The CLIMSAVE Project

Climate Change Integrated Assessment Methodology for Cross-Sectoral Adaptation and Vulnerability in Europe

Summary of the report on Assessing Cross-Sectoral Adaptation and Mitigation Measures

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Why adaptation and mitigation need to be integrated?

Adaptation and mitigation are two complementary ways of addressing climate change. Adaptation seeks to reduce the impacts of climate change, while mitigation decreases greenhouse gas emissions or increases carbon storage. CLIMSAVE reviewed a selection of adaptation and mitigation measures for the agriculture, biodiversity, coastal, forestry, urban and water sectors to identify their impacts, how these interact with other sectors, and measures which could enhance both adaptation and mitigation.

It found that almost all measures had an impact beyond the original intended one and that these additional impacts could be in the same sector, but often involved one or more other sectors. For example, coastal adaptation measures, such as managed realignment and restoration projects, tend to impact on biodiversity via the creation of valuable intertidal habitat, as well as providing carbon storage for mitigation.

Examples were found of neutral, positive and negative impacts on the affected sector(s). Few measures had little or no direct impact, although in the urban sector, building measures, such as natural ventilation, insulation and painting surfaces white, have little or no effect on adaption or mitigation in other sectors, nor do many biodiversity adaptation measures. These are no-low regret options and provide benefits despite climate change uncertainties (Table 1). The highest number of interactions between sectors was positive, with many benefitting adaptation in the biodiversity and water sectors. For example, stormwater management in urban areas using different types of greenspace, such as green roofs, Sustainable Urban Drainage Systems (SUDS) and urban trees can have numerous benefits for biodiversity. In addition to helping urban areas adapt, they can reduce adaptation needed by the biodiversity sector.

Table 1: Adaptation measures for the sectors and their interactions and impacts. No-low regrets, "++" indicates measures that will produce benefits regardless of climate change, "+" indicates no-regret in some cases, depending on circumstance.

Sector	Examples of adaptation options	No-low regret	Reversible / flexible	Synergies with mitigation	Synergies with adaptation in other sectors
Agriculture	Changing planting dates	+	+		
	Genetic modification		–	+	
	Conservation agriculture	+		+	+
Urban	Green infrastructure	++	+	+	++
	Building measures	++	–	+	
Water	SUDS	++		+	++
	Flood defences		– –		+
	Storage	+			
	Floodplain restoration	+		+	+
Biodiversity	Increasing habitat connectivity	++	+	+	++
	Restoration schemes	++		+	+
	Habitat creation	+		+	+
Forest	Afforestation with climate-resilient tree genotypes	+	–	++	+
Coastal	Hard-engineering		– –	–	
	Managed realignment	+		+	+
	Wetland creation	+		++	++

Some measures not only contribute to adaptation in other sectors, but also to mitigation, as in the example of coastal adaptation above. Major synergies between adaptation and mitigation also exist for agriculture through reducing greenhouse gas emissions by improving nitrogen use efficiencies and soil carbon storage. Measures include some forms of conservation agriculture, reducing soil erosion, soil moisture conservation, and land use changes involving abandonment or less intensive agriculture. Also, the restoration of freshwater wetlands, such as peat bogs, to manage water flows could contribute to biodiversity adaptation and mitigate climate change.

Many negative interactions also related to biodiversity and water. For example, no-tillage systems may negatively affect native species, as may some forestry planting and operations, while coastal hard-engineering could prevent ecosystems migrating inland in response to sea-level rise. Possible conflicts with water include afforestation on new land for carbon storage or crop irrigation which can increase water demand, while increasing water supply is needed to meet demands of urbanisation or economic activities. All these changes can impact biodiversity, especially river and wetland species/habitats, and their ability to adapt. These negative impacts may lead to trade-offs, for example between maintaining water levels for biodiversity and agriculture and domestic or industrial supply. For coasts they may relate to managed realignment, where the trade-off is between maintaining the current primary habitat and sustainable coastal defence. For forestry they may be between afforestation for carbon storage and water supply.

Very often interactions with adaptation and mitigation measures in other sectors were not explicit, thus many opportunities of positive interactions are not taken into account in any assessment of the success of measures. An integrated approach to adaptation and mitigation is needed, therefore, so that measures with beneficial cross-sectoral interactions, which may also be more cost-effective, are implemented as well as avoiding negative cross-sectoral interactions. Since many interactions involved biodiversity and water, these may be good sectors to start with and already ecosystem-based adaptation for climate change is being promoted.