1 **Supplementary Material 4.B**

2 **Table 4.B** Select adaptation options with mitigation synergies and trade-offs identified

Option	Synergies	Trade-offs
Power infrastructure resilience	Some options can help improve system efficiency	
Renewable energy	Besides reducing emissions, renewable energy can provide electricity and income and livelihood means to rural populations, improving their adaptive capacity (Ley, 2017). Options such as aquavoltaics (use of solar photovoltaic energy over water surfaces) has synergies for electricity generation and aquaculture (Pringle et al., 2017).	Without adequate consultation of Indigenous communities, large-scale mitigation projects and payments for ecosystem services can substantially disrupt social and environmental systems on a local level, with negative implications for Indigenous communities and community adaptive capacity (Dunlap, 2017; Ingty, 2017; Rodríguez-de-Francisco and Boelens, 2016). Without appropriate use of safety and quality codes and standards, renewable energy projects can increase vulnerability of populations they serve, especially in rural areas (Ley, 2017).
Indigenous knowledge	Revitalization of traditional management of agriculture may simultaneously increase resilience, improve biodiversity, and reduce emissions by eliminating agrochemical inputs production to food production (Altieri and Nicholls, 2017; Niggli et al., 2009; Nyong et al., 2007). Recognizing and supporting Indigenous management of blue carbon habitats (Vierros, 2017) and grasslands (Dong, 2017; Russell-Smith et al., 2017), and utilizing new technologies to revitalize traditional forms of energy provision (Thornton and Comberti, 2017), can provide mitigation and adaptation benefits.	
Ecosystem restoration and avoided deforestation	Can be coupled with biodiversity and conservation interventions to complement habitat provision (Felton et al., 2016) Forests (through REDD+) can support 'economies dependent on climate-sensitive sectors including agriculture, fisheries, and energy (Few et al., 2017; Somorin et al., 2016).	Potential conflict with biodiversity goals in habitat restoration and forest production efforts (Felton et al., 2016) Some projects world-wide don't target REDD+ projects on adaptation or resilience, nor local contexts, in some cases leaving negative livelihoods impacts (Few et al., 2017; McElwee et al., 2016). In some cases, there is a perception of the inability to reconcile development and environmental interests (Pham et al., 2017).
Sustainable Land-use and Urban planning	Potential for synergies in urban planning at policy, organizational, and practical levels (e.g. urban regeneration or retrofitting policies, urban greening) (Landauer et al., 2015). Spatial planning plays a central role in adaptation, mitigation, and sustainable development (Davidse et al., 2015;	Potential conflicts including the promotion of urban densification to reduce emissions which can intensify heat island effect and increase surface run-off (Di Gregorio et al., 2017; Endo et al., 2017; Landauer et al., 2015).

	Francesch-Huidobro et al., 2017; Hurlimann and March, 2012; King et al., 2016). Through the use of integrated approaches there is potential synergy in land use planning (e.g. maintenance of urban forests, urban greening).	
Sustainable water use	Strong co-benefits to the implementation of demand-side management measures, such as reducing leakages and water loss (Deng and Zhao, 2015; Wang et al., 2011), while minimizing the need to address the environmental and energy implications of supply measures such as desalination (Miller et al., 2015)	Increasing water quality is linked to increasing energy use in the water sector (Mamais et al., 2015; Rothausen and Conway, 2011), Increased biofuel production may strain water resources as consumption is dependent on the type of biofuel used (Hammond and Li, 2016). Some renewable energy technologies, carbon capture and storage (CCS), and concentrating solar power (CSP) technologies, have substantial water demand associated with their operation (Fricko et al., 2016).
Green infrastructure and ecosystem services	In urban gardens and parks, cover crops can be used to reduce erosion and improve soil health and adaptive management of precipitation and temperature change (Kaye and Quemada, 2017) Urban canopy is a cooling mechanism that can help decrease heat and water stress (Hines, 2017)	Not considering the role vegetation has within the heat-water-vegetation nexus can worsen heat and water stress (Hines, 2017)
Sustainable and resilient transport systems	Some evidence suggests cities are re-urbanizing in ways that coordinate transport sector adaptation and mitigation (Gota et al., 2017; Newman et al., 2017; Salvo et al., 2017). Cities that reduce the use of private cars, and develop sustainable transport systems can simultaneously benefit from reduced air pollution, congestion and road fatalities while reducing overall energy intensity in the urban transport sector (Goodwin and Van Dender, 2013; Newman and Kenworthy, 2015; Wee, 2015).	In middle and low income countries urban density of informal settlements is typically associated with a range of water and vector-borne health risks that undermine adaptive capacity and the benefits of energy efficiency, may provide a notable exception to the adaptive advantages of urban density (Lilford et al., 2017; Mitlin and Satterthwaite, 2013) unless new approaches using leapfrog technology are used to upgrade slums in situ (Teferi and Newman, 2017).
Built environment	Building codes can play a critical role to reduce carbon emissions and make the built environment more resilient to climate impacts	Codes and standards that aren't applied correctly can increase vulnerability
Energy use in industry	Some options can help improve system efficiency	
Disaster risk management	Incorporating environmental considerations into recovery decision-making (Amin Hosseini et al., 2016), implementing disaster risk management plans and increasing *ex-ante* resilience to disasters are important opportunities to reduce the extent of rebuilding following disasters, and the emissions associated with recovery. Post-disaster recovery can be an opportunity to rebuild in a more resilient and sustainable	The urgency of recovery and the surge in demand for construction materials have been observed to promote unsustainable behaviours, including deforestation (Chang et al., 2010; Nazara and Resosudarmo, 2007) or uncontrolled extraction of sand and gravel (Abrahams, 2014). 'Building back better' requires capacity, time, and mechanisms for balancing competing desires and perspectives that are not necessarily available after severe disasters, and may be challenged by

	way, or to "build back better", particularly where immediate impact is substantial but not overwhelming (Guarnacci, 2012; Mochizuki and Chang, 2017).	both local and external influences in the rebuilding process (Abrahams, 2014; O'Hare et al., 2016; Paidakaki and Moulaert, 2017) The pre-disaster phase, disaster risk management measures may negatively impact local ecosystems; for instance, hard stabilization of coastlines using sea walls or other barriers may further degrade ecosystems already vulnerable to change (Dugan et al., 2017; Finkbeiner et al., 2017).
Finance - insurance	Where mitigation measures act to reduce health and property risks, there may be important synergies between adaptation and mitigation in insurance. In response to the substantial risk posed to the insurance industry by climate change (Bank of England, 2015; Glaas et al., 2017), insurance companies are mobilizing their role as investment manager to promote climate mitigation; for example, in 2014, insurance companies pledged to invest USD 420 billion over five years in renewable energy, energy efficiency, and sustainable agriculture projects (Fabian, 2015; Webster and Clarke, 2017).	Insurance companies only cover a particular subset of climatic risks and are ineffective at considering slow-onset and/or irreversible changes. Suggestion of some risk that is "beyond adaptation" (Linnerooth-Bayer and Hochrainer-Stigler, 2015); given that these risks are not well incorporated into insurance schemes, an overreliance on pricing mechanisms to motivate mitigation action could result in sub-optimal levels of mitigation.
Social safety nets	Public work programmes structured to address climate risks, for instance, Ethiopia's Productive Safety Net Programme has been used to employ locals suffering from food insecurity to work on water-shed management interventions, sequestering carbon in the soil and reducing greenhouse gas emissions (Jirka et al., 2015). Increase in income supports the adaptive capacity of households to weather climate risks, and has been shown to improve food consumption at household-level, and for children (Debela et al., 2015; Mohamed, 2017).	Where cash transfers are unconstrained, limited increases in purchasing power can prompt families to invest in additional consumption, transport, or agricultural equipment as part of a general risk reduction strategy (Lemos et al., 2016; Nelson et al., 2016); Aggregated, these individual investments could lead to increased emissions.

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