Title: The transition towards a low-carbon economy under Agenda2030: trade-offs and synergies between achieving climate-change and SDGs targets

Agenda 2030 on the Sustainable Development Goals (SDGs) and the Paris Agreement on limiting global warming to well below 2°C are two important international agreements adopted in 2015. Although independently defined, targets within these two agreements are strongly linked and their simultaneous achievement requires an in-depth understanding of their interactions. However, despite the broad literature on climate-development interactions and the high expected impacts of low-carbon transition, no comprehensive overview of climate-mitigation measures impacts on other SDGs exists. In this study, we conducted an extensive literature review to identify impacts of climate-change mitigation measures on all relevant SDGs and categorized them based on direction (trade-off or synergy) and likelihood of occurrence (always or dependent on local context). We compiled our findings in a cross-sectoral framework covering all economic sectors (electricity and heat, industry, buildings, transport, agriculture and forestry) and all policy types (energy efficiency, switch to low carbon fuels – addressed by individual types of energy sources-, reduction of demand of material and energy-based services, taxes, subsidies, and education and awareness raising). We found that climate-change mitigation measures directly affect 13 out of 17 SDGs, mostly through synergies (strongest in SDGs 7 and 9), suggesting a high potential to simultaneously tackle both climate and development issues. Policies targeting energy efficiency and a reduction in demand of materials and energy-based services provide most synergies with other areas of sustainable development. In contrast, carbon capture and storage and nuclear energy were generally conflicting with other SDGs. Although renewables have both positive and negative impacts, with differences across technologies, these energy sources are mostly synergistic when compared to fossil fuel alternatives. This study advances the knowledge of climate-development synergies and trade-offs, which is an essential milestone towards future research on policy coherence and governance of the sustainable development and climate goals at the local, national, regional and international level. Moreover, the climate-development impacts framework aims to facilitate the process of climate-change strategy design in minimizing trade-offs and maximizing synergies based on country-specific development needs and strengths. Understanding climate-development interactions is the first step towards the fundamental societal transformation required by both international Agendas.