poverty) (CONEVAL, 2015). At the same time, as an oil exporting country whose economy is still highly dependent on fossil fuels, it faces a difficult transition towards a low-carbon and climate resilient development model.

Mexico's solid institutional frameworks for the implementation of the 2030 Agenda and the Paris Agreement could be the key to succeed in this transition, as seen on the discussion for SDG 16 (Target 16.6). On the one hand, Mexico has recently installed a multi-stakeholder National Council for the 2030 Agenda, and plans to adopt a long-term National Strategy for the Implementation of the SDGs. It also has a Specialized Technical Committee in charge of monitoring progress, a Working Group for the Legislative Follow-up of the SDGs in the Senate, and a 2030 Agenda Commission within the National Conference of Governors to promote effective implementation at the local level. On the other hand, Mexico has a General Law on Climate Change and a National Climate Change Strategy with commitments for the next 10, 20 and 40 years, as well as a number of policy and financial instruments to advance implementation, such as a National Climate Fund and a carbon tax. The National Climate Change System includes an Inter-Ministerial Committee, a multi-stakeholder Climate Change Council, and a technical-scientific body (the National Institute for Ecology and Climate Change), as well as representatives from Congress, state governments and municipal authorities. However, the two systems operate independently from each other, making an integrated approach to SDG and NDC implementation dependent on active efforts to ensure policy coherence between them.

Mexico has adopted the 2030 Agenda as a State commitment, but the way forward in terms of specific lines of action and measures is yet to be defined by the National Strategy under development. In contrast, its NDC defines concrete commitments and priorities. Regarding mitigation, it includes an economy-wide target to reduce its emissions of GHG and short-lived climate pollutants by 25% below business-as-usual by 2030, through measures in sectors such as energy, industrial processes and product use, agriculture, waste, and land use. Regarding adaptation, three priorities are outlined: first, adapting the social sector and building community resilience by addressing issues such as food security, water access and early warning systems; second, fostering ecosystem-based adaptation through measures such as promoting the connectivity of natural protected areas and the integral management of water; and third, adapting strategic infrastructure and productive systems, including by integrating adaptation criteria in the considerations to approve public investments and projects (Mexico, 2015b).

4.2 Interactions in practice: challenges and best practices

Many of the anticipated challenges that were outlined throughout this paper are already visible in Mexico at present, and expected to worsen in the near future. For example, regarding SDG 1, conservative estimates calculate that by 2030, poverty will increase by 2.43% due to climate change (de la Fuente & Olivera Villarroel, 2013). Relating to SDG 2, diminishing productivity rates are already reported in crops that are essential to Mexico's food security, such as maize, with over 25% of production units reporting reduced soil fertility (Mexico, 2012). Furthermore, regarding a number of SDG targets (particularly 11.5), although 68% of the population reports having been affected by disasters related to climate change (Mexico, 2012), only 21% of municipalities at high risk from meteorological hazards have a disaster response plan (World Bank, 2013).

There are, however, some interesting best practices in Mexico that could be critical in ensuring positive reinforcing and enabling interactions between the SDGs and its NDC. The National Climate Change Strategy already lists the attainment of social and health co-benefits as part of the criteria for the prioritization of climate change policies, and identifies flagship policies that can maximize them, such as promoting high-efficiency agricultural practices (Targets 2.3 and 2.4), improving wastewater treatment (Targets 6.3 and 12.4), increasing the quality and coverage of public transportation (Target 11.2), encouraging better management of cultivated land (Targets 2.3 and 2.4), and using landfill gases for energy generation (Target 12.5) (Mexico, 2013). Furthermore, the adaptation annex of the NDC provides the basis for a number of measures that are seen as indivisible from SDG achievement, such as the promotion of ecosystem-based adaptation through the conservation and recovery of water-based and coastal ecosystems (Targets 6.6 and 14.2), and adapting strategic infrastructure (Target 9.1) (Mexico, 2015b).

Most importantly, a number of policies beyond the environmental protection sector are already creating positive interactions with climate action. For example, Mexico's multidimensional poverty measurement includes elements that are highly relevant to vulnerability and adaptive capacity, such as access to health services and social protection, housing quality, educational level and food security (Target 1.2) (CONEVAL, 2014). Mexico also has one of the largest cash transfer programs in the world which, though not specifically designed to reduce vulnerability to climate change, has proven useful in reducing the impact of climate shocks upon the incomes of the poorest households (Target 1.3) (World Bank, 2013). The program, currently called Prospera, has existed for decades but has been recently reformed to broaden the services it covers, and now includes educational scholarships for the children of beneficiary households (Target 4.7), subsidies for food products of high nutritional value (Target 2.1), employment and productive inclusion programs specifically targeting women (Targets 5.5 and 8.5), and financial education and access to credit, savings and insurance instruments (Target 1.4) (Prospera, 2016).

Moreover, Mexico has insurance instruments specifically designed to help absorb the impacts of climate change. For example, the CADENA program, which insures low-income workers in the agricultural and fisheries sectors against the impacts of natural disasters on their means of production, has been shown to increase investments in productive assets and boost productivity, with positive co-benefits for food security (Targets 2.1, 2.3 and 2.4) (Hallegatte et al., 2017) (SAGARPA, 2015). Mexico has also consolidated its disaster prevention and response system, including a national centre for disaster prevention and a national fund for disaster emergencies, and is in the process of developing a national atlas of vulnerability to climate change at municipal level (Targets 1.5 and 11.5) (INECC, 2016).

Other interesting positive interactions are taking place across the board, with the Energy Reform of 2013 incentivizing new investments in clean energy and creating more than 22 thousand new jobs (Targets 7.1, 7.2, 8.5) (Onexpo, 2016). However, it is estimated that by 2020, 135 thousand additional energy professionals and technicians will be required to keep up with the growth of the renewables sector, and the educational system is lagging behind in training them (SDG 4) (Proyecto FSE, 2016).

In general, Mexico has shown that there are plenty of options to promote coherence. One of them is through regulation. For example, the General Law on Climate Change was reformed in 2016 to address climate-induced displacement, which would enable the achievement of Target 10.7. Another option is the creation of coordination mechanisms. An interesting example is a working group that brings together several government agencies –including the Ministries of Agriculture, Social Development and Environment- which was recently created to address the issue of food waste, therefore directly contributing to Target 12.3. The inclusion of relevant stakeholders in policy design, as called for in Target 16.7, has been particularly relevant in Mexican climate change policy: for example the design of a carbon market, which is expected to be operational by 2021, is being fully consulted with the private sector.

4.3 Key challenges for the integrated implementation of the SDGs and climate policy in Mexico

A critical look at Mexico from the perspective of the interactions highlighted in this paper allows for the identification of some of the country's biggest challenges for a successful integration of the SDG and NDC implementation processes (these are meant to be illustrative, as this list is by no means exhaustive).

First, one of the most daunting challenges for Mexico to overcome is its fossil fuel dependency. In 2015, 87.2% of primary energy production came from fossil fuels, and only 7.9% was produced through renewables (Mexico, 2015a). Although Mexico is mandated by both its Energy Transition Law and the General Law on Climate Change to generate at least 35% of its electricity from clean energies by 2024, this will probably not be enough, given that the sectors with the highest energy consumption are transportation and industry (Mexico, 2015a). Addressing these two sectors could be potentially beneficial for the achievement of certain targets under SDGs 7, 8, 9, 11 and 12. However, as mentioned earlier, attention must be paid to possible distributive impacts, including by targeting regressive subsidies (Labeaga et al., 2016).

A second challenge that seems particularly important is that of striking a balance between rural and urban development. On the one hand, Mexico is a rapidly urbanizing country, with 79.2% of the population already living in cities. Almost a quarter of the population lives in and around Mexico City (CIA, 2017), which generates almost a third of the country's emissions (CDMX, 2016). This concentration in cities generates immense pressure on elements identified as essential for the achievement of the SDGs, such as social services, housing, transportation and infrastructure. It is thus clear that significant efforts and resources must be devoted to addressing the urban challenges outlined mostly by SDG 11. It is also worth noting that the five most populated cities in Mexico have an annual mean of air pollution above the WHO guideline, making Target 3.9 particularly relevant (WHO & UNFCCC, 2015b). However, policymakers cannot neglect rural communities, which are usually the most underprivileged and the most exposed to the adverse effects of climate change, as discussed primarily through SDGs 1 and 2. Addressing climatic impacts in rural areas will be essential for strategic purposes, such as food

security: although 54.9% of the land is managed for agricultural use (CIA, 2017), Mexico is not food independent (El Financiero, 2014).

This relates to the third challenge, which could be the make or break for an integrated implementation of the SDGs and climate policy (particularly the NDC) in Mexico: inequality, both in terms of income (Target 10.1) and of lack of opportunities for underprivileged groups (Target 10.2). Regarding the former, Mexico ranks 77 in the world in terms of the Human Development Index, but its HDI score is reduced in 22.9% when adjusted for inequality (UNDP, 2016). Climate change will aggravate this situation, as it is estimated that by the end of the century, it could increase the national Gini coefficient by 20% (López-Feldman, 2014). Regarding the latter, Mexico is a country where the overlap between various conditions of vulnerability is particularly visible, with most municipalities at high-risk from the impacts of climate change being poor and rural (SDG 1 and 2), mostly inhabited by indigenous communities (SDG 10), and with larger proportions of households headed solely by women (SDG 5) (World Bank, 2013).

And indeed, in Mexico, being born to indigenous parents increases the likelihood of growing in a poor household by 9%, while access to basic services such as sanitation and electricity is up to 18% lower than that of non-indigenous households (World Bank, 2015). With regards to gender inequalities, Mexico also has immense challenges to overcome, i.e. only 23% of Mexican women working in agriculture are involved in decision-making processes that affect them, and the very few that actually own land, have smaller parcels which are also of a comparatively lesser quality than those of men (Carrillo, Rosario, Villalpando, & Martelo, 2016). It must be noted, however, that Mexico's NDC includes a short segment recognizing the need to mainstream gender perspective into climate policies in order to empower women and avoid the exacerbation of the disproportionate impacts they endure (Mexico, 2015b).

These challenges are great and highly complex, but they can surely be overcome. There are significant on-going efforts in Mexico that attest to a change in the development paradigm, as well as an increasingly profound understanding of its relationship to climate change. Mindful of the interactions outlined above, Mexico could strengthen its institutional framework and consolidate a coordination process between the actors and mechanisms that are currently addressing the 2030 Agenda and the Paris Agreement separately. Furthermore, the elaboration of the National Strategy for the Implementation of the 2030 Agenda could be seized as a unique opportunity to ensure full alignment to Mexico's Climate Change Mid-Century Strategy. And finally, these efforts would be most effective if they can translate into support for the integrated implementation of the SDGs and the NDC at the local level, where governmental attributions and specific contexts might completely change the way in which climate change and sustainable development interact.

5. Discussion and conclusions

5.1 Key outcomes

This paper aimed to identify the strongest and most direct interactions between SDG targets and climate change policies for mitigation and adaptation. A total of 34 SDG targets were identified as having strong typical interactions with climate action or vice versa. An in-depth literature review of these interactions confirmed the need for policymakers from both communities of practice to consider synergies and tradeoffs in their national implementation processes.

The adaptation of the methodology developed by Nilsson et al (2016) presented a number of challenges. The allocation of ratings based on the literature and expert judgment allowed for the identification of the interactions to be expected and their usual dynamics, but this level of generality often made it difficult to assess how strong they would be in practice, i.e. differentiating between a +2 and a +3 rating. Many assumptions had to be made about the kind of policies that could be put in place to implement commitments across both agendas, but the particular design features of such policies could not be discussed in depth. Therefore, to address this paper's first research question, the framework for categorization was found to be useful in producing a qualitative assessment that can serve as a general guideline, but ultimately the nature and intensity of any given interaction will depend on the particular policy context in which it develops.

However, the exercise helped confirm the original expectations regarding the most strongly interacting targets. It also allowed for the identification of general trends, namely that development policies that help reduce exposure and vulnerability are indivisible from adaptation, and in most cases, development will be stagnated and even reversed without ambitious adaptation action. On the other hand, the challenge to achieve a fully sustainable, carbon neutral development, and promote mitigation action that facilitates the accomplishment of the SDGs, requires more than comprehensive policy design: it requires a fundamental change in the development model. Decoupling socioeconomic development from environmental degradation, and integrating adaptation with efforts to ensure the wellbeing of present and future generations is possible, but deliberate choices are needed to deviate from the current growth-based development path.

When considered together comprehensively, the 2030 Agenda and the Paris Agreement are the roadmap to this new development model. Millions must still be lifted out of poverty, and be kept out of poverty, by preventing the impacts of climate change from affecting their livelihoods. Additionally, the tools and knowledge must be provided for this not to imply a significant rise in emissions. We need to radically change the way we produce and consume, especially food. We must feed a rising global population while transforming the agricultural practices that are consuming land and water, threatening biodiversity and increasing the vulnerability of the people working the land. We have to change our diets and eliminate food waste, which will require awareness raising, but also regulation. We need to foster our economies' transition towards renewable energies, while avoiding distributional impacts and ensuring affordable access for all. We must educate for sustainable lifestyles, but at the same time provide the infrastructure and services that make it possible for people to make the right choices. We must revalue and protect our terrestrial and marine ecosystems, which are not only carbon sinks but also our natural defence against the impacts of climate change. We have to address the structural inequalities that allow for the wealthy few to keep contributing to the problem, while the

destitute many absorb the costs. We need policies that are not blind to the reinforcing nature of different inequalities, including those of race and gender, and address the multiple dimensions of vulnerability. We need institutions that are fit for the challenge, that can address complex problems with coordinated responses, and involve the active participation of all stakeholders. And in every action, we must operationalize the central mandate of the 2030 agenda: to leave no one behind.

The application of this general assessment to a particular country case proved useful in directing attention to policies that could lead in this direction, and identifying some of the greatest obstacles for an integrated implementation of SDGs and climate policy within the limits of its specific needs and circumstances. Many of the general expectations derived from the analysis were clearly visible in the Mexican context. A number of positive interactions that are already taking place inadvertently could benefit from an explicit attempt to maximize synergies across both agendas. Furthermore, although the main challenges identified are critical and complex, Mexico has the potential to overcome them effectively if it manages to harmonize its institutional mechanisms and address its sustainable development and climate change commitments through a whole-of-government approach.

5.2 Limitations and applicability

The analysis is qualitative and not exhaustive. Further research is needed to differentiate the “middle” cases into the original 7-point rating of Nilsson et al. (2016). There is also a need to review these interactions through quantitative methods, especially for cases where policymakers are faced with potential tradeoffs and must prioritize actions based on potential co-benefits and long-term impacts. Further research is also required to explore the interactions between the SDGs and climate policy regarding their means of implementation (finance, technology and capacity building), as well as include other aspects of climate policy, namely the emerging agenda of loss and damage. It is also important to further explore second order interactions, i.e. how a positive or negative interaction in one SDG target may in turn have positive or negative impacts upon other SDG targets. The possibilities for such complex networks of interactions are endless, and should be thoroughly explored when using this assessment to approach particular country cases.

Our findings include only a few negative interactions; this reflects the fact that the analysis uses best practice implementation as a benchmark for typical mitigation and adaptation policies. In the reality of national contexts however, a number of factors beyond what is strictly climate and sustainable development policy are at play. These include issues of governance (institutional arrangements, institutional strength, corruption levels) economic dependency, availability of technology, and many other factors that detract the reality from ‘best practice’ policy scenarios. As mentioned above, both the strength and direction of each interaction will depend on each country’s specific institutional and policy layout, as well as its socioeconomic and environmental circumstances.

5.3 The need for an integrated approach

One thing is certain, as per the conclusions of most of the academic and institutional literature reviewed: climate change can no longer be addressed as an exclusively environmental issue, it must be approached as a sustainable development challenge. Attempting to tackle climate change solely from the perspective and capacities of environmental ministries and

environmental organizations will not only prove more costly, but it will also be significantly less effective (and in some cases, even outright contradictory with the achievement of social development). The same thing can be said for sustainable development interventions and policies that do not consider the impacts and structural causes of climate change. Smart action for sustainable development must be indivisible from increasing resilience, and guaranteeing a future in which ensuring the wellbeing of all people does not entail greater environmental degradation.

There is thus an urgent need for policy coherence mechanisms that allow for each country to make a dedicated assessment of what these interactions imply at the national and local levels. Formal and informal institutional silos must be broken in order to truly mainstream climate change considerations in the implementation process of all SDGs, and make all climate policy inclusive and development aware. Tradeoffs will be inevitable, but the decisions taken to address them will be most effective if they are the result of a conscious cost-benefit analysis with a long-term perspective, and not the unexpected consequence of unattended inconsistencies in the policy framework.

Importantly, silos must also be broken at the global level, promoting a greater integration of the negotiation processes derived from both regimes and the international institutions that follow-up on their progress. Although the scope of this paper is limited to the interactions between the Paris Agreement and Agenda 2030, other cross-cutting international agendas of equal importance and relevance (such as the Aichi Targets adopted under the Convention on Biological Diversity, or the New Urban Agenda adopted under Habitat III) should also be considered in national implementation processes, as well as global governance discussions.

If there is one conclusion that this paper allows us to reach, it is that sustainable development and climate action are profoundly intertwined; in fact, for many sectors and concrete policies, they can be practically the same. Without recognizing it, the 2030 Agenda has put forth a number of issues that are highly relevant to mitigation and adaptation, which go far beyond SDG 13. It remains to be seen if countries will be able to recognize the benefits this presents, and seize the opportunity to transition towards a low-carbon, climate resilient and sustainable future.

6. References

- Agrawal, A., Kononen, M., & Perrin, N. (2009). The Role of Local Institutions in Adaptation to Climate Change. *Social Development Working Papers*, 118. Retrieved from <http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1164107274725/sdp118.pdf>
- Aguilera, E., Lassaletta, L., Gattinger, A., & Gimeno, B. S. (2013). Managing soil carbon for climate change mitigation and adaptation in Mediterranean cropping systems: A meta-analysis. *Agriculture, Ecosystems & Environment*, 168, 25–36. <http://doi.org/http://doi.org/10.1016/j.agee.2013.02.003>
- Alesina, A., & Perotti, R. (1996). Income distribution, political instability, and investment. *European Economic Review*, 40(6), 1203–1228. [http://doi.org/10.1016/0014-2921\(95\)00030-5](http://doi.org/10.1016/0014-2921(95)00030-5)
- Andersen, K. E. (2011). Communal Tenure and the Governance of Common Property Resources in Asia - Lessons From Experiences in Selected Countries. *Land Tenure*, (April), i–iii, 1-45. Retrieved from <http://www.fao.org/publications/card/en/c/82c99179-f1d7-5a2e-bb6e-3cc157f4a65f/>
- Anderson, A. (2012). Climate Change Education for Mitigation and Adaptation. *Journal of Education for Sustainable Development*, 6(2), 191–206. <http://doi.org/10.1177/0973408212475199>
- Ansuategi, A., Greño, P., Houlden, V., Markandya, A., Onofri, L., Picot, H., ... Walmsley, N. (2015). *The impact of climate change on the achievement of the post-2015 sustainable development goals*. CDKN. Retrieved from <http://cdkn.org/wp-content/uploads/2015/05/Impact-of-climate-on-SDGs-technical-report-CDKN.pdf>
- ARUP, & C40 Cities. (2014). *Global Aggregation of City Climate Commitments*. Retrieved from http://publications.arup.com/publications/g/global_aggregation_of_city_climate_commitments
- Bates, B. C., Kundzewicz, Z. W., Wu, S., & Palutikof, J. P. (2008). *Climate Change and Water. Climate change and water*. Intergovernmental Panel on Climate Change (IPCC). <http://doi.org/10.1016/j.jmb.2010.08.039>
- Bathge, S. (2010). *Climate change and gender: economic empowerment of women through climate mitigation and adaptation?* Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH. Retrieved from <https://www.oecd.org/dac/gender-development/46975138.pdf>
- Carrillo, A., Rosario, M., Villalpando, G., & Martelo, Z. (2016). Género , Cambio Climático Y Redd + : Experiencias En El Tiempo. *Terra Latinoamericana*, 34, 139–153.
- CDMX. (2016). Inventario de Emisiones de la Ciudad de Mexico.
- CIA. (2017). World Factbook: Mexico. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/mx.html>
- CONEVAL. (2014). *Metodología para la Medición de la Pobreza en Mexico*. Retrieved from http://www.coneval.org.mx/Informes/Coordinacion/INFORMES_Y_PUBLICACIONES_PDF/Metodologia_Multidimensional_web.pdf
- CONEVAL. (2015). *CONEVAL Informa sobre los Resultados de la Medición de Pobreza 2014. Comunicado de Prensa 005*. Retrieved from http://www.coneval.org.mx/SalaPrensa/Documents/Comunicado005_Medicion_pobreza_2014.pdf
- DANE/Colombia. (2015). *Pobreza Monetaria y Multidimensional en Colombia 2015*. Departamento Administrativo Nacional de Estadística de Colombia (DANE). Retrieved from https://www.dane.gov.co/files/investigaciones/condiciones_vida/pobreza/bol_pobreza_1

- de la Fuente, A., & Olivera Villarroel, M. (2013). *The Poverty Impact of Climate Change in Mexico. Policy Research Working Paper No. 6461*. World Bank.
- Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Kadner, S., Minx, J., Brunner, S., ... Zwickel, T. (2014a). Technical Summary (WG III - Mitigation). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 33–107.
- Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Kadner, S., Minx, J., Brunner, S., ... Zwickel, T. (2014b). Technical Summary (WG III - Mitigation of climate change). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 33–107.
- El Financiero. (2014). Dependencia agroalimentaria pasó del 10 al 43% en 20 años. Retrieved from <http://www.elfinanciero.com.mx/economia/dependencia-agroalimentaria-paso-del-10-al-43-en-20-anos.html>
- Espinosa, P. (2017). Climate Change Is a Security Story: Patricia Espinosa's Address at Munich Security Conference, 20 February 2017. Retrieved from <https://www.climate-diplomacy.org/news/patricia-espinosa-munich-security-conference-2017>
- FAO. (2015). *Food Wastage Footprint and Climate Change*. Food and Agriculture Organization of the United Nations. Retrieved from <http://www.fao.org/3/a-bb144e.pdf>
- FAO. (2016). *The State of World Fisheries and Aquaculture 2016: Contributing to Food Security and Nutrition for All*. Food and Agriculture Organization of the United Nations. Retrieved from <http://www.fao.org/3/a-i5555e.pdf>
- Field, C. B., Barros, V. R., Mach, K. J., Mastrandrea, M. D., Aalst, M. van, Adger, W. N., ... Yohe, G. W. (2014). Technical Summary (WG II - Adaptation). In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, ... L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. <http://doi.org/10.1017/CBO9780511793677.006>
- Granoff, I., Eis, J., Hoy, C., Watson, C., Khan, A., Grist, N., ... Marijs, C. (2015). *Eradicating extreme poverty in the climate crisis*. Overseas Development Institute (ODI). Retrieved from <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9844.pdf>
- Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., ... Vogt-Schilb, A. (2016). *Shock Waves: Managing the Impacts of Climate Change on Poverty*. World Bank. <http://doi.org/10.1596/978-1-4648-0673-5>
- Hallegatte, S., Vogt-Schilb, A., Bangalore, M., & Rozenberg, J. (2017). *Unbreakable: Building Resilience in Face of Natural Disasters*. World Bank. Retrieved from <https://openknowledge.worldbank.org/handle/10986/25335>
- Höhne, N., Fekete, H., Kuramochi, T., Iacobuta, G., & Prinz, L. (2015). Progress towards good practice policies for reducing greenhouse gas emissions: Initial results from an analysis of the status of climate related policies in 30 countries. Retrieved from https://newclimateinstitute.files.wordpress.com/2015/12/good-practice-policies-initial-report-2015_2.pdf
- IAEG. (2017). *Revised list of global Sustainable Development Goal indicators. Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2017/2), Annex III*. Retrieved from <https://unstats.un.org/sdgs/indicators/indicators-list/>
- IEA. (2011). *World Energy Outlook 2011*.
- IEA. (2015). *Energy and Climate Change*. International Energy Agency (IEA). Retrieved from https://www.iea.org/media/news/WEO2015_COP21Briefing.pdf
- IEA, & World Bank. (2015). *Energy for All 2015-Progress Toward Sustainable Energy*.

- International Energy Agency (IEA) & World Bank. <http://doi.org/10.1596/978-1-4648-0690-2>
- INECC. (2016). Atlas Nacional de Vulnerabilidad al Cambio Climático. Retrieved from <http://www.gob.mx/inecc/acciones-y-programas/atlas-nacional-de-vulnerabilidad-ante-el-cambio-climatico-anvcc-80137>
- INEGI. (2015). México: Número de habitantes. Retrieved from <http://cuentame.inegi.org.mx/poblacion/habitantes.aspx?tema=P>
- INEGI. (2016). Cuentas Económicas y Ecológicas de México. Retrieved from http://www.inegi.org.mx/est/contenidos/proyectos/scn/c_anuales/c_econecol/
- IPCC. (2014a). *Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. Retrieved from <http://www.ipcc.ch/report/ar5/wg2/>
- IPCC. (2014b). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. Retrieved from <http://www.ipcc.ch/report/ar5/wg3/>
- IPS. (2008). *Peatlands and Climate Change*. (M. Strack, Ed.). International Peat Society (IPS). <http://doi.org/10.1016/B978-0-444-52734-9.50009-8>
- Kagawa, F., & Selby, D. (2012). Ready for the Storm: Education for Disaster Risk Reduction and Climate Change Adaptation and Mitigation1. *Journal of Education for Sustainable Development*, 6(2), 207–217. <http://doi.org/10.1177/0973408212475200>
- Kuriakose, A. T., Heltberg, R., Wiseman, W., Costella, C., Cipryk, R., & Cornelius, S. (2012). *Climate-responsive Social Protection*. World Bank. Retrieved from <http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/430578-1331508552354/1210.pdf>
- Labeaga, J. M., Labandeira, X., & López-otero, X. (2016). Energy Tax Reform and Poverty Alleviation in Mexico: A Demand System Approach. Retrieved from http://eforenergy.org/docpublicaciones/documentos-de-trabajo/wp_04_2016.pdf
- Latek, M. (2015). *COP21 and Agenda 2030 The challenges of complementarity*. European Parliament Research Service. Retrieved from [http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/572793/EPRS_BRI\(2015\)572793_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/572793/EPRS_BRI(2015)572793_EN.pdf)
- López-Feldman, A. (2014). Cambio climático, distribución del ingreso y la pobreza: El caso de México. Retrieved from http://repositorio.cepal.org/handle/11362/36777%5Cnhttp://repositorio.cepal.org/bitstream/handle/11362/36777/S2013710_es.pdf?sequence=1
- McGray, H., & Sokona, Y. (2012). *Why Institutions Matter For Climate Change Adaptation In Developing Countries*. World Resources Institute (WRI). Retrieved from <http://www.wri.org/blog/2012/05/why-institutions-matter-climate-change-adaptation-developing-countries>
- Mexico. (2012). Plan Nacional de Desarrollo 2013-2018: Programa Especial de Cambio Climático 2014-2018. Retrieved from http://www.semarnat.gob.mx/sites/default/files/documentos/transparencia/programa_especial_de_cambio_climatico_2014-2018.pdf
- Mexico. (2013). Estrategia Nacional de Cambio Climático. Vision 10-20-40. Retrieved from http://www.semarnat.gob.mx/archivosanteriores/informacionambiental/Documents/06_otras/ENCC.pdf
- Mexico. (2015a). Balance Nacional de Energía. Retrieved from <http://www.gob.mx/sener/documentos/balance-nacional-de-energia>

- Mexico. (2015b). Mexico's Intended Nationally Determined Contribution. Retrieved from <http://www4.unfccc.int/submissions/INDC/Published Documents/Mexico/1/MEXICO INDC 03.30.2015.pdf>
- NCE. (2014). *Better Growth, Better Climate*. The Global Commission on the Economy and Climate - New Climate Economy (NCE). Retrieved from http://newclimateeconomy.report/2014/wp-content/uploads/sites/2/2014/08/NCE-Global-Report_web.pdf
- NCE. (2016). *The Sustainable Infrastructure Imperative: Financing for Better Growth and Development*. The Global Commission on the Economy and Climate - New Climate Economy (NCE). Retrieved from http://newclimateeconomy.report/2014/wp-content/uploads/sites/4/2014/08/NCE_2016Report.pdf
- Nilsson, M. (2016). *Understanding and mapping important interactions among SDGs: Ready institutions and policies for integrated approaches to implementation of the 2030 Agenda. Background paper for the expert meeting in preparation for HLPF 2017*. Retrieved from https://sustainabledevelopment.un.org/content/documents/12067Understanding_and_mapping_important_interactions_among_SDGs.pdf
- Nilsson, M., Griggs, D., & Visbeck, M. (2016). Map the interactions between Sustainable Development Goals. *Nature*, 534(15), 320–322. <http://doi.org/10.1038/534320a>
- Nkoana, E. M., Komendantova, N., & Jardandhan, V. (2016). *Impacts of environmental education on perceptions of climate change risks in rural and township communities in Limpopo Province, South Africa*. International Institute for Applied Systems Analysis (IIASA). Retrieved from <http://pure.iiasa.ac.at/14140/1/WP-16-023.pdf>
- Onexpo. (2016). México: energía limpia, 22 mil empleos y menos contaminación. Retrieved from http://onexpo.com.mx/NOTICIAS/mexico-energia-limpia-22-mil-empleos-y-menos-contaminacion/?ID_NOTICIA=368
- Porto Alegre. (2016). *Estratégia de Resiliência de Porto Alegre*. Retrieved from http://lghhttp.60358.nexcesscdn.net/8046264/images/page/-/100rc/pdfs/PortoAlegre_Strategy_Portuguese_PDF.pdf
- Power for All. (2016). *Decentralized Renewables: The Fast Track to Universal Energy Access*. Retrieved from http://static1.squarespace.com/static/532f79fae4b07e365baf1c64/t/578d7f206b8f5bebe7f47444/1468890916501/Power_for_All_POV_May2016.pdf
- Prospera. (2016). *Prospera - Cuestiones Frecuentes*. Retrieved from <https://www.gob.mx/prospera/acciones-y-programas/preguntas-frecuentes-31349>
- Proyecto FSE. (2016). Recursos humanos: un futuro luminoso para las energías limpias. Retrieved from <http://proyectofse.mx/2016/01/06/empleos-en-energias-limpias/>
- SAGARPA. (2015). En vigencia el Seguro Agropecuario Catastrófico para atender afectaciones por bajas temperaturas en el país. Retrieved from <http://www.sagarpa.gob.mx/saladeprensa/2012/Paginas/2015B015.aspx>
- Smith, D. D. (2015). *India's super solar grannies*. Retrieved from <http://www.wearesalt.org/indias-super-solar-grannies/>
- Turpie, J., Warr, B., & Ingram, J. C. (2015). *Benefits of Forest Ecosystems in Zambia and the Role of REDD + in a Green Economy Transformation*. United Nations Environment Programme (UNEP). Retrieved from <http://www.unredd.net/documents/global-programme-191/redd-and-the-green-economy-1294/forest-ecosystem-valuation-and-economics/14059-benefits-of-forest-ecosystems-in-zambia-and-the-role-of-redd-in-a-green-economy-transformation.html>
- UN-DESA. (2017a). SDG 11. Retrieved from <https://sustainabledevelopment.un.org/sdg11>
- UN-DESA. (2017b). SDG 7. Retrieved March 20, 2017, from

- <https://sustainabledevelopment.un.org/sdg7>
- UN-DESA. (2017c). SDG 8. Retrieved from <https://sustainabledevelopment.un.org/sdg8>
- UN Women. (2012). Power: Women as Drivers of Growth and Social Inclusion. Speech by UN Women Executive Director Michelle Bachelet, 16 October 2012. Retrieved from <http://www.unwomen.org/en/news/stories/2012/10/power-women-as-drivers-of-growth-and-social-inclusion-speech-by-un-women-executive-director-mich>
- UNDP. (2016). Human development indicators: Mexico. Retrieved from <http://hdr.undp.org/en/countries/profiles/MEX>
- UNEP. (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. United Nations Environment Programme (UNEP). <http://doi.org/10.1063/1.3159605>
- UNEP. (2012a). *Global Outlook on Sustainable Consumption and Production Policies*. United Nations Environment Programme (UNEP). Retrieved from <https://wedocs.unep.org/rest/bitstreams/12945/retrieve>
- UNEP. (2012b). *Sustainable Consumption and Production for Poverty Alleviation*. United Nations Environment Programme (UNEP).
- UNEP. (2016). *The Emissions Gap Report 2016*. United Nations Environment Programme (UNEP). <http://doi.org/ISBN 978-92-9253-062-4>
- UNEP. (2017). Community-based coral aquaculture and reef restoration programme, Puerto Rico. Retrieved from <http://www.unep.org/coastal-eba/content/community-based-coral-aquaculture-and-reef-restoration-programme-puerto-rico>
- UNFCCC. (2010). *CDM project co-benefits in Bogotá, Colombia: Rapid and reliable bus transport for urban communities*. Retrieved from https://cdm.unfccc.int/about/ccb/CDM_Cobenefits_Bogota_Colombia.pdf
- US Department of Energy. (2017). *US Energy and Employment Report*. Retrieved from https://www.energy.gov/sites/prod/files/2017/01/f34/2017_US_Energy_and_Jobs_Report_0.pdf
- Vallejo, L., & Mullan, M. (2017). *Climate-resilient infrastructure*. *OECD Environment Working Papers n.121*. Organisation for Economic Cooperation and Development (OECD). Retrieved from <https://mail.google.com/mail/u/0/#inbox/15baff4c7f72bcc3?projector=1>
- WHO. (2013). Protecting health from climate change: vulnerability and adaptation assessment.
- WHO. (2015). Lessons learned on health adaptation to climate variability and change: experiences across low- and middle-income countries. Retrieved from <http://www.who.int/globalchange/publications/health-adaptation-climate-change/en/>
- WHO & UNFCCC. (2015). *Climate and Health Country Profiles – Reference Document*. World Health Organization (WHO) & United Nations Framework Convention on Climate Change secretariat (UNFCCC). Retrieved from <http://www.who.int/globalchange/resources/reference-document.pdf?ua=1>
- WHO & UNFCCC. (2015b). *Climate and Health Country Profiles - Mexico*. Retrieved from <http://apps.who.int/iris/bitstream/10665/246116/1/WHO-FWC-PHE-EPE-15.26-eng.pdf?ua=1>
- WHO. (2016). Climate Change and Health. Retrieved April 23, 2017, from <http://www.who.int/mediacentre/factsheets/fs266/en/>
- World Atlas. (2017). 17 Most Ecologically Diverse Countries On Earth. Retrieved from <http://www.worldatlas.com/articles/ecologically-megadiverse-countries-of-the-world.html>
- World Bank. (2013). Las dimensiones sociales del cambio climático en México. Retrieved from <http://documents.worldbank.org/curated/en/509731468049873106/Las-dimensiones->

sociales-del-cambio-climatico-en-Mexico

World Bank. (2015). Indigenous Latin America in the Twenty-First Century : The First Decade. Retrieved from <https://openknowledge.worldbank.org/handle/10986/23751>

World Bank. (2017). CO2 emissions (metric tons per capita). Retrieved from <http://data.worldbank.org/indicator/EN.ATM.CO2E.PC>

Annex – General ratings table

As explained in section 2, the rating system presented in this annex is adapted from Nilsson et al (2016). The ratings were assigned through the process described in sections 2.1 to 2.3, based on the authors' expertise and findings from the literature. They could, of course, be further refined (especially regarding the bundled ratings going from -1 to +1), but they are meant to open the debate. For a broader table with comments explaining the rating assigned to each target, please contact the authors.

#	Target	Mitigation	Adaptation	Self-declared expertise
Goal 1. End poverty in all its forms everywhere				
1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day	-1 / 0 / +1	+2	**
1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	-1 / 0 / +1	+3	***
1.3	Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable	-1 / 0 / +1	+3	**
1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	-1 / 0 / +1	+2	**
1.5	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	-1 / 0 / +1	+3	***
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture				
2.1	By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round	Variable	+3	**
2.2	By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons	-1 / 0 / +1	+2	***
2.3	By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	Variable	+3	***

#	Target	Mitigation	Adaptation	Self-declared expertise
2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	+2	+3	***
2.5	By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed	-1 / 0 / +1	+2	*
Goal 3. Ensure healthy lives and promote well-being for all at all ages				
3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	-1 / 0 / +1	+2	*
3.2	By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	-1 / 0 / +1	+2	*
3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	-1 / 0 / +1	+2	**
3.4	By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being	-1 / 0 / +1	-1 / 0 / +1	*
3.5	Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol	-1 / 0 / +1	-1 / 0 / +1	***
3.6	By 2020, halve the number of global deaths and injuries from road traffic accidents	-1 / 0 / +1	-1 / 0 / +1	***
3.7	By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes	-1 / 0 / +1	-1 / 0 / +1	**
3.8	Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	-1 / 0 / +1	+2	**
3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	+2	-1 / 0 / +1	***
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all				

#	Target	Mitigation	Adaptation	Self-declared expertise
4.1	By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes	-1 / 0 / +1	-1 / 0 / +1	***
4.2	By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education	-1 / 0 / +1	-1 / 0 / +1	**
4.3	By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	-1 / 0 / +1	-1 / 0 / +1	**
4.4	By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	-1 / 0 / +1	-1 / 0 / +1	**
4.5	By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations	0	-1 / 0 / +1	***
4.6	By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	-1 / 0 / +1	-1 / 0 / +1	**
4.7	By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development	+2	+3	***
Goal 5. Achieve gender equality and empower all women and girls				
5.1	End all forms of discrimination against all women and girls everywhere	-1 / 0 / +1	-1 / 0 / +1	**
5.2	Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation	-1 / 0 / +1	-1 / 0 / +1	***
5.3	Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation	-1 / 0 / +1	-1 / 0 / +1	***
5.4	Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	-1 / 0 / +1	-1 / 0 / +1	***
5.5	Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	-1 / 0 / +1	+2	***
5.6	Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action	-1 / 0 / +1	-1 / 0 / +1	**

#	Target	Mitigation	Adaptation	Self-declared expertise
	and the outcome documents of their review conferences			
Goal 6. Ensure availability and sustainable management of water and sanitation for all				
6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all	-1 / 0 / +1	-1 / 0 / +1	**
6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	-1 / 0 / +1	-1 / 0 / +1	**
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	-1 / 0 / +1	-1 / 0 / +1	**
6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	-1 / 0 / +1	-1 / 0 / +1	**
6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	-1 / 0 / +1	-1 / 0 / +1	**
6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	+2	+3	**
Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all				
7.1	By 2030, ensure universal access to affordable, reliable and modern energy services	Variable	+3	***
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix	+3	+2	***
7.3	By 2030, double the global rate of improvement in energy efficiency	+3	-1 / 0 / +1	***
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all				
8.1	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries	Variable	+2	**
8.2	Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	Variable	-1 / 0 / +1	*

#	Target	Mitigation	Adaptation	Self-declared expertise
8.3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services	Variable	+2	*
8.4	Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead	+3	-1 / 0 / +1	*
8.5	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Variable	+2	**
8.6	By 2020, substantially reduce the proportion of youth not in employment, education or training	Variable	+2	*
8.7	Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms	-1 / 0 / +1	-1 / 0 / +1	*
8.8	Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	-1 / 0 / +1	-1 / 0 / +1	*
8.9	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products	-1 / 0 / +1	+2	*
8.10	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all	-1 / 0 / +1	+2	**
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation				
9.1	Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	+3	+3	***
9.2	Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	+3	+2	*
9.3	Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	Variable	+2	*

#	Target	Mitigation	Adaptation	Self-declared expertise
9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	+3	+2	*
9.5	Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	+2	+2	*
Goal 10. Reduce inequality within and among countries				
10.1	By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average	Variable	+3	***
10.2	By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	Variable	+3	***
10.3	Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard	-1 / 0 / +1	-1 / 0 / +1	**
10.4	Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality	-1 / 0 / +1	-1 / 0 / +1	**
10.5	Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations	-1 / 0 / +1	-1 / 0 / +1	*
10.6	Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions	-1 / 0 / +1	-1 / 0 / +1	*
10.7	Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies	-1 / 0 / +1	+3	***
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable				
11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	-1 / 0 / +1	+3	**
11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	+3	-1 / 0 / +1	**
11.3	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human	+2	+2	**

#	Target	Mitigation	Adaptation	Self-declared expertise
	settlement planning and management in all countries			
11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage	-1 / 0 / +1	-1 / 0 / +1	**
11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	-1 / 0 / +1	+3	***
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	+3	-1 / 0 / +1	**
11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	-1 / 0 / +1	-1 / 0 / +1	**
Goal 12. Ensure sustainable consumption and production patterns				
12.1	Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	+2	-1 / 0 / +1	**
12.2	By 2030, achieve the sustainable management and efficient use of natural resources	+2	+2	**
12.3	By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	+3	-1 / 0 / +1	***
12.4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	+3	-1 / 0 / +1	**
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	+3	-1 / 0 / +1	**
12.6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	+2	-1 / 0 / +1	*
12.7	Promote public procurement practices that are sustainable, in accordance with national policies and priorities	+2	-1 / 0 / +1	**
12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	+2	+2	**
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development				

#	Target	Mitigation	Adaptation	Self-declared expertise
14.1	By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	-1 / 0 / +1	-1 / 0 / +1	*
14.2	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	-1 / 0 / +1	+3	**
14.3	Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	-1 / 0 / +1	-1 / 0 / +1	**
14.4	By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	-1 / 0 / +1	-1 / 0 / +1	*
14.5	By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	-1 / 0 / +1	+2	**
14.6	By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation	-1 / 0 / +1	-1 / 0 / +1	*
14.7	By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	-1 / 0 / +1	+2	*
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss				
15.1	By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	+2	+2	**
15.2	By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	+3	Variable	**
15.3	By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	+2	+3	**

#	Target	Mitigation	Adaptation	Self-declared expertise
15.4	By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development	-1 / 0 / +1	+2	**
15.5	Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	-1 / 0 / +1	+2	*
15.6	Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed	-1 / 0 / +1	-1 / 0 / +1	*
15.7	Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products	-1 / 0 / +1	-1 / 0 / +1	*
15.8	By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species	-1 / 0 / +1	-1 / 0 / +1	*
15.9	By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts	+2	+2	**
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels				
16.1	Significantly reduce all forms of violence and related death rates everywhere	-1 / 0 / +1	-1 / 0 / +1	*
16.2	End abuse, exploitation, trafficking and all forms of violence against and torture of children	-1 / 0 / +1	-1 / 0 / +1	*
16.3	Promote the rule of law at the national and international levels and ensure equal access to justice for all	-1 / 0 / +1	-1 / 0 / +1	*
16.4	By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime	-1 / 0 / +1	-1 / 0 / +1	*
16.5	Substantially reduce corruption and bribery in all their forms	-1 / 0 / +1	-1 / 0 / +1	*
16.6	Develop effective, accountable and transparent institutions at all levels	+3	+3	***
16.7	Ensure responsive, inclusive, participatory and representative decision-making at all levels	+2	+2	**
16.8	Broaden and strengthen the participation of developing countries in the institutions of global governance	+2	+2	**
16.9	By 2030, provide legal identity for all, including birth registration	-1 / 0 / +1	-1 / 0 / +1	*
16.10	Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements	+2	+2	**