

Organising Framework for Case Studies (Underlying framework: Driver-Pressure-State-Impact-Response (DPSIR))

Variables¹:

Type of coast/Natural systems	Sector/Human systems	Drivers	Adaptation Option/Strategy	Geographic Coverage/Scale	Institutions/Governance Structure	Underlying policy framework/principles/guidance
<ul style="list-style-type: none"> • Beaches, barriers, and sand dunes • Rocky coasts • Wetlands and seagrass beds • Coral reefs • Coastal aquifers • Estuaries and lagoons • Deltas 	<ul style="list-style-type: none"> • Human settlements <ul style="list-style-type: none"> ○ Population density ○ Urbanization ○ Exposure levels • Industry, infrastructure, transport, and network industries • Fisheries, aquaculture, and agriculture • Coastal tourism and recreation • Health • Energy <p>[Importance of sector to national/regional/local economy]</p>	<p>Climate-related:</p> <ul style="list-style-type: none"> • Sea level rise • Severe storms • Extreme sea levels • Winds and waves • Sea surface temperature • Ocean acidification • Freshwater input <p>Human-related:</p> <ul style="list-style-type: none"> • Socioeconomic development • Nutrients • Hypoxia • Sediment delivery <p>Natural-, climate-, human-related:</p> <ul style="list-style-type: none"> • Coastal erosion 	<p>Protection:</p> <ul style="list-style-type: none"> • Land claim • Beach and dune nourishment • Construction of artificial dunes • Hard structures (seawalls, sea dikes and storm surge barriers) • Removing invasive and restoring native species <p>Accommodation:</p> <ul style="list-style-type: none"> • Increasing flexibility • Flood proofing • Flood-resistant agriculture • Flood hazard mapping • Flood warning systems • Replacing armoured with living shorelines <p>Retreat:</p> <ul style="list-style-type: none"> • Wetlands migration (inland) • Shoreline setbacks • Managed realignment (e.g., breaching coastal defences allowing the creation of an intertidal habitat) <p>Ecosystem-based adaptation:</p> <ul style="list-style-type: none"> • Protection and restoration of relevant coastal natural systems such as mangroves, oyster reefs, and salt marshes <p>Cross-cutting:</p> <ul style="list-style-type: none"> • Capacity development (e.g., demonstration sites and capacity development centres) • Public education 	<ul style="list-style-type: none"> • Regional (EU) • International/ Cross-border • National/federal • Regional (sub-national) • Local 	<ul style="list-style-type: none"> • Multi-level <ul style="list-style-type: none"> ○ Predominantly local, regional, or national • Public-private-civil society • Vertical and horizontal integration • Short-term and long-term 	<ul style="list-style-type: none"> • Standards and regulations that integrate climate change considerations into design at various levels • Land-use policies • Building codes • Insurance • Adaptation principles • Best practices • Guidance for mainstreaming adaptation into national/sub-national development planning and budgetary processes through existing strategies, frameworks, agreements

Distribution of Case Studies

¹ References: IPCC WGII AR4 and AR5 Reports

Case Study/ Location	Type of coast/Natural systems	Sector/Human systems	Drivers (Climate- and Human-related)	Adaptation Strategies/ Options	Geographic Coverage/ Scale	Institutions/ Governance Structure	Underlying policy framework/principles/ guidance
1a. Fairbourne, Wales, UK	<ul style="list-style-type: none"> • Low-lying sandy beaches • Built infrastructure 	<ul style="list-style-type: none"> • Human settlement • Other infrastructure 	<ul style="list-style-type: none"> • Sea-level rise • Coastal erosion • Vulnerability to storm waves • Storm surges and high tides 	Protection: <ul style="list-style-type: none"> • Artificial reef sea defences to the south • Hard defences and ancillary works 	Irish Sea/Atlantic	Shoreline Management Plans	<ul style="list-style-type: none"> • From 2015: 'managed retreat' (Shoreline Management Plans adopted by Gwynedd County Council) • From 2050: 'no active intervention'
1b. Severn Estuary, Bristol Channel, UK	<ul style="list-style-type: none"> • Open, low lying coast • Salt marshes and tidal flats • Offshore islands <p>[Well known for nature conservation (a Natura 2000 site, being internationally important for migratory fish (e.g. salmon and the rare shad) and migratory birds (e.g. the Bewick's swan and the European white-fronted goose)]</p>	<ul style="list-style-type: none"> • Human settlements (Cardiff, Newport, Bristol and Gloucester) • Industry, infrastructure, transport, and network industries (ports, navigation, etc.) • Coastal tourism • Energy (renewable) • Archaeological and maritime history 	Climate-related: <ul style="list-style-type: none"> • Sea level rise • Storm surges 	<ul style="list-style-type: none"> • Surveys, workshops • Exploratory socio-economic scenarios • Adaptation guidelines • Simple summaries of climate change science and impacts • Baseline study of the Severn estuary environment • Large scale events and education materials 	<ul style="list-style-type: none"> • Atlantic • Regional (sub-national) 	<ul style="list-style-type: none"> • Shoreline Management Plans 	<ul style="list-style-type: none"> • Adaptation guidelines
2. East Frisian Islands, Germany	<ul style="list-style-type: none"> • Small islands 	Human Settlement Coastal Tourism Renewable energy Nature protection (National park Wadden Sea)	<ul style="list-style-type: none"> • Sea-level rise • Coastal erosion • Vulnerability to storm waves Storm surges and high tides	Protection <ul style="list-style-type: none"> • Island-related coastal protection (dunes, wave breaker etc.) Planning <ul style="list-style-type: none"> • Controlling land use • Building codes • Economic incentives • Resettlement /retreat Capacity building <ul style="list-style-type: none"> • awareness rising by workshops • training • organisational measures (e.g. establishing civic protection) 	Atlantic (North Sea)	<ul style="list-style-type: none"> • Multi-level: • Predominantly local, regional, or national • Vertical and horizontal integration • Multi-actor: Public-private-civil society • Short-term and long-term • Scientific / non scientific 	Plan that integrates climate change considerations into design at various levels: Generalplan Küstenschutz – Ostfriesische Inseln 2010
3. Romania	<ul style="list-style-type: none"> • Delta • Sandy beaches • Soft-rock cliffs • Sandy barrier beaches 	<ul style="list-style-type: none"> • Human settlements (Constanta and resorts) • Industry, 	Climate-related: <ul style="list-style-type: none"> • Coastal erosion Human-related: <ul style="list-style-type: none"> • Socioeconomic 	Protection: <ul style="list-style-type: none"> • Jetties Ecosystem-based: <ul style="list-style-type: none"> • Biosphere reserve 	<ul style="list-style-type: none"> • Black Sea • Regional • Focus on three local sites 	<ul style="list-style-type: none"> • Multi-level <ul style="list-style-type: none"> ◦ Predominantly local, regional, or national 	Danube Delta Biosphere Reserve National Law 82/1993 (with subsequent changes)

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		<ul style="list-style-type: none"> infrastructure, (Constanta and Midia ports) Coastal tourism 	<ul style="list-style-type: none"> development 			<ul style="list-style-type: none"> Limited / no integration Short-term and long-term 	<ul style="list-style-type: none"> Danube Delta Masterplan (to be changed in 2014-2015) Master Plan for Reduction of Coastal Erosion on the Black Sea Coast (2012)
4a. Greece (Western)	<ul style="list-style-type: none"> Coastal plains Deltas 	<ul style="list-style-type: none"> Urbanization Industry, infrastructure, transport, and network industries Fisheries, aquaculture, and agriculture Coastal tourism and recreation Energy 	<p>Climate-related:</p> <ul style="list-style-type: none"> Sea level rise Increased storm events Increased rainfall <p>Human-related:</p> <ul style="list-style-type: none"> Socioeconomic development 	<ul style="list-style-type: none"> Climate change impacts study National programme of reduction of greenhouse gas emissions 	<p>National</p> <p>Mediterranean</p>	<ul style="list-style-type: none"> Multi-level <ul style="list-style-type: none"> Predominantly local, regional, or national Public-private-civil society Vertical and horizontal integration Short-term and long-term 	<ul style="list-style-type: none"> Standards and regulations that integrate climate change considerations into design at various levels
4b. Adriatic-Ionian sea	<ul style="list-style-type: none"> Cliffed and rocky coasts Coastal plains Deltas 	<ul style="list-style-type: none"> Urbanization Industry, infrastructure, transport, and network industries Fisheries, aquaculture, and agriculture Coastal tourism and recreation Energy 	<p>Climate-related:</p> <ul style="list-style-type: none"> Sea level rise Increased storm events Increased rainfall <p>Human-related:</p> <ul style="list-style-type: none"> Socioeconomic development 	<p>Regional (Adriatic)</p> <ul style="list-style-type: none"> Mediterranean SSD priorities Adriatic/Ionian initiative National strategies (national-Ionian) National adaptation strategy Island level adaptation Key Sector Action plans (water, energy, biodiversity, natural risks, agriculture, tourism, ports) <p>awareness-consultation-concerted actions</p>	<p>International/Cross-border</p> <p>Adriatic-Ionian Seas</p>	<ul style="list-style-type: none"> Multi-level <ul style="list-style-type: none"> Predominantly local, regional, or national Public-private-civil society Vertical and horizontal integration Short-term and long-term 	<ul style="list-style-type: none"> Standards and regulations that integrate climate change considerations into design at various levels
5. Andalusia, Spain	<ul style="list-style-type: none"> Sandy beaches Tidal flats Dune systems Spits Cliffs 	<ul style="list-style-type: none"> Human settlement Fisheries and agriculture Industry, infrastructure, transport, and network industries Coastal tourism and recreation 	Not specified	[Sectoral measures and adaptation actions at the regional and local levels, including training]	<ul style="list-style-type: none"> Regional Local <p>Atlantic/ Mediterranean</p>	<ul style="list-style-type: none"> Multi-level predominantly national Short-term and long-term 	<ul style="list-style-type: none"> Regional Climate Change Strategy 2010 Program for Adaptation to Climate Change
6a. Azores, Portugal	<ul style="list-style-type: none"> Small islands 	<ul style="list-style-type: none"> Human settlement Fisheries and agriculture 	<p>Climate-related:</p> <ul style="list-style-type: none"> Local sea-level rise Extreme storm events 	<p>Protection:</p> <ul style="list-style-type: none"> Hard structures (seawalls, rock armours) 	<ul style="list-style-type: none"> Regional (sub-national) Local 	<ul style="list-style-type: none"> Multi-level predominantly national Short-term and 	<ul style="list-style-type: none"> Land-use policies Adaptation principles Best practices

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		<ul style="list-style-type: none"> Industry, infrastructure, transport, and network industries Coastal tourism and recreation 	<ul style="list-style-type: none"> Rainfall distribution <p>Human-related:</p> <ul style="list-style-type: none"> Socioeconomic development <p>Natural-, climate-, human-related:</p> <ul style="list-style-type: none"> Coastal erosion Flooding at low-lying areas 	<p>Retreat:</p> <ul style="list-style-type: none"> Shoreline setbacks Create public domain as buffer zone 	Atlantic	long-term	<ul style="list-style-type: none"> Guidance for mainstreaming adaptation into national/sub-national development planning and budgetary processes through existing strategies, frameworks, agreements
6b. Portuguese NW Coast	<ul style="list-style-type: none"> Coastal plains Beaches and sand dunes Rocky coasts Estuaries 	<ul style="list-style-type: none"> Human settlements <ul style="list-style-type: none"> Population density Urbanization Exposure levels Industry, infrastructure, transport Fisheries and agriculture Coastal tourism and recreation 	<p>Climate-related:</p> <ul style="list-style-type: none"> Sea level rise Severe storms Extreme sea levels Winds and waves <p>Human-related:</p> <ul style="list-style-type: none"> Socioeconomic development Sediment delivery <p>Natural-, climate-, human-related:</p> <ul style="list-style-type: none"> Coastal erosion Flooding 	<p>Protection:</p> <ul style="list-style-type: none"> Beach and dune nourishment Construction of artificial dunes Hard structures (seawalls, sea dikes, groins, detached breakwaters) Dune rehabilitation Geocontainers <p>Accommodation:</p> <ul style="list-style-type: none"> Increasing flexibility Flood proofing Flood hazard mapping Flood warning systems Replacing armored with living shorelines <p>Retreat:</p> <ul style="list-style-type: none"> Relocate, readapt, remove Shoreline setbacks <p>Ecosystem-based adaptation:</p> <ul style="list-style-type: none"> Protection and restoration of relevant coastal natural systems such as dunes <p>Cross-cutting:</p> <ul style="list-style-type: none"> Capacity development Public education 	<ul style="list-style-type: none"> National Regional (sub-national) Local <p>Atlantic</p>	<ul style="list-style-type: none"> Multi-level predominantly national Short-term and long-term 	<ul style="list-style-type: none"> Land-use policies Adaptation principles Best practices Guidance for mainstreaming adaptation into national/sub-national development planning and budgetary processes through existing strategies
7. Charente- Maritime	<ul style="list-style-type: none"> Sandy beaches and dunes Marshes Artificial coasts 	<ul style="list-style-type: none"> Urbanization Coastal tourism Fisheries, aquaculture and agriculture Infrastructure (harbour, roads...) 	<p>Climate-related:</p> <ul style="list-style-type: none"> Sea level rise Storm events and associated risks (coastal erosion and flooding) <p>Human-related:</p> <p>Socioeconomic development</p>	<ul style="list-style-type: none"> Development of scientific studies Improvement of coastal hazard planning Asset protection based on coastal engineering structures (dikes, seawalls, rip raps, etc.) Sand dune restoration projects <p>Relocation of threatened human assets</p>	French Central Atlantic coast	<ul style="list-style-type: none"> Multi-level <ul style="list-style-type: none"> Predominantly local, regional, or national Public-private civil society Vertical and horizontal integration Short-term and long-term 	<ul style="list-style-type: none"> Standards and regulations that integrate coastal risks and climate change considerations into design at various levels