ORIENTGATE REPORT

Report on Cross sectoral links and possible mix of measures

Work Package 7
Act. 7.1 - State of art on mitigation and adaptation plans and identification of cross sectoral links.

Deliverable n. 2

DELIVERABLE INFORMATION	
WP7	Regional Planning Cross Sectoral Study
Activity:	7.1 - State of the art on mitigation and adaptation plans and identification of cross sectoral links
WP Leader:	Regione Basilicata
Authors:	**Albania:** Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) **Austria**: Elisabeth Gerhardt (Elisabeth.Gerhardt@bfw.gv.at). Federal Research and Training Centre for Forests, Natural Hazards and Landscape – BFW (ERDF PP13) **Bosnia and Herzegovina:** Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) **Bulgaria**: Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) and Dragan Peshisnki (DPeshinski@mrrb.government.bg) Ministry of Regional Development and Public Works of Bulgaria (ERDF PP4) **Croatia**: Nebojsa Kalanj (nebojsa.kalanj@koprivnica.hr). Grad Koprivnica (IPA PP3) Kreso Pandzic (pandzic@cirus.dhz.hr). Meteorological and Hydrological Service (IPA PP2) **Greece**: Vasso Tsiaoussi (vasso@ekby.gr). The Goulandris Natural History Museum – EKBY (ERDF PP5) **Attica region**: Maria Ioannidou (maria.ioannidou@patt.gov.gr) **The Former Yugoslav Republic of Macedonia**: Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) **Hungary**: Venelina Varbova (VVarbova@rec.org) and Zsuzsanna Keri (ZsKeri@rec.org). REC (ERDF PP7) **Italy national framework**: Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) **Autonomous Province of Trento**: Roberto Barbiero (roberto.barbiero@provincia.tn.it), Serenella Saibanti (serenella.saibanti@provincia.tn.it), Susanna Sieff (Susanna.Sieff@provincia.tn.it) (ERDF PP1) **Basilicata Region**: Anna Abate (anna.abate@regione.basilicata.it), Salvatore Cipollaro (salvatore.cipollaro@regione.basilicata.it), Vincenzo Dottorini

	(vincenzo.dottorini@supporto.regione.basilicata.it) (ERDF PP2) **Puglia Region**: Melania Michetti (melania.michetti@cmcc.it), Eva Banos de Guisasola (eva.banosdeguisasola@cmcc.it), Eleonora Cogo (eleonora.cogo@cmcc.it), Donata Balzarolo (donata.balzarolo@cmcc.it) – CMCC (LP) **Montenegro**: Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) **Romania**: Ileana Luminiţa CORNEA (luminita@apmcv.anpm.ro), Marius DĂNILĂ (danila.marius@apmcv.anpm.ro), KICSI Istvan (kicsi.istvan@apmcv.anpm.ro). Environmental Protection Agency Covasna (ERDF PP9) Elena Mateescu (elena.mateescu@meteoromania.ro), Gheorghe Stăncălie (gheorghe.stancalie@meteoromania.ro), Daniel Alexandru (daniel.alexandru@meteoromania.ro), Rodica Sandu (rodica.sandu@meteoromania.ro). National Meteorological Administration of Romania (ERDF PP10) **Serbia**: Ariel Milosevic (ariel.milosevic@hidmet.gov.rs). Republic Hydrometeorological Service of Serbia (IPA PP5) **The Former Yugoslav Republic of Macedonia**: Filomena Pietrapertosa (filomena.pietrapertosa@imaa.cnr.it). CNR-IMAA (ERDF PP2) **Ukraine**: Khokhlov Valeriy (khokhlov.valeriy@gmail.com). Odessa State Environmental University (10%PP4)

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1. Introduction

Prevent the dangerous consequences of climate change is one of the main challenge launched by EU, that has defined structured programmes and comprehensive package of policy measures to tackle climate change in the near future (e. g.: Second European Climate Change Program – 2005, the EU adaptation strategy – 2013).

Likewise, following the path drawn by European Commission, all European countries, and in particular the South East European (SEE) countries, have placed mitigation and adaptation to climate change on their agenda, integrating these themes in their current and future national policy priorities in order to stop the increase in temperature and reduce the vulnerability of all sectors.

Nowadays only few SEE countries have already developed well structured mitigation and/or adaption plans, while most of them are yet implementing comprehensive plans to tackle climate change both from adaptation and mitigation point of view.

However, in absence of specific plans, often specific actions and measures by country can be recognized and identified as climate change mitigation and/or adaptation into sectoral and territorial plans, such as for example agriculture, forestry, energy, transport, water management, biodiversity, etc.

In this report, a carefully examination of sectoral and territorial plans in the OrientGate country partners is carried out, identifing country-by-country those actions and measures that contribute to mitigation and adaptation.

Moreover, a critical review of existing policies and plans is implemented, identifing a basic set of measures, in order to support the definition of their optimal mix for regional planning identifying possible obstacles, conflicts and trade off between adaptation and mitigation.

This report was implemented in the framework of the Work Package 7 “Regional planning cross sectoral study” / Activity 7.1. “State-of-the-art on mitigation and adaptation plans and identification of cross-sectoral links” thanks to a joint effort by several partners representing all the 13 countries involved in the OrientGate project. This report along with the “*Report on the state of the art in term of policies and plans*”, developed also by Activity 7.1., provides an updated and complete picture of the climate change mitigation and adaptation actions and policies in South East Europe.

2. Mitigation and Adaptation from a cross-sectoral perspective in the ORIENTGATE Countries

In order to outline a comprehensive picture of local actions undertaken to face up climate change in the SEE countries, two templates were distributed to all OrientGate partners in a table format with the final aim to gather mitigation and adaptation actions in a cross-sectoral perspective: Table 2.1 that summarises the specific actions identified into sectoral plans, such as Transport, Air Quality, Energy, etc., that could be recognised as mitigation measures, and Table 2.2 that collects measures and actions referable to adaptation to climate change.

Table 2.1: Main Climate Change Mitigation (CCM) actions by thematic sector template.

SECTORS	CCM actions
Transport	For example: Car Pooling, Car Sharing, Hybrid public transport, Incentivising public transport, use of bicycles, less polluting cars, expansion/implementation of cycle-lanes, ...
Air quality	For example: CO2 and GHG targets reduction, *please specify baseline and target year.* ...
Energy	For example: Renewable Energy Sources: PV, Wind, Thermal solar, Biogas...please specify objective Energy Efficiency measures „green technologies“ ...
Forest	For example: Forestation/Reforestation, ...
Waste management	For example: Recycling and reuse, MSW separate collection, recovery energy from incinerator, recovery biogas from landfill, ...
Spatial Planning	For example: increase of green areas, Construction of new energy-efficient buildings, Integration of RES (solar thermal, PV, geothermal and wind) in all new buildings, ...
Agriculture	For example: Cropland, nutrient and water management,... Energy crops, ...
Socio-economic	For example: Green economy, Green Public Procurement,

	...
Community Involvement	For example: Initiatives for awareness raising, ...
.....	

Table 2.2: Main Climate Change Adaptation (CCA) actions by thematic area[1] template.

Thematic areas	**CCA actions**
Hydrogeology	For example: measures to prevent floods, landslide, ...
Water management	For example: sustainable use of water resources, irrigation water demand reduction by introducing crops more suitable to the changing climate
Agriculture	For example: water scarcity and droughts, irrigation water demand reduction by introducing crops more suitable to the changing climate….
Costal and marine systems	For example: Strategies for adapting to sea-level rise,..
Forests	For example: Fire protection, adaptive forest management,...
Biodiversity	For example: Conservation strategies to safeguard local biodiversity
Human health	For example: Adapting to extreme meteorological events: heat waves *(development of health early warning systems and preventive emergency plans*), risk of flooding (*public flood warning systems, evacuations from lowlands, ..)*
Energy and Transport	For example: Reduce exposure of energy users and producers to impacts of unfavourable climate through the mitigation of GHG emissions (by reducing overall energy use), mitigation of emissions from transport though cleaner technologies and adapting behaviour,...
Tourism	For example: Coastal tourism: protection of resorts from sea-level rise
.....	

In the next paragraphs, according to these two templates each partner described the actions and measures (including national/local sectoral plans) existing on their territory in the identified key sectors, in order to provide a complete picture of local actions, in terms of climate change mitigation and adaptation.

[1] Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007 M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds) Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

2.1 Albania

The main climate change mitigation and adaptation actions for sector as identified in the Albania's Second National Communication to UNFCCC are summarised in Table 2.1.1.

Table 2.1.1: Main Climate Change Mitigation (CCM) and Climate Change Adaptation (CCA) actions in the principal thematic sectors in Albania at national level.

SECTORS	CCM/CCA actions
Transport	- Improving Energy Efficiency of vehicle stock
Industry	- Increasing Energy Efficiency of boilers/furnaces in industry & Services sectors. - Increase of power factor in industrial companies
Energy	- Thermal insulation of the existing stock of public buildings - Promotion of thermal solar energy use - Renewable Energy and Energy Efficiency Promotion Programme (improvement and extension of electricity supply, strengthened grid stability, reduced system losses, energy saving) - Encouragement of using efficient bulbs in households, service sector and industry

References

- Republic of Albania, Ministry of Environment, Forestry and Water Administration. Albania's second national communication to the Conference of Parties under the United Nations Framework Convention on Climate Change. 2009 http://unfccc.int/essential_background/library/items/3599.php?such=j&symbol=ALB/COM/2%20E#beg

2.2 Austria

In this paragraph, the Austrian National and Regional sectorial and territorial plans were analysed, with particular reference to Upper Austria, and the main mitigation and adaptation instruments identified were summarized in the following tables.
In particular, Tables 2.2.1 and 2.2.2 refer to the main mitigation and adaptation actions at National level, whereas Tables 2.2.3 and 2.2.4 are relative to Regional actions.

Table 2.2.1: Main Climate Change Mitigation (CCM) actions in the principal thematic sectors in Austria at national level.

SECTORS	CCM actions
Transport	- Decrease of emissions by increasing the percentage of renewable energy, expansion of public transport and rail cargo, mobility-management and focus on new technologies - Fuel-decree for substitution of 7% of fossil fuel through biodiesel and bio ethanol - Action program for promoting of electro-mobility - Awareness raising programs for fuel efficiency, alternative vehicles and bicycle traffic (target: doubling until 2015 - 10% share of transport; promotion of E-Bikes) - Ecologization of the Austrian car registration tax (NOVA) by a bonus-malus model with tax bonus for economical cars (under 120 g CO2/km) and alternative vehicle as well as a malus system for non-economical cars (over 160 g CO2/km) - Extension of public transport and rail cargo - Conversion of public transport to E-mobility [Austrian Energy Strategy, 2009]
	- Support and funding programs for promoting of alternative vehicles and mobility management (fuel-saving initiatives, mobility management in enterprises, schools, public administration, cities, municipalities and regions, tourism, building promoter, real estate developer and investors), car sharing, - Parking space management and parking regulations to promote public transport in urban areas [Klima:aktiv (since 2004)mobil]
Air quality	- Amendments of the Air pollution control laws in the Federal Provinces - Decrease of GHG (which are not subject to the emissions-trade) by 16 % (in comparison with the level of 2005), in the field of the emissions-trade: 21 % reduction (in comparison with 2005) until 2020. [Austrian Energy Strategy, 2009]
	- Obligation to prepare measure packages for decreasing emissions on all levels and sectors - Climate Impact Assessment since 2008 for all planned regulations by the relevant Federal Minister. [Climate Protection Law, 2011]
Energy	- Stabilization of the final energy consumption till 2020 on the level of 2005 (1.100 PJ) by action-packages (household: 3% renovation-percentage; production, services and small-scale consumer: energy-management systems, support and utilization of waste-heat; mobility: expansion of public transport and rail cargo, mobility-management and focus on new technologies) - Expansion of renewable energy for electricity: hydropower 12.6 PJ more, doubling of wind energy and integration of photovoltaic in housings – for heating: substitution of fossil fuels by renewable ones and by using of waste-heat; combined heat and power (CHP) promotion - Energy-efficiency-monitoring - Energy-efficiency-package (draft law). [Austrian Energy Strategy, 2009]
	Promotion of green power (e.g. wind energy, photovoltaic, small hydropower plants). [Green power Act (Ökostromgesetz), 2012]

	Solar heat (cost saving and enhanced image), ecofacility (reduction of heat-costs and CO2 emissions through restoration of buildings), e5-Program for municipalities (better using of energy), wood fuel, biogas, efficiency of biomass-heating plants, energy-efficient enterprises, klima:aktiv house, energy optimization of governmental buildings, energy efficient equipment, energy-self-sufficient municipalities. [Klima:aktiv energy programs]
Forest	planning of afforestations for the improvement of water balance, especially in areas with only rare forest stands, for the protection of water resources "site protective forests" (Standortschutzwälder) can be designated in the Forest Development Plan. [Austrian Forest Law Act]
	Currently the BMLFUW (Forest Department) elaborates a new subsidy tool (as part of the new EU Rural Development Regulation) for forest owners to improve the forest effects on the water regime and to clean up ditches and riverside forests. [Subsidy Programme "Forest for Water"]
Waste management	Renewable energy from landfill gas, sewage and biogas as well as biomass (also bio-degradable litter and remnants from agriculture, forestry, industry and households) – for heating and cooling. [Austrian Energy Strategy, 2009]
	Reduction of methane-emissions trough pre-treatment of waste for reduction of emissions, intermediate storage, after-care (aerobe ventilation for acceleration of degradation processes), gathering and discharge of arising landfill gas [Landfill Decree 2009]
Spatial Planning	- Energy pass law (for every building), Decreasing of the greenhouse gas emissions by 45% in space-heating, integration of photovoltaic in housings, for heating: substitution of fossil fuels by renewable ones and by using of waste-heat (in cities: long-distance heating, in rural areas: biomass) – incentives (e.g. renovation-check 2009) - Amendments of building regulations (e.g. no new building-zoning in HQ100-zones and red as well as yellow zones of the Hazard Zone Mapping of torrent and avalanche control) - Promotion of low-energy-housing - Roof greening, networking of green areas in settlements, planting of inner courtyards [Austrian Energy Strategy, 2009]
	Joint steering instrument for defining common tasks for spatial planning and development in future (et al. regarding climate change aspects) [Austrian Spatial Development Concept (ÖREK), 2011]
Agriculture	Various plant protection provisions, intensive subsidization program within the framework of rural development [Action Program Nitrate]
	About 70% of the agricultural areas (without alpine pastures) are involved in measures, which aim at reduction or waiver of nitrogen fertilizer Consulting of farmers (focus on water and climate protection) Promotion of regional marketing initiatives and organic farms Biogas-eco-power plants (utilization of agricultural fertilizer) [ÖPUL – Austrian Program for the promotion of an environmentally suitable, extensive and the natural habitat protecting agriculture]
	Promotion of open stabling Project "WeinKlim" (reduction of greenhouse gas emissions and adaptation to climate change in viniculture).
	Project "Method of accounting humus as a practical tool for farmers for a CO2-storing agriculture". [StartClim 2009 – Bio Research Austria]
Socio-economic	Due to the implementation of this strategy 80.000 jobs can be created or assured (especially by renovation of buildings) plus 31.000 by the expansion of the public transport infrastructure. [Austrian Energy Strategy, 2009]

	Green Jobs (every 20th job, 11,8 % of the GDP are produced – tendency to rise), advanced training by the help of klima:aktiv, green innovators Award for business plans and green tech Award for scientific works.
Community Involvement	Several initiatives for awareness raising (e.g. internet platforms of BMLFUW, Environment Agency, Central Meteorological Institute; newsletters), school-curriculum. Concerning agriculture: e.g. establishment of water protection consulting centres, which help farmers to become water-friendly in their farming methods Climate protection Award for ideas and projects for active climate protection Actual Climate Map (Klima-Atlas) on digital basis (e.g. Styria, Tyrol, Carinthia).
Research	Development of an important research program for questions concerning climate change and adaptation in the context with the Climate and Energy Fund, scientific basis for future decisions in policy, economy and society. [Austrian Climate Research Program]
	Networking and promotion of cooperation in context with climate research (et al. participation of several universities). [Climate Change Center Austria]
	2002 initiated by the Austrian climate research initiative AustroClim, flexible instrument for annual allocation of projects relating to climate change. [StartClim – National climate research program]

Table 2.2.2: Main Climate Change Adaptation (CCA) actions in the principal thematic sectors in Austria at national level.

Thematic areas	CCA actions
Hydrogeology	Establishment of the "Agency for Natural hazards" for harmonizing the Hazard Zone Plans (due to fragmentation of competencies); implementation of some recommendations of the Project FloodRisk I+II (e.g. forecast, early warning systems, disaster management, adapted hazard zone mapping, awareness raising) Regional studies about future water supply and necessary measures for a guaranteed water supply in all regions under climate change karst water research program for drinking water Project HORA (BMLFUW)– digital application of natural hazard zoning in Austria (with focus on flooding)
Water management	In some areas, where drought problems in summer sometimes occur, water saving appeals are distributed among the population
Agriculture	Research focused on drought-tolerant plants and pest control
Forests	Research focused on changes in tree species and pest infestations due to climate change Adaptive Management Strategies for the "Österreichischen Bundesforste" (Project „Adapt") – Study of the Institute of Silviculture (BOKU)
Biodiversity	200 reserves with approximately 8600 ha were contractually secured to create of at least one representative for each forest reserve per forest community and the growing region. Thereby the maintenance and development of natural forest communities should be supported. Furthermore studies about vulnerability or adaptability of forest ecosystems to potential climate changes should be promoted. [Austrian Natural Forest Reserves Program, 1995]
	Research and prohibition concerning distribution of Neobiota (non-indigenous species), land use changes, changes in species (flora and fauna) Restoration of nearly natural ecosystems (et al. as carbon sinks, retention areas), networking of protection or natural areas
Human health	Adapting to extreme meteorological events:

	- health early warning systems (e.g. ozone, heat, pollen), - public extreme weather warning systems (directly from the central meteorological institute) - Careful observation of possible new carriers of virus-diseases - Installation of drinking water fountains in public spaces - Heat plan (e.g. Styria) – description of procedures in case of heat-waves emergency aid "Team Austria" databank (based on volunteers)
Energy and Transport	More energy demand for the cooling of buildings Suitable asphalt materials for streets, secure infrastructure trough "object protection forests", retention areas...
Tourism	Research and development of alternative strategies concerning winter tourism in low /medium high mountain areas in future Remediation measures in context with the decrease of permafrost and development of risk maps for tourists (e.g. Großglockner)

Table 2.2.3: Main Climate Change Mitigation (CCM) actions in the principal thematic sectors at Regional level (Upper Austria).

SECTORS	CCM actions
Transport	No expansion of building zones before mobilisation of existing building zones Definition of criteria for a traffic-minimising spatial structure Promotion of settlement development in areas with good access to public transport by instruments of spatial planning and subsidies for housing. [Traffic Concept 2008]
Air quality	Resolution to achieve the Kyoto-objectives (-13% of GHG from 1990-2010) [Government Programme 2009-2015]
Energy	complete coverage of energy demand for housing and electricity by renewable resources (Water power, Wind mills, photovoltaic, solar heating) [Energy Strategy 2030]
Forest	See "national level" (this applies also to the regional level)
Spatial Planning	No zoning within HQ30 [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Agriculture	more hedges and trees for a better micro-climate and erosion-protection and higher amount of different species as a natural protection against infestations and thermophilic weeds. [ÖPUL-Program]
Community Involvement	Installation of a Climate Protection Ombuds Person (since 2000) Climate Alliance Upper Austria (Klimabündnis OÖ) – involvement of municipalities, schools and enterprises (e.g. training for "communal climate manager") – often in cooperation with Agenda 21 initiatives "Climate rescue partner": Information-folder for households "Guidance for a personal contingency-plan – floods and other natural disasters", newsletter – focus on adaptation
Biodiversity	Study MoorClim (UBA, 2010): preservation and renaturation of moors for climate protection (storage of huge Co2-amounts)
Research	Upper Austria is the first Federal Province which participates in this program [StartClim – National climate research program / Austrian Climate Research Program]

Table 2.2.4: Main Climate Change Adaptation (CCA) actions in the principal thematic sectors at Regional level (Upper Austria).

Thematic areas	CCA actions
Hydrogeology	Improved flood protection, management of flood risks in the context with the Flood Directive (flooding protection plan) Study (BOKU, 2009) about the water economic development in flooding areas (methods for risk assessment, loss of retention space, damage potentials, development of concepts for compensation measures) [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
	The harmonisation of hazard mapping between River Administration and the Torrent and Avalanche Control is under discussion In hazard maps the 300-year flood risk area has to be visualized in the future. Regional Programmes for Water Management will be implemented as new instrument. They can state public interests like conservation of retension areas and will get the status of an ordinance. [Government Programme 2009-2015]
Water management	Study about the influence of climate change to groundwater resources and adaptation strategies to minimize conflicts between agriculture and public water supply (Austrian Institute of Technology, Seibersdorf) Study "Description of results of climate relevant studies on regional basis for water management in Upper Austria" (TU Vienna, ZAMG, 2012) In progress: follow-up study "Analysis of the impacts of climate change, the problem areas and solution approaches for the regions in Upper Austria" Further digitalisation of precipitation data for improved availability Planned: evaluation of rated values for existing and future projects in terms of flood protection and protective water management (estimation of future changes of floods and low water) Shorter approvals [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Agriculture	Study about climate change und its impacts on agriculture in Upper Austria and adaptation strategies (BOKU, 2009) Change to other species, e.g. later maturing and more fertile crops (e.g. maize), pasture land is more vulnerable because of less flexibility (e.g. change to luzerne) Development of a "Carbon calculator" for farmers for the optimization of the humus-management (international project) [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Forests	Information, support (with 100 demo-spaces) and incentives for forest owners, brochures with recommendations concerning tree species taking account of climate change, funding of mixed forest stands trough conversions and reforestation after disaster events, pilot actions with choice of suitable sources (e.g. oak) [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Human health	Study about the heat-waves in Upper Austria and estimation of future developments (BOKU, 2007) Pilot Project in hospitals – improvement of summer-behavior and estimation of additional costs Pilot Project in governmental buildings for secure housing against extreme weather events (storm, hail, heavy rainfall) - planned: in combination with information- and support-program and insurance incentives for suitable housing [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
	Since 1985 80 % of all new buildings with a roof pitch up to 20 degree have been planted (500.000 m²) – the temperature decreases 30 to 60 degrees below the temperature on normal roofs, the sewage flow is reduced and the sewage system disburdened – so this measure has a positive influence on temperature and heavy

	rainfalls [Building Plan in Linz (provincial capital)]
Socio-economic	Study about economic effects of the climate warming in Upper Austria and Austria (Johannes Kepler University, 2007) [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Energy and Transport	Increase of the adaptive capacity by change from the actual energy system to decentralized systems with renewable energy suppliers and by adaptation of the distribution- and transmission network to decrease risks trough natural disasters ("power supply line masterplan for Upper Austria" actually in progress) Expansion of the long-distance cooling by renewable energy (waste heat, groundwater, solar cooling...) [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Tourism	Study about impacts of climate change to determined issues concerning tourism (BOKU, 2009) in some regions of Upper Austria: possible increase of summer-tourism due to wormer lake temperatures and more heat-waves in the South, winter-tourism have to search for creative, sustainable solutions (although the situation in Upper Austria is foreseen not so bad as in other regions of Austria), trend to more climate-independent activities like city-, culture- and wellness-tourism [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
Disaster Management and insurance	Great risks trough storms and hail After the flooding 2002 improvement of disaster management (e.g. digital disaster protection map, review and adaptation of existing Hazard Maps) Assessment of risks concerning geogenic aspects like land- and mudslides and development of hazard maps considering these issues Insurance for the whole devastated area after natural disasters is desired [Climate Change Adaptation Strategy for Upper Austria (only draft!)]
	The resolution of a new law for the management of natural disasters The integration of flood protection measures and the obligatory consideration of flood zones in the spatial planning and the building laws. [Government Programme 2009-2015]
	The flood catastrophe in the year 2003 induced the up-stream and down-stream municipalities in the Feldaist / Waldaist region to establish an intercommunity cooperation A formal cooperation with influence on local land use planning, on the development of common planning strategies in catchment areas and on the agreement on compensation measures has been established to reduce the damage potential and to conserve and develop retention areas. [Flood Protection Association Aist]

2.3 Bosnia and Herzegovina

The Initial National Communication of Bosnia and Herzegovina to UNFCCC assesses the potential effects of reducing greenhouse gas emissions through the analysis of two scenarios: a baseline scenario, and a scenario in which measures to reduce greenhouse gas emissions have been introduced. In the Tables 2.3.1 these considered measures are listed for key sectors.

Furthermore, Table 2.3.2 summarised for vulnerability sectors the main adaptation actions as proposed in the UNFCCC communication.

Table 2.3.1 Main Climate Change Mitigation (CCM) actions in the principal thematic sectors in Bosnia and Herzegovina at national level.

SECTORS	CCM proposed actions in the UNFCCC
Buildings	- Adopting new standards and codes in the field of energy efficiency; - Optimizing the shells of existing buildings based on cost-effective measures; - Using energy-efficient technologies in buildings and introducing metering and controls.
Renewable Energy Sources	- create a legislative framework for renewable energy; - develop a functional system of incentives; - develop a strategy for renewable energy in close cooperation with competent institutions for water management, agriculture and forestry; - address grid connection issues; - substitute renewables for liquid fuels, especially in public buildings; - assess biomass-fuelled remote heating systems in places with a developed timber and wood industry.
Industrial Processes	- replace partially fossil fuels with alternative fuels that are obtained primarily from waste
Agriculture	- the use of biomass in biogas production, i.e. for energy purposes; - measures to reduce methane emissions by introducing new livestock breeding and feeding practices; - measures to reduce nitrogen oxides emissions through programmes aimed at improving the application of mineral and organic fertilizers and introducing organic production.
Forestry	The application of certain silviculture methods could increase carbon sequestration in tree biomass and enlarge forest area by reforestation of bare lands, therefore increasing the overall annual biomass increment. Activities that could be integrated into everyday forest management planning include permanent control of forest health conditions and monitoring, increase of thinning activities and planting pioneer wood species on the degraded forest lands. Increasing fire protection measures, restoring the productive forest cover, increasing protection measures and generally expanding the forest and mountain areas under protection.
Waste management	- improve the system of waste management (avoiding of waste generation, recycling and re-usage), with an emphasis on collection and usage of methane from regional landfills.

Table 2.3.2: Main Climate Change Adaptation (CCA) actions in the principal thematic areas in Bosnia and Herzegovina at national level.

Thematic areas	CCA proposed actions in the UNFCCC

Land	- Implementation of nature protection measures throughout the country - Increase in the amount of territory designated as protected areas by law. - Consideration of potential changes in habitat due to climate change when establishing the boundaries of national parks and protected areas.
Coastal areas	Inclusion in the coastal zones management programmes of the Republic of Croatia
Water management	Construction dams and accumulation reservoirs for hydropower generation, agriculture, drinking water, tourism, fish-farming, etc.
Agriculture and cattle breeding	-Changes in crop mix -Modification of crop rotation -Inclusion of agriculture in water management programmes -Construction of reservoirs and canals for agricultural needs -Use of drip irrigation techniques
Forest	-Conduct a detailed mapping of forests -Afforestation of bare areas -Change of species in the process of forest development -Establishment of plantation forests for the needs of industry and energy -Increased protection of forests against pests and plant diseases
Mining and energy	-Planning of energy development (energy industry) within the regional cooperation (SEE) initiative -Introduction of integrated water resource management -Development of renewable energy sources to promote employment opportunities (especially in villages) and decrease the level of dependence on energy imports
Tourism	-Promote the development of year-round tourism
Economy and trade	-Development of infrastructure for the entire process of transfer and commercialization of new technologies (within the UNFCCC and other forms of international cooperation) -Encouragement of scientific and research work, development of technological parks and introduction of funds for support to development and acceptance of technologies related to adaptation to climate changes
Infrastructure	-Creation of a vulnerability study and strategic assessment of the environment that address climate change within current infrastructure planning procedures -Analysis optimal residential density -Planning that includes space for plants (for the water accumulation) and aqueducts -Inclusion of risk of landfill self-ignition during assessments of repair projects for existing landfills
Health and social status	–Timely warnings about anticipated heat waves –Strategy to protect at-risk populations from extreme heat events.
Education	-Introduction of curriculum related to climate change (and environmental education more generally) at all educational levels -Introduction of relevant programmes of study for secondary schools and universities
Socio-Economic Development	–Practical implementation of aggregated indicators (climate- development) -Development of a system of monitoring, forecasting, and disseminating information on climate change -Improvement of the hydro-meteorological services -Formal and informal training on coping with climate change -Introduction of development plans for state and local communities that respect existing and anticipated climate change

References:

1. Initial National Communication (Inc) of Bosnia and Herzegovina under the United Nations Framework Convention On Climate Change (UNFCCC). 2009. Available at: http://unfccc.int/essential_background/library/items/3599.php?such=j&symbol=%20BIH/COM/1%20E%20#beg

2.4 Bulgaria

In the table below (Table 2.4.1) an overview of the main climate change mitigation and adaptation actions as identified in the national sectorial plans was reported.

Table 2.4.1 Main Climate Change Mitigation (CCM) and Climate Change Adaptation (CCA) actions in the principal thematic sectors in Bulgaria at national level.

SECTORS	CCM actions
Energy	- Improvement of existing and new coal plants; - Increase of co-generations' and RES share also in heating and cooling, new low-carbon heating systems; energy efficiency in transport; - Smart networks for energy storage geological research for CO2 depositories
Agriculture	Management of degraded agricultural lands through: 1.Re-cultivation with traditional grass species and 2. Application of counter-erosion measures; Introduction of water-saving and energy-saving irrigation technologies; Enhancing the storing and utilization of natural fertilizer, including through low-carbon practices; Financial incentives for farmers for soil cultivation and for utilization of modern production equipment and technologies
Households & Services	- natural gas supply network; - Energy efficiency measures in buildings; standards for sustainable buildings and energy management; - energy efficiency certificates and energy passports of buildings
Industry	- Energy efficiency measures; - Use of biomass and wastes in fuel systems
Waste management	- Installations for mechanical and biological treatment of waste, compost and biogas; - burn up of biogas and evaluation of its energy potential.
Land Use and Forestry	- Adoption of a programme for afforestation of: 1. Non-afforested areas in forest territories and 2. Abandoned agricultural lands or eroded areas outside of forest territories; - Sustainable management of wet areas; - Maintaining field-protecting forest "belts"; - Pilot application of up-to-date forestry systems for maintaining mixed forests; - Application of schemes and projects for carbon storage.

2.5 Croatia

The main climate change mitigation and adaptation actions that will be adopted in Croatia were reported in the table below (Table 2.5.1).

Table 2.5.1: Main Climate Change Mitigation and Adaptation actions in the principal thematic areas in Croatia at national level.

Thematic areas	CCM/CCA actions- possible short term measures
Hydrology and Water resources	**Reducing risks** ▪ Flood risk map ▪ Holistic approach to river management ▪ Flood rescue scenarios ▪ Development and assessment of irrigation systems ▪ Assess impact of Climate change for important rivers **Policy** ▪ Plans for flood management ▪ Improvement of existing regulations ▪ Sustainable Water management as basis for policies **Monitoring and research** ▪ Better warning systems for extreme climate events ▪ Climate change impacts on water resources **Capacity building and public awareness** ▪ increased capacity of LGs ▪ increased capacity of research institutions ▪ increased public awareness on Climate change and its impact
Forestry	**Reducing risks** ▪ Forestation of neglected areas ▪ Diseases and vermin control ▪ Forest data base **Policy** ▪ Improvement of existing regulations ▪ Sustainability as basis for new plans and strategy ▪ Climate change and its impact **Monitoring and research** ▪ Better warning systems for extreme climate events ▪ Climate change impacts on forest resources **Capacity building and public awareness** ▪ increased capacity of LGs ▪ increased capacity of research institutions ▪ increased public awareness on Climate change and its impact
Agriculture	**Reducing risks** ▪ Detailed assessment of climate change impact ▪ Developing irrigation systems and supporting infrastructure ▪ Changes in agriculture cultivations ▪ Increase the share of organic farming and related land management

	Policy ▪ Improve existing policies ▪ Stronger measures of rural development ▪ New sustainable approach to agriculture **Monitoring and research** ▪ Model for assessing climate change impacts on agricultural production ▪ Better prediction of climate extremes **Capacity building and public awareness** ▪ Increase capacity of farming community ▪ Higher income of rural areas ▪ Increase awareness of climate change impact on agricultural production
Biodiversity and Natural Terrestrial Ecosystems	**Reducing risks** ▪ More areas under protection ▪ Development of monitoring systems **Policy** ▪ Increased number of protected areas ▪ Improvement of existing regulations ▪ Sustainable management of protected areas **Monitoring and research** ▪ Extreme climate events and their impact on protected areas ▪ Developed data-base of eco-system **Capacity building and public awareness** ▪ increased capacity of connected institutions ▪ increased capacity of research institutions ▪ increased public awareness on Climate change and its impact on biodiversity
Health	**Reducing risks** ▪ Decreasing heat island effect in urban areas ▪ Tackling energy poverty **Policy** ▪ Identification of vulnerable groups ▪ Implementing climate changes and its effect on health in existing and new policies on local, regional and national level **Monitoring and research** ▪ Developing of time warning systems on climate extremes for wider public **Capacity building and public awareness** ▪ Acquainting public with climate extremes and their impact on health ▪ Increased capacity of health institutions

The City of Koprivnica as a local community has a smaller administrative area than other types of communities and therefore many climate change and developments do not have direct impact. Nevertheless, there are ways how a local community can tackle climate change. Because 80% of energy consumption and C02 production occurs in urban areas, transport and energy consumption in households are the most effective areas where a urban community can act.

2.6 Greece

Although in Greece, an over-arching mitigation and adaptation strategy is not yet available, mitigation and adaptation measures are currently under implementation as part of a broader network of measures that apply to the specific areas of identified vulnerabilities. A thorough analysis of the climate change sectoral impacts can be found in the recent "Environmental, Economical and Social Impacts of Climate Change in Greece" study, published by the Bank of Greece. The main mitigation and adaptation sectorial actions identified in Greece are resumed in Table 2.6.1.

Table 2.6.1: Main Climate Change Mitigation and Adaptation actions in the principal thematic areas in Greece at national level.

SECTORS	CCM/CCA actions
Water management	Greece incorporated the EU Water Framework Directive (60/2000/EC) in 2003 (Law 3199/2003), while the framework of measures and procedures for Integrated Water Resource Management was established in 2007 (Presidential Decree 51/2007). The national objectives are mainly based on the implementation of the various EU water-related directives, supplemented, when appropriate, by additional provisions. The National Strategy for the Management of Water Resources has amongst its aims to use existing water reserves sustainably. River Basin Management Plans for 10 out of the 14 Districts are in the public consultation stage and are expected to be officially approved by autumn 2012. Approval is expected for the remainder by the beginning of 2013. Regarding Flood Risks, Greece has transposed the EU Directive 2007/60/EC in 2010 (National Gazette 1108/B/21.07.2010). The 1st stage of the preliminary assessment, is completed and all available information is published in the Water Information System for Europe (WISE). The consequences of potential future floods are currently under evaluation in order to select flood prone areas at a national level. In addition, technical specifications for the development of flood mapping and flood risk management plans are under preparation and related projects are expected to be initiated within 2012.
Agriculture and Forests	
Biodiversity and ecosystems	
Spatial Planning	The General National Framework for Spatial Planning and Sustainable Development (National Gazette 128/A/3.7.2008) includes priorities that could be considered as contributing to climate change adaptation, such as energy saving measures, forest fire prevention and reforestation measures, implementation of bioclimatic energy etc. and food (MRDF).
Coastal Zone Management	With reference to coastal zone management, the consequences are already embedded in the law concerning the creation of new settlements or the expansion of existing ones. Additional useful provisions exist in the Specific Framework Spatial Plans that were published in 2009 and refer to Tourism and Industry (National Gazette 1138/B/11.06.2009). In order to promote the management of coastal zones exposed to particular and complex pressures, including climate change, a Specific Framework Spatial Plan of Coastal Areas and

	Islands has been developed and presented to the public.
Human health	The National Action Plan for the 'Response of Environmental Hazards Threatening Health' for 2008-2012 includes a special action dedicated to the 'Exploring of Climate Change Impacts on Health', primarily referring to the identification, research and documentation of the above mentioned impacts. The General Secretariat for Civil Protection is responsible for the implementation of all the corresponding phases of preparation, mobilization and coordination of actions regarding Civil Protection (Law 3013, Official Gazette 102A/04.06.2002), including prevention and protection from forest fires, floods, extreme weather events etc.
Desertification	The National Action Plan for Combating Desertification was approved in 2001 (Common Ministerial Decision 996005/31719). The implementation of the plan is coordinated by the National Committee to Combat Desertification, while the Ministry of Rural Development and Food ensures secretarial and technical support to the committee.

References

- The 5th National Communication to the United Nations Framework Convention on Climate Change
- The European Climate Adaptation Platform (CLIMATE-ADAPT) http://climate-adapt.eea.europa.eu/web/guest/home

2.7 Montenegro

Although the entire territory of Montenegro, in the last twenty years was directly or indirectly affected by strong climatic anomalies mainly relative to water resources, no mechanisms determining self-adaptation have been identified. Nowadays, there are no national strategies or adaptation measures and estimates of the expected mechanisms of self-adaptation. Moreover, the lack of sectoral development plans, relevant data and other significant national studies addressing the problems of climate change made difficult to individuate specific actions addressing mitigation and adaptation.

References

1. The Initial National Communication on Climate Change of Montenegro to the United Nations Framework Convention on Climate Change UNFCCC. 2010. http://unfccc.int/essential_background/library/items/3599.php?such=j&symbol=MNE/COM/1%20E#beg

2.8 Hungary

In the following tables (Table 2.8.1 and 2.8.2) is reported an overview of the main mitigation and adaptation actions recognised in the Hungarian sectoral plans.

Table 2.8.1: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in Hungary.

SECTORS	CCM actions
Transport	• **Hungarian Transport Policy 2003–2015**, the **Unified Transport Development Strategy 2007–2020** and the **Hungarian Intermodal Logistic Development Concept** all aim at the development of environmentally friendly and efficient distribution infrastructure in Southern and Eastern Europe. • Unified **Transportation Development Strategy (UTDS):** published in 2008 for rebuilding and refurbishing train lines, technical and technological development, a road transport strategy, and an urban-suburban transport strategy for Budapest. • **National Transport Strategy for 2014–2020 (**prepared by end 2013): ambitious modal split rates, transport consciousness, waterway development, etc., and in general the sustainable development of the Hungarian transport system. • **Bus Bill** and the **Law on Public Procurement** integrating technical environmental criteria for public vehicles. • **Széll Kálmán Plan 2.0 (Action plan for an economic reform):** reorganisation and rationalisation of routes and timetables to eliminate parallel operation of buses and trains; giving preference to rail transport where possible to curb emissions; introduction of an electronic road toll on public roads; passenger car traffic restriction (or congestion charge) in the centre of Budapest and sustainable financing for the public transportation system of the capital. • **Development plan of the Transport System of Budapest (2012-2020)**: development/improvement of cycling lanes, awareness raising campaigns and introduction of a public bicycle sharing system (BuBi); road development to give priority to public transportation; other measures to increase the share of public transportation in the modal split.
Air quality	• The GHG emissions reduction target of Hungary is 6 % by 2020, compared to base year 1990. In the **National Climate Change Strategy** the GHG emissions reduction target is 16-25 % by 2025 (base year: 1990). • Air quality legislation: **use of Best Available Technologies for all sources of air pollution** and introduction of the 'environmental load charge' for emissions of main air pollutants from stationary sources. • **Air quality plans:** prepared by regional directorates and local authorities in zones where the yearly data exceeds the defined limits for PM10, PM 2.5 or main pollutants. If the limits are exceeded for several air pollutants, integrated air quality plans have to be prepared.
Energy	• **The National Energy Strategy 2012-2030:** its key principles are security of supply, competitiveness and sustainability. The two main pillars are: **the National Energy Efficiency Action Plan for 2008–2016 and Renewable Energy Strategy for 2010-2020.**

- **The National Renewable Energy Action Plan 2008–2020:** determines the roadmap towards reaching the 2020 target for the share of renewable energy (13 %).
- The **Renewable Energy Strategy** regulates the establishment of feed-in tariffs for renewables and waste (only for the licensed period and amount) and certificates of origin for RES electricity).
- **Act on Sustainable Energy Management and Transformation of the Mandatory Off-Take scheme** (**MOT system**): established a more predictable regulatory environment that facilitates the use of renewable energy sources.
- The **National Sustainable Development Strategy (2007–2025/2050)** includes the development of energy management reform.
- The **New Hungarian Development Plan (NSRF, 2007–2013)**, especially its Environment and Energy Operational Programme, includes promotion of energy efficiency and the use of renewables. Within the framework of the Environmental and Energy Operational programme for the period 2007–2013, EUR 215 million is allocated for this objective.
- Since January 2011, the **New Széchenyi Plan** (modified NSRF) determines the regional policy framework, but also puts special emphasis on green economy and energy efficiency. According to the Plan, investments in facilities producing electricity from renewables are eligible for subsidies covering 25 percent of the investment.
- The **National Reform Programme**, under the Europe 2020 Strategy, discusses the utilisation of EU development funds for fulfilling the Strategy's climate and energy targets.
- The **National Rural Strategy** 2011–2020 contains plans **for increasing biomass production**,
- The **Agricultural Energy Programme** aims to promote the efficient and sustainable exploration and production of renewable sources of agricultural origin energies, and to encourage their local utilisation.
- An amendment to the **Act on Natural Gas** from 2005 has abolished any legal obstacles hampering the **feed of purified biogas and biomass gases into the natural gas network**, although their actual use requires further, detailed legislative regulations. The **law and its implementation regulation on sustainable production of bio-fuels** applies a voluntary system with the provision of advantageous tax levels and prescribes a compulsory mixing ratio from 2011.
- The **Energy Efficiency, Environment and Energy Information Agency, or 'Energy Centre'** manages subsidy and loan programmes for energy efficiency and renewables, and is also active in training and providing information, technical assistance and knowledge transfer on energy efficiency and renewables.
- As of 2008, large energy consumers in the industrial sector are obliged to employ **energy managers** and to **deliver an energy consumption report**, followed by an energy savings plan and implementation report. In 2008, **voluntary agreements were also launched in energy-intensive sectors to reduce energy use**, to apply more efficient technologies, and to develop products with higher energy efficiency indicators. These two measures are expected to **save 0.8–1.5 TWh by 2016**.
- In 2003, a feed-in tariff scheme for CHP installations was adopted, including

	industrial cogeneration facilities (not belonging to the district heating network) of below 50 MW capacity. Industrial companies that install CHP facilities or renewable systems can benefit from subsidies, as established in the Environment Protection and Infrastructure Operative Programme, or EIOP. • Revenue from the ETS was used to setup a new financial support system, the '**Green Investment Scheme' in July 2009**. Among others the 'National Energy Saving Programme' and the 'Panel Programme I and II' provided targeted support for energy efficiency investments in households. In the future the funds will be used to support energy efficient refurbishments of private houses and multi-dwelling buildings and energy efficient building of new real estate.
Forest	The **New Hungary Rural Development Programme** (2007-2013) introduced an afforestation programme on grassland areas with funding from the EAFRD. It also supports the continuation of forest management activities in the already forested areas.
Waste management	• The **National Waste Management Plan 2009–2014:** aims at reducing annually produced waste by 20% over the period 2009–2013, to no more than 20 million tons by 2014. • **The Waste Prevention and Waste Management Act**: aims to bring national legislation, targets and implementation tools in line with requirements of the new Waste Framework Directive (2008/98/EC). • The **Law on Product Charge** was adopted for simplification and transparency purposes in 2011. • The **Decree on Waste Management Sites** (2006) regulates the disposal of communal waste and the processing of waste derivatives. • The **Waste Reduction Alliance (HuMuSZ**), a network of Hungarian green organisations, launched the **Zero Waste Programme** in 2009, which aims to reduce domestic waste generation. This wide-range initiative tries to highlight the need for society-level cooperation and raise new awareness to bring present consumption and production patterns to environmentally conscious levels. The Alliance takes part in the National Environmental Programme and participates in the development of the National Waste Management Programme.
Spatial Planning	• In compliance with EU regulations, **energy labelling** is obligatory for new buildings and in case of renting or selling existing properties. • A **national strategy on energy efficiency of buildings**, in accordance with Hungary's second National Energy Efficiency Action Plan, is planned (by summer 2013) to establish objectives and an appropriate framework of specific measures to enhance efficient energy use of buildings in different sectors. **Several measures will be implemented** in order to reduce energy consumption. In the short term, a **survey is being conducted concerning the energy efficiency of buildings owned by state and local authorities**, while energy-efficient renovation of blocks of flats built by industrial technologies is also taking place. The **renovation of public buildings** is a long-term priority. A **review of building authorisation procedures** to facilitate the use of renewable energy resource is another priority *(NRP).* • The **Hungarian Green Buildings Council** was founded in early 2009 to become an official member organisation of the World Green Building Council. Its main goal is training in the field of environmental and climate-friendly building technologies.

	• **'Apple of Our Eyes'** is an ongoing nationwide municipal Energy Service Companies (ESCO) programme, established in 2006, to improve the energy efficiency of buildings used for public education by upgrading heating, lighting and insulation. From 2007, the Environment and Energy OP partly finances the needed investment for this programme *(EC 2011a).* • Within the **Energy Saving Programme**, financial support is provided for changing windows, insulation, modernisation of heating systems and water heaters, and the use of renewable energy sources. Loans are available at a reduced rate to complement these investments in the residential sector. • The **Panel Programme, under the Green Investment Scheme,** supports energy efficiency refurbishment of prefabricated residential multi-apartment panel buildings with low thermal U values for the thermal insulation of buildings, the modernisation of building engineering, and the use of renewable energy sources. • The **Öko Programme** provides financial assistance to households connected to district heating systems for the development of their individual heating regulation and metering. • The Municipaity of Budapest plans to implement **sustainable transport iniatives** from 2012 similar to systems in other European cities. **BUBI** will be a public bicycle-rental transport system with 70–80 stations and 1,500 bicycles. **Congestion charges to reduce the number of cars** are also planned for introduction.
Agriculture	The **National Climate Change Strategy** aims to foster mitigation in the agriculture sector by introducing regulations and financial instruments to support a more sustainable land use and more efficient use of fertilisers. More efficient livestock farming and manure treatment methods are also promoted to decrease methane emissions.
Socio-economic	The **New Széchenyi Plan** (new NSRF since 2011) contains a separate programme for green economic development. The proposed measures cover the fields of energy efficiency, renewable energy sources, energy production from agriculture, waste recycling, green jobs, and related research, innovation and education**.**
Community Involvement	• See above examples from the **Green Investment Scheme** • The **Eco school network** was founded in 2000 and the number of its members increases yearly. In member schools a more sustainable lifestyle is promoted to students in classes and extra-curricular activities and the institutions themselves are setting an example by reducing the energy consumption of their buildings.

Table 2.8.2: Main Climate Change Adaptation(CCA) actions in the principal thematic areas in Hungary.

Thematic areas	CCA actions
Hydrogeology	• A new **River Basin Management** plan was adopted to provide water reservoirs and improve water beds for flood management purposes in 2010 and 2011. • The further developed New **Vásárhelyi Plan** (Plan for flood risk management along the Tisza river) was incorporated into the New Hungary Development Plan 2007–2013. • The **National Climate Change Strategy** contains plans for reviewing the municipal drainage systems to ensure the uptake of an increased amount of stormwater run-off.

Water management	• The **National Water Management Plan** was adopted in May 2010 in line with WFD requirements (2000/60/EC). • The **New Hungary Development Plan (2007–2013)** (NSRF) foresees development in waste management, wastewater management, improvement of drinking water quality and wise water management involving: flood protection, protection of water quality and quantity, and prevention of further pollution.
Agriculture	• A code of good agricultural practices was introduced in the early 2000s, which led to a concept of 'strict environmental management' that now applies to 1.4 million hectares of **Environmentally Sensitive Areas (ESA)** out of 5 million hectares of farmland. **ESAs**, addressed as zone targets in the National Agro-Environmental Programme, overlap with 50% of the Natura 2000 network. • The **National Climate Change Strategy** includes enhanced plant breeding activities to help the use and spreading of species that are more resistant to the effects of climate change.
Forests	• **Hungarian Forestry Program and its Implementation Plan 2006–2015.** • The **Forest Act (2009)** indirectly supports climate change-related mitigation and adaptation efforts. The law was followed by its implementation regulation on regional forest planning in 2010. The preparation of forest plans for Hungary's 15 forest districts started in 2011. • The **National Climate Change Strategy** also supports the enlargement of forested areas, (re)introduction of protective forest belts and research on how forest management can further help adaptation.
Biodiversity	• The **National Biodiversity Strategy** and **National Nature Conservation Master Plan** were adopted in 2009 as an Annex to the Third National Environmental Programme for 2009–2014. • In 2010, the Ministry of Rural Development further developed **information systems** on biodiversity conservation, upgraded the Nature Protection Information System on Hungarian protected areas, created a new official website on invasive species, and introduced the provision of meta-data on protected areas required by the INSPIRE Directive. • A **National Rural Strategy Concept 2011–2020**: promoting sustainable landscapes and natural resource management. • The **Wise Management of Natural Assets priority axis** of the ongoing **Environment and Energy OP** allocates around EUR 115 million to the restoration and protection of natural and Natura 2000 areas and assets, supports the development of the forest school system and botanical gardens, and creates an infrastructural basis for habitat-conserving agriculture and forestry. There are also financial sources available for biodiversity conservation from the ongoing **Life+** programme and the ongoing **Swiss Contribution**. • The **National Climate Change Strategy** also supports adaptation

	actions to conserve biodiversity, the connectivity of natural areas and the coordination of climate measures in biodiversity policy with those of forestry, agriculture, water- and energy management policies.
Human health	• An **early warning system for extreme weather events** is in place at the Hungarian Meteorological Service. • The **Hydrological Information Service** has long traditions in the country and its system is constantly improved. The monitoring activity extends to meteorological and hydrological data also outside the borders of Hungary, to the catchment areas of the rivers crossing the country. • Among the necessary adaptation measures, the **National Climate Change Strategy** lists the preparation of action plans for heatwaves and reviewing the public healthcare system to become more responsive to the effects of climate change.
Energy and Transport	• The **National Climate Change Strategy** foresees the modification of building regulations that, in case of new buildings, would result in less vulnerable settlement structures.
Tourism	• The **National Eco-tourism Strategy** (2008) contains the outlines of regional tourism development and environmental protection. At the end of 2009, a study was elaborated on the development and use of methods for monitoring the environmental effects of tourism in protected areas by the Ministry of Local Government and the Ministry of Environment and Water.

2.9 Italy

This paragraph provides a selection of the main mitigation and adaptation climate change actions in Italy, both at national level, and at local level, analysing in particular, as partners of OrientGate project, the Autonomous Province of Trento and the Basilicata and Puglia Regions.

Table 2.9.1: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in Italy at National level.

SECTORS	CCM actions
Transport	- infrastructure expansion, - promotion of modal transfer to less emitting types of transport, - fleet update with more efficient vehicles and promotion of low carbon fuels (LPG, natural gas, biofuels, electricity).
Households & Services	Promoting the diffusion of energy efficiency through specific actions targeted both at existing and new buildings and at appliances; in particular, fiscal incentive have been allocated for the implementation of energy efficiency projects, such as: - improvement the insulation of existing buildings, - installation of solar thermal applications, - replacement the existing boilers with condensing boilers, - Construction of new energy-efficient buildings, - Integration of RES (solar thermal, PV, geothermal and wind) in all new buildings.
Energy	- energy labelling obligatory for new buildings - White Certificates system is the main instrument aimed at promoting energy efficiency and deliver emissions reductions in all the energy end-use sectors. - Increasing the energy efficiency (White Certificates system) of the national economic system and fostering the use of renewable energy sources, - Implementing the Clean Development and the Joint Implementation mechanisms established under the Kyoto Protocol, - Fostering research and development activities in order to promote hydrogen as a main fuel in energy systems and in the transport sector and to promote the construction of biomass plants, solar thermal power plants, wind and photovoltaic power plants (feed-in tariffs), waste and biogas fuelled power plants, - Promotion of high efficiency cogeneration through the White Certificates system.
Industry	- improving industrial energy intensity through the White Certificates system.
Forest	- Increasing carbon dioxide removals deriving from land use, land-use changes and forestry, as established under the Kyoto Protocol - afforestation and reforestation activities.
Socio-economic	Green Public Procurement - GPP) for sustainable consumption in public administration.
Waste management	- Recycling and reuse, - MSW separate collection, - recovery energy from incinerator,

	- recovery biogas from landfill.

Table 2.9.2: Main Climate Change Adaptation (CCA) actions in the principal thematic areas in Italy at National level.

Thematic areas	CCA actions
Agriculture	- specific funds to alleviate the effects of extreme events, including droughts have been allocated (National Plan for Irrigation in support of Agricultural sector), - diversification of activities and production, - Risk early warning system for floods, landslides, overflowing.
Costal zone	Several measures have already been extensively used in Italy to protect coastal zones from sea level rise, increased erosion and other impacts: - technical measures (e.g. dikes), - behavioural strategies (e.g. changing location of recreational facilities), - managerial interventions (e.g. changing agricultural practices in areas prone to floods), and - political decisions (e.g. land use planning). The range of traditionally implemented coastal defence measures includes: - artificial reefs (shore parallel rock mound structures), - near shore breakwaters, - artificial channelling and drainage and, - Sand feeding (generally in high-profit touristic areas). These interventions increase the the steadiness of shores and touristic attractiveness however, on the other hand contribute to reduce their resilience to coastal erosion and increase marine/coast habitat vulnerability as well as environmental degradation .
Drought	**National Action Plan (NAP) to combat drought and desertification**. The NAP provides a coherent set of interventions aimed at reducing the vulnerability to desertification. The Plan entrusted the regional governments and watershed authorities with the responsibility to implement specific agronomic, forest, civil and social measures and to adopt information, training and research programmes in the priority sectors: soil protection, sustainable management of water resources, reduction of environmental impact from productive activities, land restoration. The **Rural Development Plans** (2007-2013) includes some initiatives aimed at protecting soil and restoring its stability, such as: improving soil quality and reducing the organic content loss (Puglia); restoring dry stone walls and relative works to support steep slopes (Liguria); renewable energy production plants from biomass and other renewable sources (Sardegna, Basilicata and Puglia); water resources management and water saving technologies (Sardegna, Basilicata, Puglia and Calabria).
Forests	The Directorate for Nature Protection (Direzione per la Protezione della Natura - DPN) is involved in the protection of Italian forests from fires.

Biodiversity and natural ecosystems	National Biodiversity Strategy is aimed at reducing biodiversity loss by and beyond 2010, with an eco-regional approach and in cooperation with local socio-economic stakeholders.
Human health	• **Prevention of heat health effects and the mortality surveillance system** - A national project of the Department for Civil Protection for the prevention of heat health effects is ongoing since 2004, including city-specific Heat Health Watch Warning Systems (HHWWS) and a surveillance system. The aim is to provide cities with specific early warning systems to foresee extreme weather conditions, such as heat waves, and a near-real time mortality surveillance system that identifies increases in deaths associated to summer heat. This enables the activation of rapid health care response plans and the detection of summer health emergencies. • **HEAT LAB website** - The special website of the Ministry of Health and CCM called HEAT LAB, created in 2004, allows a general view of practical local experiences in order to facilitate the exchange of knowledge between stakeholders. • **Information and communication "For a safe summer"** - A number of initiatives for providing the citizens with information and recommendations exist, such as the National Call Centre Service number "fifteen hundred", booklets for advice website and special TV programmes.
Water resources	The projected increased drought frequency and water scarcity are high priorities on the policy agenda and are driving the development of suitable responses in combination with the other components of water regulation at the EU level.
Hydro-geological risk	Legge Sarno (L. 267/1998) – is the main legal mechanism involving the implementation of hydro-geological protection. It requires the authorities responsible for hydrological basins management to detect risk areas, set prevention plans and establish regulations to avoid additional risk due to anthropogenic factors. It is also the legal basis for identification and funding of urgent preventive measures.

References

1. Ministry for the Environment, Land and Sea. Fifth National Communication under the UN Framework Convention on Climate Change Italy. November 2009.

2.9.1 Autonomous Province of Trento

Table 2.9.1: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in Trento Province.

SECTORS	CCM actions
Transport	– At 2007 in Autonomous Province of Trento the vehicle freight transport was the 73% of the total (Italy 87,6% and EU 76,2%), the target for 2020 is to reduce the percentage to 70-65%. – At 2010 in Autonomous Province of Trento the number of cars per 10.000 inhabitants was 5.701 (in Italy 6.090, EU 4730 for 2.009), the target by 2020 is 5.000-5.250; the percentage of electric cars was 1,6% (in Italy 1,31%) an the target for our Province by 2020 is 5-10%: • Improvement and increase of rail transport with the realisation of the second track of the Valsugana Railway; • Extension of the cycling lanes and development of the bike sharing; • Development of the car sharing; • Purchasing new buses and natural gas vehicles; • Local incentives for low environmental impact vehicles; • Extension of the natural gas network.
Air quality	The GHG reduction target for Autonomous Province of Trento is fixed in 15-20% by 2020.
Energy	**From Environmental Energy Plan 2013-2020, just now implemented** – **Energy Efficiency measures: energy intensity (units of energy for unit GDP) at 2009 for Autonomous Province of Trento was 130,6, for Italy 140,1 and EU 148,8:** • DIRECTIVE 2012/27/EU: from 2014 our Province will renovate each year the 3% of the total area of the public buildings; • Public incentives for the energy requalification of entire buildings or urban area; • Introduction of more restrictive standards for energy consumption for new buildings: energy class B+ from 2015 and energy class A from 2019; • Anticipation at 2015 (instead of 2019) of the commitment for public administrations to building near zero-energy buildings; • Introduction of the smart controls for public buildings. – **Renewable energy sources: Autonomous Province of Trento aims to get 35,5% of its energy from renewable sources by 2020, at 2009 it was the 30,2% of the total:** • National incentives for mini-hydropower systems and for revamping of old hydropower plants; • Local incentives for the installation of solar panels in public buildings; • Local incentives for the use of PV with accumulator energy systems; • Local incentives for biomass district heating systems and for replacing the old and small ones; • Improvement of residual biomasses in agriculture.
Forest and Agriculture	**Forest management Plans and Land Use Plans** – The amount of carbon sequestration and storage by the forest in our Province is evaluated, in comparison with the anthropic emissions, in 50% (The national mean is 13%).
Waste management	**Waste management Plans** – The Urban solid production per equivalent inhabitants was 452 kg in our province (550 kg in Italy and 567 kg in EU) at 2010; – The percentage of separate waste collection was 66,3% at 2010 (44% in Italy

	and 40% in EU), our target for 2020 is 70-75%.
Spatial Planning	The Provincial Planning Plan defines, as by law enacted, the effective application of the energy efficient measures for the urban areas and for the buildings, considered in the Environmental Energy Plan 2013-2020.
Socio-economic	– **Brands to environmental sustainability issued by the Autonomous Province of Trento:** • "Ecoristorazione": is a provincial brand for the restaurants that make actions to reduce their environmental impact through the reduction of waste and water and energy consumption, as well as increase public awareness of the customers; • "Ecofesta": the brand is assigned to the public events that practice environmental sustainability actions; • "Ecoacquisti": it's the 3rd provincial brand for the large-scale distribution (super market) that make actions to reduce waste, and to increase the waste separate collection. – **Green Public Procurement project** (GPP): since 2011 the purchases of Autonomous Province of Trento take on account of the environmental impacts of products and services bought. In particular, the provincial administration structures must buy "green" products and "green" services with ecological features, for 30% upon the annual expenditure. – **The EMAS environmental certification**: is the Eco-Management and Audit Scheme and is a voluntary initiative designed to improve the environmental performance of organisations. In the Autonomous Province of Trento we have more than 100 public authorities that have this important environmental certificaton. It means that these organisations have a quality label for voluntary environmental management, internal efficiency, environmental communication and transparency. – **ECOLABEL** is a European environmental certification: it's a voluntary instrument that aims to promote the products and services that during the life cycle have a lower environmental impact than those of the same type on the market. In the Autonomous Province of Trento we have a lot of hotels and b&b that have the Ecolabel. – **To support business and research** the Autonomous Province of Trento created "TRENTINO SVILUPPO" which is the agency to promote the sustainable development of Trentino region, through actions and services to support the growth of private company and their ability to innovate even in the environmental field.
Community Involvement	The "Pact for the sustainable development of Autonomous Province of Trento 2020 and beyond" (PA.S.SO.) and the Environmental Energy Plan 2013-2020 were approved after a period of participation and dialogue with citizens and the major institutions in trentino region that contributed to the final draft.

Table 2.9.2: Main Climate Change Adaptation(CCA) actions in the principal thematic areas Trento Province.

Thematic areas	CCA actions
Water management	Water management is regulated by the Public Water Use Effeciency Master Plan (PGUAP, 2006). This plan includes the conservation and sustainable use of water and the management of hydrogeological risks; however the plan needs to be updated in order with the climate change impacts. In the study "*Future scenarios and consequences of climate change in Trentino region* (2008)" the critical issues in water management were analyzed especially referring to fresh water use, civil and agricultural use, and hydrogeological risks,

	recommending actions to be taken in short, medium and long term period.
Hydrogeology	The Public Water Use Effeciency Master Plan (PGUAP, 2006) makes the mapping of hydrological risks, locating and delineating the areas where there would be potential risks in terms of flooding, wash-out, erosion, mudslides, avalanches and so on. However it's necessary a revision of the plan concerning the impacts of climate change. The Law about the government of the activities of civil protection in the Autonomous Province of Trento (2011) settles an integrated "system" for the risk management that involves forecasting tools (hazard maps, weather monitoring and early warning system), prevention, protection and finally emergency management plans with appropriate local Civil Protection plans. All the components of the "system" of Civil Protection need to be updated on the basis of expected climate change impacts due to possible changes of extreme events frequency.
Agriculture	The Autonomous Province of Trento promotes and finances the research activities of the E. Mach Foundation on agriculture and the development of the agro-food and forestry sectors, with particular reference to the environment and the soil protection of trentino region. Among these activities are improved studies concerning impact effects due to climate change.
Energy	In the study "Future scenarios and consequences of climate change in Trentino region (2008)" the critical issues in energy sector were analyzed with particular reference to the previous provincial Environmental Energy Plan. The Province planned essentially to achieve mitigation objectives through energy efficiency actions, renewable energy and forestry resources. Further studies are necessary to introduce adaptation actions.
Ecosystems and Biodiversity	In the study "Future scenarios and consequences of climate change in Trentino region (2008)" the critical issues in ecosystems, biodiversity, forestry, water and air quality were analyzed.
Human health	Local Plans of Civil Protection were defined depending on the hydrogeological risk mapping and on warning system for extreme weather events. In particular the Local Plans discriminate the potential risks in terms of flooding, avalanche, and geological hazard. These plans needs to be updated on the basis of expected climate change impacts due to possible change of extreme events frequency while it's necessary to implement new Plans for heat weave risk and water scarcity.
Tourism	In the study "Future scenarios and consequences of climate change in Trentino region (2008)" the critical issues in tourism sector were analyzed considering both the risks and the opportunities with the changes in demand and supply, especially in summer and winter. However the expected climate scenarios and their associated impacts need to be defined and updated with greater accuracy for the short (2020-2030) and long term (2040-2050). In 2011 the Provincial Government adopted the "Guidelines for the provincial tourism policy" in which climate change is taken into consideration in terms of impact and opportunity on the differentiation of the tourist offer.
Information and communication	In the study "Future scenarios and consequences of climate change in Trentino region (2008)" the critical issues in information and communication sectors were considered: the public perception of climate change, the process and the

	communication actors, with some suggestions for information campaigns and policy proposals. Many activities of education, communication and information on environmental issues and on climate change for citizens and schools are carried out in coordination by different structures: the Provincial Agency for Environmental Protection, the network of environmental educators for sustainable development, the Science Museum of Trento, the Adamello Brenta Natural Park. Other activities undertook in such sense are the organization of periodic events of information with public lectures, scientific conferences, workshops and theater performances, to discuss the issues of climate change and their implications such as: *"Trentino Clima 2008*" (Trento 20-24 february 2008); *"Climatica…mente cambiando – Trentino Clima 2011"* (Trento, 5-10 september 2011)**.** The Autonomous Trento Province adopted a new web site, www.climatrentino.it, entirely dedicated to the issues of climate and climate change with data and reports at regional, national and international level. On this web site there will be updated the actions undertaken to address and manage climate change.

2.9.2 Basilicata Region

Table 2.9.3: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in Basilicata region.

SECTORS	**CCM actions**
Energy	- Reducing fuel consumption and the energy bills; - Increasing electricity production from renewable sources; - Increasing thermal energy production from renewable sources; - Creating an energy district in the Agri Valley.

Table 2.9.4: Main Climate Change Adaptation(CCA) actions in the principal thematic areas in Basilicata region.

Thematic areas	**CCA actions**
Forestry	**Guidelines of the Forestry sector for the decade 2013 to 2022":** development strategy of Basilicata region in the field of forestry, protection of the territory and biodiversity.
Human health	- Daily online publication of UV index during summertime.

2.9.3 Puglia Region

Table 2.9.5: Main Climate Change Mitigation (CCM) and Climate Change Adaptation (CCA) actions in the principal thematic sectors in Puglia region.

SECTORS	CCM/CCA actions
Air quality	-Regional Air Quality Plan, 2008;
Agriculture	-Rural Development Plan 2007-2013, approved in 2010;
Biodiversity and natural ecosystems	-Regional Conservation Plan for the biodiversity, 2009;
Costal zone	-Regional Coastal Plan, 2011
Energy	-Sustainable Energy Action Plan, approved in 2013;
Forest	-Forest Regional Management Plan: guidelines for the forest management programming 2005-2007
Human health	-Regional Plan of Surveillance and Response to the health care effects of anomalous heat waves, 2007; -Regional Plan for the Health Care.
Hydro-geological risk	-Hydrogeological Setting Plans, 2005; -River Basin District Management Plan for the Southern Appennino District, adopted in 2009; -Flood Risk Management Plan for the Southern Appennino former District, in progress;
Socio-economic	-Regional Law 23/2006: Regional rules to promote the ecological public purchases and to introduce the environmental aspects in the procedures to purchase goods and services of the public administrations;
Transport	-Regional Transport Plan, approved in 2002, and Implementation Plan 2009-2013;
Water resources	-Water Conservation Plan, 2009;
Waste	-Waste Management Plan, approved in 2001 and adjourned in 2009.

2.10 Romania

The following table (Table 2.10.1.) resumes the main climate change mitigation and adaptation actions undertaken in Romania in the principal thematic areas.

Table 2.10.1: Main Climate Change Mitigation (CCM) and Climate Change Adaptation (CCA) actions in the principal thematic areas in Romania.

SECTORS/AREAS	CCM/CCA actions
Transport	**Strategy for a sustainable transport for the periods 2007-2013 and 2020, 2030** - development and modernization of the transport network, especially the ones with European and National interests - increase safety conditions and the quality of services - compatibility with the surrounding environment **General Master Plan for Transport** - increase the efficiency of the transport system
Air quality	**Emission inventory of green house gases - Romanian NIR 1989-2008. National Inventory Report, submission 2010** **Emission inventory of green house gases - CRF Tables 2010. Common Reporting Format, submission 2010** **National Transition Plan (NTP) for combustion installations within the provisions of Chapter III of the 2010/75/UE Directive, concerning industrial emissions** - ensuring the conformation of installations foreseen by the NTP, as of 1st of July 2020, by implementing the necessary measures in period 1st of January 2016 – 30th June 2020 - ensuring a steady linear decrease of national emissions between 2016-2020 for SO_2,NO_x, residual dust resulting from burning installations - ensuring a mechanism to monitor the state of fulfilled objectives and the proposed measures as well as for reporting Governmental Order 64/ 2011 regarding geological carbon capture and storage according to the EU Directives. **Program for renewal of the national car park, financed by the National Fond for the Environment 2012** **Program for reduction of the impact on the atmosphere, financed by the National Fond for the Environment 2012**
Energy	**Romania's Energy Strategy for the period 2007-2020, updated for 2011-2020** - increase energy efficiency; - promotion of renewable energy sources - promotion of CHP plants, with special interest on those with high efficiency - support for the activities of researcher's in this field as well as dissemination of their results - reduce the negative impact of the energy sector on the environment - rational and efficient use of primary energy resources **PNAEE II. National Action Plan in the field of Energy Efficiency for the period 2011-2020** - continue the adoption, by law, of high energy efficiency standards when installing new capacities (having as an effect the reduction of energy consumption to 9,5 million toe)[toe=tons equivalent petrol] - initiation, development and implementation of an organizational program and

	institutional measures to increase energy efficiency (having the goal of reducing the current energy consumption from 15.9 million toe) **National Action Plan for Renewable Energy Sources (PNAER 2010)** - the share of renewable energy in the gross final energy 2005 (S2005) - 17,8 % - the objective of the renewable energy share in the gross final energy 2020 (S2020) - 24,00% - adjusted total energy consumption expected for 2020 - 30278 (ktep) - the expected consumption of renewable energy according to the objective for 2020 - 7267 (ktep) **The Strategy of CENTRU Region on the use of reusable energy resources, elaborated by Regional Development Agency CENTRU** **Priority axis 1**- Efficient energy management through well based local policies and through the modernization of the local and regional administration structure **Priority axis 2** - Capitalization of the natural potential of CENTRU region in order to produce energy from renewable sources **Priority axis 3** - Stimulation of alternative energy use of local entrepreneurs **Priority axis 4** - Increase the capitalization of the researchers results and develop innovation potential in the field of renewable energy **Priority axis 5** - Improve the qualification of human resources and develop a managerial atitude of people implicated in renewable energy **Government Decision - 935/2011** regarding the promotion of utilization of bio-fuels and bio-liquids **Law - 220/2008 r**egarding establishment of promotion system for energy production from renewable energy sources **Government Order - 22/2008** regarding energy efficiency and promotion of renewable energy sources for the final consumers **Government Decision - 443/2004** regarding the promotion of electrical energy from renewable energy -sources **Government Decision - 1892/2004** regarding establishment of promotion system for energy production from renewable energy sources **Government Decision - 750/2008** regarding the approval of the help aid scheme of the regional state on capitalization of renewable energy resources **Green House Programme** for individuals and legal persons, financed by the National Environment Fund – regarding the installation of heating systems using renewable energy
Forest	**National Forest Administration Strategy on medium term 2011-2016** - scientific identification and formalization of ecological data bases of sustainable forest management - natural risk identification and quantification of their impact on the ecosystems of the forests - implementation and perfection of the Forest Monitoring System at the level of EU - ensuring sustainable fishing and hunting management - ensuring sustainable protected area management (natural preserves, Natura 2000 sites **National Forest management Plan for 10 years including:** - description of the administered surface

	- forest management master plan - registering methods and evidence of the work that has been done on the forest fund **Annual plan for protection against forest fires**, elaborated at the level of forest districts **Protection plan for the forest fund and for the control of wood traffic,** elaborated at the level of forest districts **Program for improvement of the environments quality by afforestation of degraded agricultural lands, ecological reconstruction and sustainable forest management,** financed by the National Environment Fund
Waste management	**National Waste Management Strategy 2014 - 2020** - development of such measures that encourage the prevention of waste generation and reutilization, promoting a sustainable resources utilization - increase the rate of recycling and improvement of the recycled materials quality in close collaboration with the financial sector and with the entrepreneurships that capitalize waste - promotion of capitalization of waste from packages - reduce the produced impact of the generated carbon - encourage the production of energy from those types of waste that can't be recycled **National Waste Management Plan:** provides the basic principles of the Romanian environmental policy, established according with the European and international provisions, assuring the protection and the preservation of nature, the biodiversity and the sustainable use of its components. **Regional Waste Management Plans and County level Waste Management Plans,** elaborated in respect of the National Waste Management Strategy **Project „ Integrated Waste Management System for Covasna County"** financed by Environmental Operational Programme (Cohesion Fund), unrolled in the period 2010 -2015
Spatial Planning	**National Infrastructure Development Program** - 10.000 km of county roads with local interests - modernization of the Romanians villages - sewerage and sewage water treatment - water supply infrastructure - multiannual programmes for the environment and water management - water management infrastructure, hydro-technical work for protection against floods, increase grade the safety of dams and rehabilitation and protection of coastal areas **Law - 350/2001** regarding spatial planning and Governmental Decision 525/1995 for approval of the general urbanism regulations **Program for realization of bicycle roads financed by the National Environment Fund**
Agriculture	**Research-Development and Innovation Strategy in Agriculture and Rural Development for 2014 –2020:** -development of biotechnologies in the animal, vegetal, nutrition field and unconventional energies obtained from agricultural resources; -rural development research and promotion for ecologic and sustainable agricultural system; -research to prevent and control desertification and against the impact of regional and global climatic changes; -research on preservation and sustainable administration of biodiversity;

	-research on systems of the sustainable exploitation of agricultural and zootechnical resources considering the global climatic modifications; -research on fuels generation and utilization and unconventional power resources in agriculture and the sustainable development of the rural environment; **The Code of Action for Reducing the Impact of Climate Change in Agriculture** **National Strategy for Rural Development 2007-2013** **Axis 2:** Improving the environment and the countryside in order to promote a sustainable management of agricultural lands and forests **Priority 1:** Biodiversity conservation **Priority 2:** Protection and sustainable management of natural resources **Priority 3:** Mitigation of green house gas emissions and combating climate changes **Measures:** Agro – environment payments; Natura 2000 payments for agricultural land; Afforestation of agricultural lands; Afforestation of non-agricultural lands; Natura 2000 payments for forest; development and increased use of renewable energy sources, including biofuels from agriculture and production of biomass from forestry as well as increasing the level of conformity with EU standards for zootechnical farms (mitigation of ammonia emissions)
Sustainable development	**Romanian National Strategy for a Sustainable Development Orison 2013-2020-2030** **- Orison 2013**: incorporation of the practices and principles on sustainable development into the Romanian programs and policies **- Orison 2020:** reaching the average EU indicators on sustainable development **- Orison 2030:** significantly closing in on the actual years EU average indicators on sustainable development **CENTRU Region Development Strategy for the period 2014-2020** **Priority axis 1** - urban development, the development of regional technical and social infrastructure **Priority axis 2** - increase the economic competitivness, stimulating innovation **Priority axis 3** - protection of environment, increase the efficiency of energy consumption, stimulation of alternative energy sources **Priority axis 4** – development of rural areas, supporting agriculture and forestry **Priority axis 5** - development of tourism **Priority axis 6** - development of human resources, increase social inclusion **Environmental Action Plan for Covasna County** - Improving water quality - Reducing soil and groundwater pollution - Waste management improvement - Improving water resources management - Management of urban areas - Tourism and recreation - Nature protection and conservation of biodiversity - Ecological education - Mitigation of atmospheric pollution - Managing threats caused by major accidents or by natural or anthropogenic - Health of the population - Strengthening local authorities capacity to manage climate change
Industry	**Sectorial Operational Programme "Increase the economic competitivness", Axis IV,** financed from Structural Funds**:** - increase the energetic efficiency and the security of energy supply in the context of fighting against climate change - support the investment of installations and equipment of the industry, in order to make economic savings on energy to improve the efficiency

	- linking the national electric energy and natural gas transport networks with the European networks
Tourism	**Master Plan for National Tourism Development 2007 - 2026**
Water resources	**1. River Basin Management Plans for 2009 - 2015 which include Plan for the Watershed (Quantitative component of Water Management) and Water Management Plan (Qualitative component of Water Management).** In-depth assessment topics are: - Governance (administrative arrangements, public participation, international cooperation) - Characterization of the river basin district - Monitoring of surface waters and groundwater - Assessment of groundwater status - Environmental objectives and exemptions - Programme of measures - Strategy to deal with water scarcity and droughts - Adaptation to climate change in RBMP **2. Regulations approved by Ministerial Orders (M.J.O.nr. 638/420/ 31.05.2005) - Procedures for Management of Emergency Situations due to hydrological drought.** It includes obligation to elaborate an Operational Report about: - Hydrological situation - Area of restriction - Measures for supplements of flow rates of the rivers - Program of restrictions in drinking water consumption. **3. Regulation regarding emergency situations management generated by floods, dangerous meteorological phenomena, accidents at hydro-technical constructions, accidental running water pollution and sea pollution, approved by Order 192/1422/ 2012** **4. At the level of each basin there are elaborated Water Restriction Plans during deficit periods of water. The main aspects from Water Restriction Plans are:** − The informational and decision-making system and alarm system for population and for social – economic entities; − The list of water users, necessary flow rates and minimum flow rates; − The control sections along the rivers and characteristics for special situations (Normal Stage, Attention-Alarm Stage, Restriction Stage). **5. Environmental Operational Programme, Priority Axis 5, Sector protection against floods and reduction of coastal erosion** **6. Program financed from National Environment Fund: "Works for prevention, mitigation and combating the effects of dangerous meteorological phenomena at public waterworks"**
Biodiversity	**National Strategy and Action Plan for Biodiversity Conservation 2010 – 2020** **Action 1:** Stopping the declining biological diversity represented by the genetic resources, species, eco-systems, landscape and restoration of degraded systems till 2020 **Action2:** biodiversity conservation related policy integration into sectorial policies till 2020 **Action 3:** Knowledge, practice, innovating method, pure technologies promotion as measures for supporting biodiversity conservation as part of sustainable development, till 2020. **Action 4:** Improvement of communication and education in the field of biodiversity, till 2020

	Management Plans for Romanian Natura 2000 sites - **Management Plan** of Natura 2000 site - Ciomad-Balvanyos - **Management Plan** of Natura 2000 site - Herculian
Education	**Program with the aim of education of the public and raising public awareness on the topic of environment protection** - financed by the National Environment Fund
Insurances	**Law - 260/2008 regarding mandatory house insurance for earthquakes, landslides and floods** **Law no. 381/2002 on the provision of compensation in case of natural disasters in agriculture**
Water management	**National Strategy for the Management of Flood Risks: Prevention, Protection and Mitigation of the Flood Effects, for the period 2010-2035,** approved through Government Decision 846/2010 • it's according to the European Framework Directive regarding the Water; • avoid the alterations and anthropical influences in the geomorphology of hydrographical basins; • prevent the pollution of running waters and of underwater after floods, and the effects on the ecological quality of running waters; • protection and improving of the quality of crop lands, and where is possible, the encouragement to change the agricultural techniques in order to prevent or mitigate the floods and their effects because of intensive agricultural works; • protection and conservation of historical assets, of the monuments, of protected areas and ecosystems; • protection and improvement of the environment; • prevention and mitigation of the impact of climatic changes over the floods phenomena
Costal and marine systems	**Master Plan regarding the Protection and Rehabilitation of Romanian Costal Area** **The Strategy for Danube Delta, for the period 2011-2015**
Human health	**The National Strategy to Prevent Emergency Situations,** approved by Government Decision 762/2008 **Protection Plans against floods, dangerous meteorological phenomena, accidents at hydro-technical constructions and accidental running water pollutions, elaborated by the County Committee for Emergency Situations -** at the level of each County, providing: - short description of the county - synoptic of hydro-meteorological and managing information system of the county - tables with the technical protection elements of the local committees, the human forces at county level, the protection materials stocks - the drawings with the flood bands for the running waters, with a limit of 1% and for the maximum historical level - profiles of the hydro-technical constructions - the prevention and action plan for accidental pollutions - water restriction plans during deficit periods of water Joint Order of the Minister of Interior and Administrative Reform, Minister of Public Health, Minister of Labour, Family and Equal Opportunities and Minister of Environment and Sustainable Development on the approval of the Plan of measures to achieve cooperation actions between the prefects and mayors, in their capacity of presidents of the county committees for emergency situations, respectively of the local committees for emergency situations, and the authorities of public health, for the attenuation of the high temperatures effects on the population.

2.11 Serbia

The main climate change mitigation and adaptation sectorial actions adopted in Serbia are reported in the tables below (Table 2.11.1 and Table 2.11.2).

Table 2.11.1: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in Serbia.

SECTORS	CCM actions
Energy	From 1990 until now, the emissions from the energy sector represent the largest share in total GHG emissions on the national level. Simultaneously, the „Business as usual" scenario indicates further increases in the level of emissions from this sector. This is mainly due to: the increase in fuel consumption with a somewhat decreased participation of coal and increased participation of oil and natural gas, enlargement of the power production capacities using lignite and hydropower, and alternatively on natural gas, and the expected introduction of systems for desulphurization in thermal plants using lignite. The analyses showed that the greatest potentials for a reduction of GHG emissions from the energy sector until 2015 are: -Rational use of energy, *i.e.*, increase in energy efficiency -Increased use of renewable energy sources.
Industrial Processes	The GHG emissions from this sector in 1990 had a relatively small share (5.28 %) of the total GHG emissions. The level of GHG emissions practically remained the same during the 1990s and only after 2003 has a tendency of steady moderate growth been visible. The GHG emissions from this sector mainly result from prime processing/refining, energy intensive, industries. Thus, in the period up to 2015, there are minimal possibilities for reducing the growth rate of GHG emissions from this sector.
Agriculture	The potential for GHG emissions mitigation until 2015 may be primarily found in the use of biogas for heat generation or cogeneration of heat and power for local use, on large cattle and pig farms. The implementation of these activities depends to a large extent on foreign financial and technical/technological support.
Forestry	The draft of the master plan for forests (from 2008) emphasized the significance and possibilities of the forest complex in mitigating climate change and adaptation to the changed climatic conditions. The measures were defined for supporting the realization of a 10–year goal on afforestation on soils (primarily category V and VI) that are not intensively used for agricultural production anticipate certain quantitative measures for increasing the forest cover, as well as optimal use of the production potential of the habitats. The implementation of these measures would significantly increase the potential for CO2 capture from the atmosphere.
Waste management	The contribution of GHG emissions from the waste sector to the total emissions in 1990 was practically insignificant (2.38 %). According to the "Business as usual" scenario, the GHG emissions will rise in the coming years, until 2015. Taking into account that the main GHG emissions are a result of poorly organized landfills, which is the only present practice for organized waste disposal, the greatest potential for reduction of emissions are noted in this area. The realization of the potentials for the mitigation of GHG emissions may be accomplished by establishing regional landfills, along with utilization of the fumes, as well as by increasing the degree of recycling and the introduction of co–combustion of selected waste in power and/or heat production facilities. A large portion of these activities, related primarily to recycling and co–combustion, depend on foreign financial and technical support.

Table 2.11.2: Main Climate Change Adaptation(CCA) actions in the principal thematic areas in Serbia.

Thematic areas	CCA actions- possible short term adaptation measures
Hydrology and Water resources	**Reducing risks** – Assess vulnerability to climate change – Develop vulnerability map and map of flood risk – Determine need for widening and deepening riverbeds and their additional cleaning – Estimate ability of dams and other constructions, as well as city channel systems for flood control – Improve flood resistance systems – Estimate capability of irrigation and drainage systems – Improve irrigation and drainage systems – Establish vulnerability for important rivers **Policy** – Adopt flood control, including financial needs for its implementation – Adopt a special plan for flood managing – Improve inter–sector planning – Improve planning of integral water resource management – Improve regulations and directives – Include climate change impacts in the sector strategy and action plan – Adopt an adaptation plan within the sector **Monitoring and research** – Improve the climate monitoring system – Improve hydrological observation network – Improve early warning systems for climate and hydrological extreme events – Establish a data base on extreme meteorological and hydrological events and disasters – Improve research in area of numerical modelling of hydrological processes (precipitation/snow–runoff for different time intervals) – Intensify multidisciplinary research on climate change impacts – Intensify research on climate change impacts on water resources **Capacity building and public awareness** – Strengthen capacity of responsible institutions – Strengthen local community capacity – Strengthen research capacity –Raise the public awareness level and improve information on climate change impacts and possible adaptation measures, in general
Forestry	**Reducing risks** - Detailed forest mapping - Detailed vulnerability assessment to climate change - Improve forest fire protection systems - Increase protection of forests against vermin - and plant diseases - Intensive forestation **Policy** - Revise regulations and directives in forest management - Include climate change impact problems into forest sector strategy and Action Plan - Adopt an adaptation plan within the sector, including its financial needs **Monitoring and research** -Improve integral monitoring of the effects of air, water and soil pollution

	and climate change on forest ecosystems - Intensify multidisciplinary research of climate change impacts on forests - Develop and apply strategy evaluation methods and adaptation measures, including measures for strengthening the resilience of forests to climate change **Capacity building and public awareness** Capacity building in institutions responsible for forest management - Educate rangers - Strengthen the role of local communities in sustainable forest management - Raise awareness of the scientific community and forest owners - Raise the public awareness level and improve information on climate change impacts and possible adaptation measures
Agriculture	**Reducing risks** – Detailed assessment of vulnerability to climate changes – Improve irrigation and drainage – Invest in new irrigation systems and related infrastructure – Adjust harvest dates and the field work calendar to the new climate conditions – Reduce the share of summer crops and increase the share of winter crops in the harvest structure – Change mulching practices – Improve soil structure with adequate treatment in order to increase its water storage capacity – Introduce measures to protect land from erosion – Change practices concerning the use of fertilisers and chemicals **Policy** – Include climate change impacts in sector strategies and Action Plans – Create an adaptation plan within the sector – Improve inter–sector planning and integral management of water resources in catchment areas of importance to agriculture – Introduce new insurance mechanism **Monitoring and research** – Improve climate monitoring systems – Establish a data base containing information on extreme weather occurrences and disasters connected with climate change, including information on damage in the agriculture and other sectors – Improve climate monitoring and early warning systems of droughts and other extreme climate episodes of importance to agriculture – Research and development of new sorts and hybrids – Develop and apply methods and models for integral assessment of climate change impacts on agriculture and economic parameters of adaptation options – Develop and apply agro–climate indicators in agro–climate and agroecological zoning **Capacity building and public awareness** – Improve the advisory service related to crop selection – Strengthen institutional capacity building – Improve the way in which experts and the general public are informed about climate change impacts and possible ways of adaptation
Biodiversity and Natural Terrestrial Ecosystems	**Reducing risks** – Develop a biodiversity indicator system – Detailed vulnerability assessment to climate change – Increase protected areas

	– Ensure corridors for the migration of species – Decrease pressure of other anthropogenic factors to biodiversity **Policy** – Include climate change in sector strategy and planning – Adopt an adaptation plan within the sector – Adopt protection plans for especially endangered species and ecosystems – Adopt a plan for increasing protected areas **Monitoring and research** – Organize monitoring of relevant parameters within protected areas – Establish systematized and continuous monitoring – Establish a data base – Commence monitoring of endangered species and ecosystems **Capacity building and public awareness** – Strengthen scientific and research capacity – Strengthen private and public sector capacity – Strengthen capacity of personnel in protected natural resources – Improve the informing of professionals and the general public on climate change impacts and possible adaptation options
Human Health	**Reducing risks** – Detailed vulnerability assessment to climate change – Ensure the availability of medications, vaccines equipment and diagnostic tests – Improve the heat wave early warning system **Policy** – Include climate change in sector strategy and Action Plan – Include climate change in spatial and urban planning to reduce risks of heat islands, air pollution and heat waves – Adopt a protection plan for especially vulnerable citizens – Adopt adaptation plan within the sector **Monitoring and research** – Improve systems for climate monitoring and early warning of climate extreme events – Establish monitoring of vectors, transmitted and infective diseases and establish a national network – Improve bio–monitoring systems – Establish a climate extreme events and disasters data base –Develop methods and models for integral assessment of climate change affects and economic parameters of adaptation options – Improve research of climate change impacts on health **Capacity building and public awareness** – Strengthen professional capacity – Strengthen capacity of health protection institutions – Strengthen research capacity – Strengthen capacity of institutions responsible for prevention and control programmes

2.12 The Former Yugoslav Republic of Macedonia

The mitigation analyses carried out in the Second National Communication on Climate Change of the Former Yugoslav Republic of Macedonia (FYRM) to UNFCCC takes into account two development scenarios for the period 2008-2025. In particular, a baseline (business-as-usual) scenario and a mitigation scenario have been defined, including appropriate mitigation measures/practices/ projects/interventions. The measures to cope with climate change as proposed in the National Communication were listed in Table 2.12.1.
Whereas, the most important adaptation measures undertaken at national level for the main sectors are specified in the Table 2.12.2.

Table 2.12.1: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in the FYRM.

SECTORS	**CCM actions**
Electric power	progressively increasing utilization of renewable energy sources (small hydropower, wind, and biomass) for electricity generation
Industrial energy transformations and heating	improving energy efficiency in the industrial sector and households
Transport	promotion of sustainable transport
Waste	implementation of landfill gas collection and flaring technology
Agriculture	implementation of systems for biogas collection and combustion at pig farms, etc.

Table 2.11.2: Main Climate Change Adaptation(CCA) actions in the principal thematic areas in the FYRM.

Thematic areas	**CCA actions- possible short term adaptation measures**
Agriculture	The adaptation measures involve introducing water-saving irrigation measures, soil and water conservation, genetic and plant breeding measures, new agricultural practices, etc. The most important recommended adaptation measures are: - application of organic fertilizers (manure, sideration), cultivation of legumes for enrichment of the soil, etc. - afforestation of the sloping terrain, implementation in practice of new irrigation techniques which enable efficient use of water, etc. - control of the salt-rich groundwater level by reducing the quantity of surface and ground water, drainage of micro-depressions in the valleys, etc.
Biodiversity	- preservation of the last remaining riparian communities (Periploca, Salicetum albaefragilis, Juglando-Platanetum, etc.) in the Vardar valley; - elaboration of a distribution map of the major ecosystem types, map of biomes, and mapping of habitats and vegetation types; - development of sufficient network of meteorological stations; - strengthening the capacities of the staff.
Forestry	- adjust forest management to climate change, through introduction of forest species and planning measures, - improvement of the species composition of forests (natural and afforested) with endemic tree species, resistant to climate change; - strengthen preventive measures that improve and minimize the risks of fires; - increase monitoring and observation pilots in the most vulnerable and

	economically valued forests.
Health	- control and monitoring of the entire food chain; - implementation of a Weather Early Warning System to inform the population in time, particularly vulnerable groups, about extreme weather events; - education, awareness raising, and creation of legal frameworks, institutions, and an environment that enables people to take well-informed decisions.
Water resources	- irrigation and water supply of population, - floods and droughts, - erosion and sedimentation, - water resources' management, - water quality and monitoring.

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2.13 Ukraine

The following tables 2.13.1 and 2.13.2 identify the main actions and practices undertaken in Ukraine to cope with climate change mitigation and adaptation.

Table 2.13.1: Main Climate Change Mitigation (CCM) actions in the principal thematic areas in Ukraine.

SECTORS	CCM actions
Transport	Improving the structure of the vehicle fleet and optimize its use, improved technical specifications engine vehicles, improving the quality of roads, the use of advanced materials to reduce the weight of the rolling stock of the railways, improving traffic flow.
Air quality	The annual inventory of anthropogenic emissions and greenhouse gases absorption according to the permits for greenhouse gases emissions
Energy	Optimizing the structure of power generation capacity, power grids and improving electrical equipment, improve the efficiency of gas-pumping units, the implementation of advanced technology for coal mining. Energy strategy 2030 of Ukraine considers the renewable energy sources as important factor enhancing energy security and reducing human impact on the environment.
Forest	Strengthening works to protect forests from pests and diseases; breeding resistant wood species that would ensure high performance with projected climate change. Implementation of the Forest Code of Ukraine.

Table 2.13.2: Main Climate Change Adaptation(CCA) actions in the principal thematic areas in Ukraine.

Thematic areas	CCA actions
Hydrogeology	To develop flood protection measures under the increasing the number and intensity of extreme meteorological phenomena
Water management	To develop measures to safe operation of hydraulic structures under the increasing the number and intensity of extreme meteorological phenomena
Agriculture	To keep in the crop breeding regarding changing climatic conditions. To reconsider the distribution of specialized areas for grain crops due to changes in climatic conditions. To introduce the optimal timing of major technological measures in crop production due to changes in climatic conditions. To keep in the livestock and poultry breeding on enterprises of agroindustrial complex in view of climate change. To keep in the fish breeding regarding changing climatic conditions. To provide incentives for wide introduction of insurance risks in agriculture
Land use	To prepare and to adopt measures preventing desertification and land degradation, as well as favoring restoration and improvement of soil fertility. To develop measures improving the status and quality of forests, enhancing their environmental, economic and social functions in a changing climate
Human health	To define measures for strengthening prevention activities in extreme meteorological phenomena, particularly during periods of extreme heat. To provide technical re-equipment of medical institutions taking into

	account varying climatic conditions. To develop methods for preventing infectious, cardiovascular, respiratory ailments arising from the climate change.
Energy and Transport	To develop measures for strengthening the infrastructure of transmission lines and distribution of energy due to the increased number and intensity of extreme meteorological phenomena. To develop measures providing a control for unified energy system of Ukraine due to the increased likelihood of accidents at power generating plants due to increased frequency and intensity of extreme hydrometeorological events. To develop measures ensuring the safety of passenger and cargo air, road, rail, sea, river, urban electric transport in increasing number and intensity of extreme meteorological phenomena.
Building	To provide the development and implementation of new state building codes, design methodology, construction and reconstruction of civil and industrial, engineering and transport infrastructure taking into account factors related to climate change.

3. EU projects addressing CCM and/or CCA in the ORIENTGATE Countries

In this section, each OrientGate partner lists the EU projects on Climate Change Mitigation and Adaptation themes in which they are or have been involved.

Country/Region	Name and description of project
Austria	EU projects, where the Austrian BMLFUW (PP 13) was/is involved: **CLISP (Climate Change Adaptation by Spatial Planning in the Alpine Space)** CLISP is focusing on the challenges to spatial planning in the face of climate change and shall contribute to climate change adaptation by providing climate-proof spatial planning solutions. The project aims at preventing, reducing and mitigating climate-change related spatial conflicts, vulnerability of spatial development and spatial structures to adverse climate change impacts and consequential damages and costs. As climate change adaptation, including an integrated approach to adaptation and mitigation issues is still a novel field for spatial planning policy and administration – CLISP is to be regarded as a strategic pilot project. **Programme:** European Territorial Cooperation Alpine Space Programme 2007–2013 **Priority:** Priority 3 – Environment and Risk Prevention **Timeframe**: 01/09/2008 – 31/08/2011 **Participating Countries**: 6 (AT, DE, IT, SI, LI, CH) **Lead Partner**: Environment Agency Austria http://www.clisp.eu/content **CC-WaterS (Climate Change and Impacts on Water Supply)** Climate change (CC) affects fresh water resources and may have significant influence on public drinking water supply. Land use activities exert pressure on water resources and will change according to CC. It is crucial for safeguarding future water supply to anticipate these climate and land use changes and to assess their impacts on water resources. Therefore CC-WaterS identifies and evaluates resulting impacts on availability and safety of public drinking water supply for several future decades. Elaborated measures to adapt to those changes build the ground for a Water Supply Management System regarding optimization of water extraction, land use restrictions, and socio-economic consequences under climate change scenarios for water suppliers in SEE. The joint actions to produce this technical system is performed on a transnational level in the Alps, Danube Middle and Lower Plains and coastal areas representing different SEE-characteristic climates and topography. In CC-WaterS, SEE governmental bodies, water suppliers and research institutions work together and implement jointly developed solutions, hence to be applied on a regional or local level in SEE. **Programme:**

South East Europe Transnational Cooperation Programme (SEE) 2007-2013
Priority:
Priority 3 – Protection and Improvement of the Environment
Timeframe:
01/05/2009 – 30/04/2012
Participating Countries:
9 (AT, BG, GR, HR, HU, IT, RO, RS, SI)
Lead Partner:
Vienna Waterworks
http://www.ccwaters.eu/

CCWARE (Improve integrated water management and flood risk prevention
Recent studies are revealing that water resources in South-East Europe are under increasing pressure originating in particular from land use and climate changes. Both processes will have severe impacts on water resources in general and drinking water resources in particular. This development is triggering an increasing vulnerability of water resources.
In order to meet these challenges CC-WARE is focusing on the adaptation to climate change by developing a common transnational strategy for vulnerability reduction leveraging the potentials of ecosystem services, land use change, improved water use efficiency and economic incentives for water management to decrease the vulnerability of water resources. Especially, forests, wetlands and grasslands are important ecosystems, which together with their management emerged as important means for a sustainable future drinking water supply.
Building on the detailed analysis of the water vulnerability regarding quantity as well as quality and the assessment of drinking water availability under changing climate and socio-economic condition in the considerably differing project areas as well as benefitting from the comprehensive dialogue of experts from the fields of land use and water resource management, the partners participating in the CC-WARE project are developing efficient management options tailored to the meet of the specific requirements of the water sector. The envisaged development of national action plans specifying the necessary interventions in time and space will in future facilitate the challenging task of local and regional decision makers.

Programme:
South East Europe Transnational Cooperation Programme (SEE) 2007-2013
Priority:
Priority 3 – Protection and Improvement of the Environment
Timeframe:
14/12/2012 – 30/11/2014
Participating Countries:
10 (AT, BG, GR, HU, IT, RO, SI, BG, HR, SRB)
Lead Partner:
BMLFUW, Forest Department

PermaNET (Permafrost Longterm Monitoring Network)
The overall objective of this project is to give an important contribution to mitigate natural hazards and manage their consequences with specific regard to climate change impacts. With the joint development of a common strategy for dealing with permafrost and related hazards under changing climatic conditions and the creation of an Alpine-wide monitoring network the project aims at contributing to sustainable territorial development and the

	implementation of good governance practices. The spatially distributed data gaps of permafrost should be closed and a consistent permafrost map and database for the entire Alpine Space will be elaborated. Testing new and promising technologies and finding joint solutions for the adaptation of risk management practices, the project will push the Alpine Space to be the leading model region in the field of climate change mitigation and adaptation strategies. Furthermore it aims at supporting the national and international institutions in raising awareness of the public and of policy-makers regarding the effects of climate change. **Programme:** Alpine Space Programme 2007–2013 **Priority:** Priority 3 – Environment and Risk Prevention **Timeframe**: 15/07/2008 – 30/09/2011 **Participating Countries**: 5 (AT, CH, DE, FR, IT) **Lead Partner**: Office for Geology and Building Materials Testing, Autonomous Province of Bolzano http://www.permanet-alpinespace.eu **ClimChAlp (Climate Change, Impacts and Adaptation Strategies in the Alpine Space)** This project aims at the analysis of the consequences of climate change in the Alps and the development of a basis for adaptation strategies. Furthermore the main targets are to raise the awareness of the results of climate change in the Alpine Space and to provide requirements for politicians and public administration how to deal with future challenges and how to arrange a sustainable development in the affected areas. **Programme:** Alpine Space Programme 2000–2006 **Timeframe**: 03/2006 – 03/2008 **Participating Countries**: 7 (AT, FR, DE, IT, CH, SI, LI) **Lead Partner**: Bayerisches Staatsministerium für Umwelt, Gesundheit und Verbraucherschutz **CRUE ERA-NET (Coordination of the Research financed in the European Union on Flood Management; European Research Area Network)** CRUE ERA-Net aims to introduce structure within the area of European Flood Research by improving co-ordination between national programmes. The vision for the CRUE ERA-Net action on flooding is to develop strategic integration of research at the national funding and policy development levels within Europe to provide knowledge and understanding for the sustainable management of flood risks. The CRUE ERA-Net continues to co-operate on joint research initiatives and Partners are exploring opportunities for maintaining and extending collaboration in the future.

	Timeframe: 11/2004-ongoing **Participating Countries**: 12 (AT, BE, FIN, FR, DE, HU, IRL, IT, PL, ES, NL, UK) **Lead Partner**: Department for the Environment, Food and Rural Affairs (Defra), UK Waterbouwkundig Laboratorium (Flanders Hydraulics Research), Belgium http://www.crue-eranet.net/ **NMF (Network Mountain Forest)** The key focus of this project is the protection of mountain forests and promotion of a sustainable development of mountain regions. For this purpose an extensive exchange of experiences is initiated on the level of the transnational regions in the Alpine area, which results in a common transnational strategy with regard to the mountain / protection forest policy and its measures. Therewith the "mountain / protection forest", which makes a significant contribution to the safeguarding of living space in Europe, is to get a higher value in public. The main target is the establishment of a transnational network of regions in order to develop a common strategy for mountain / protective forests. A declaration on harmonization will ensure long-term impacts and will further contribute to improving the conditions of mountain forests and reduce disaster risks. **Programme:** INTERREG IIIC East **Timeframe**: 01/2004-12/2007 **Participating Countries**: 9 (AT, DE, IT, SI, CH, BG, GR, LI, SK) **Lead Partner**: BMLFUW, Forest Department http://www.territorialcooperation.eu/frontpage/show/1328
Croatia	**IEE project, Intense** - energy efficiency in households, **IEE project, Active Access –** supporting sustainable means of transport, **Fp7 Dyn@mo –** sustainable mobility planning and electromobility implementation.
Greece	
Hungary	**Training for Re-"Building" Europe** EACI – IEE, completed in December 2012 The project was to set an integrated framework for large scale training of building professionals. Training programs were taking place in a limited number of EU member States, (HU, CZ, SK, BE, FR, IT, DE, UK, PT, RO, GR) selected according to the existing initiatives analysed and with the aim to be replicated at pan European level. **Low Carbon Strategy SEE (LOCSEE)** SEE Transnational Cooperation Program (2012-2014) The aim of the project is to develop the capacity of the SEE countries to develop low carbon strategies. It aims at setting a common platform in SEE

	region for coordinated climate change mitigation strategies and at assisting the transition societies toward creating low carbon societies across the SEE (Albania, Austria, Greece, Hungary, Italy, Montenegro, Serbia, Slovenia). **CarpathCC** DG ENV (2011-2013) The goal of the project is to establish a diverse portfolio of sustainable adaptation measures based on in-depth assessment of the vulnerability of the Carpathian region to the impacts of climate change. Vulnerability of water, soil, forests, ecosystems and related production systems are assessed and concrete ecosystem-based adaptation measures will be proposed, along with an analysis of their costs and benefits. (Hungary, Poland, Romania, Serbia, Slovakia, Ukraine) **M**ethodology for **E**ffective **D**ecision **M**aking on Adapta**TION- MEDIATION** FP7 (2010-2013) Objective is to create a methodology for adaptation-related decision taking considering the difference in political, administrative and economic conditions in the EU-27 and SEE ENP countries. SEE case study is prepared for Veliko Morava Region (Serbia) focusing on droughts and their impact on agriculture **Regions for Sustainable Change (RSC)** INTERREG IVC (2008-2011) The focus of the project was to provide regions with the methodological means to move towards low-carbon economies with minimal GHG emissions by integrating all aspects of the economy around technologies and practices with low emissions. The partnership was formed by 12 organisations from Austria, Bulgaria, Hungary, Italy, Poland, Malta, Spain and the UK.
Italy-Basilicata Region	**FACTOR20 - Forwarding ACTions On a Regional and local scale to reach UE targets of the European Climate Action Plan "20-20 by 2020". (2012-2013) LIFE08 ENV/IT/000430 http://www.factor20.it** The project aims to promote an integrated management approach to build on and improve existing approaches to GHG-reduction strategies at local, non-ETS levels. It seeks to define a technically sound tool for promoting local actions towards the contribution of the non-ETS sector to climate change objectives. The project will work to harmonize regional databases on local electrical energy systems covering energy consumption, generation and network infrastructure and particularly monitoring the impacts of energy activity on GHG emissions. This will provide the baseline data for regional information systems and policies. The data will be fed into a "burden-sharing" tool - Sirena-Factor 20 – in order to define regional sectoral targets on GHG reduction, use of renewable energy sources and energy saving. The regional targets will form a basis for the local targets for sectors outside the Emissions Trading Scheme, such as the construction industry and transport sector. Sirena-Factor 20 will be implemented and demonstrated in two local areas within each of three regions. Each local authority will identify a 'leading action' to be implemented during the project. The feasibility and effectiveness of this action will be monitored. The project will also assess the coherence of the local action plans developed with the regional strategies. The project will promote the adoption of its integrated tool for defining Local Action Plans and raise stakeholders' awareness at local and regional level on adopting CO2 quantities as core indicators to define the effectiveness of

energy policies and actions.

EU projects, where the Italian CNR-IMAA (PP2 subcontract) was/is involved:

-ONGOING-

South East Europe RE-SEEties Project "Towards resource efficient urban communities in SEE" (2012-2014) http://www.re-seeties.eu/

RE-SEEties Project aims to improve the integrated policy-making and strategic planning competences of SEE municipalities in the field of energy efficiency, RES and waste valorisation, for the purpose of changing consumption patterns and supporting changing demands with innovative solutions, tools and incentives. The project intends to intensively build on the existing methodologies (e.g. LCA) of the SEAP elaboration process.

COST Action TU1104 "Smart Energy Regions" (Action Chair: Prof. Philip John Jones) (2012-2016) http://www.smart-er.eu/

This Action will investigate the drivers and barriers that may impact on the long term creation of low carbon regions in Europe. It will identify what can be done to assist the large scale implementation of low carbon technologies and processes. The main focus will be on new and retrofit of existing buildings, their operation, embodied energy and potential for using low and zero energy supply.

INTERREG IVC "Regional Strategies for Energy Conscious Communities" RENERGY. Role: Leader of Component 3 "Exchange of experience dedicated to the identification and analysis of good practices" and coordination of the Thematic Group activities in the policy-making pillar. (2012-2014) http://www.renergyproject.eu/

The overall objective of RENERGY is to improve, through interregional cooperation, the effectiveness and approach of local/regional sustainable. Specific objectives of RENERGY are to:

- Demonstrate the relevance of an integrative bottom up stakeholder engagement process in order to tackle EE behaviour and RES by fully integrating local capacities, needs of key stakeholders, available energy resources, infrastructure, taking into account the socio-economic context and cultural background in a clear & structured way.
- Emphasise the role of local energy business sector in policies, focusing on creating a financially, legally and administrative enabling environment.
- Highlight the role of local/regional public authorities in developing and implementing sustainable tools and instruments, and closer connections with communities and local energy companies.

COST Action TU0902 "Integrated assessment technologies to support the sustainable development of urban area" (Action Chair: Dr. Richard DAWSON) - WG2 "Adaptation, mitigation and climate change feedbacks in cities" (2009-2013) http://iaforcities.com/

This COST Action is aimed to review and map the shared benefits and tradeoffs between different adaptation to climate change and greenhouse gas mitigation measures when deployed in cities. In this framework the main aim of WG2 is to review and map the shared benefits and tradeoffs between different adaptation to climate change and greenhouse gas mitigation measures when deployed in cities

	Energy European Research alliance (EERA). Joint Programme "Smart Cities", Sub-programme "Energy in cities" (lead AIT, deputy VITO) (2011-2014) **http://www.eera-set.eu/dex.php?index=30** The "Energy in cities" sub-programme is aimed to: -Providing and analyzing examples of visions for Smart Cities that can be used as a basis for tailor-made solutions and roadmaps for each individual city - Proposing integrated database structures that can allow cities to plan a Smart City and then monitor the performance of the city during and after the transition process on the basis of well-defined Key Performance Indicators (KPIs). - Offering new simulations tools (static and/or dynamic) that, once an energy concept has been chosen, will help produce a more detailed design of those measures and their implementation (sizing of technical components, business models) in particular in the case of pilot projects. - Setting up a template for the implementation of the living lab concept into practice - Defining the links and opportunities for complementary research between existing individual research areas related to sustainable city aspects (energy and e.g. water, waste, transport) and taking into account stakeholder approaches.
Italy- Trento Province	The **EULAKES** European project regrouped four important lakes for the first time: Garda Lake (IT), Balaton Lake (H), Neusiedl Lake (AT), Charzykowskie Lake (PL). The project deals with the following themes: water pollution and its levels regulation effects produced by climate change; sustainable cost management. The European "**PermaNET" project** produced an alpine-wide permafrost monitoring network including an information system and selected monitoring sites, a permafrost map for the entire Alpine Space and a common strategy as well as guidelines for the consideration of permafrost in risk and water resources management. PermaNET allows awareness of decision-makers and responsible authorities to this topic and provides Alpine-wide decision-bases and strategies. The transnational cooperation (Austria, France, Germany, Italy and Switzerland) in aggregation of existing and collection of new data to produce a common permafrost dataset will reduce costs for adaptation of governance practices to specific effects of climate change. The **ENVIROCHANGE Project** (www.envirochange.eu) focuses on global change and sustainable management of agriculture in highly developed mountain environment. It aims at assessing the short-term biological, environmental and economic impact of climatic change on agriculture at the regional level (Trentino) particularly on quality and pest management that are more likely to be influenced by climate change in the short term. **ORIENTGATE Project** The project aims to implement concerted and coordinated climate adaptation actions across South Eastern Europe (SEE). The general purpose of the Trento pilot study is to improve existing policies related to the exploitation of water resources at basin level, with particular emphasis on hydropower generation. Modelling procedures will be applied in order to evaluate trends in water resource availability for competing uses in the area (e.g. hydropower, irrigation), and a cost-benefit analysis will be carried out on the sustainability of new and existing hydroelectric systems.

Romania	**- PP9, PP10 - Project WATER CoRe/0541R2/"Water scarcity and droughts; coordinated actions in European regions"** **- PP10 / EU projects:** **- Research into climate change scenarios: ENSEMBLES, CECILIA, CC-WATERs, etc;** **- Research on droughts and water scarcity:** EC - DG Environment - Halting desertification in Europe, "Mitigation Drought in Vulnerable Area of the Mures Basin – MIDMURES" (2010 - 2012). **- PP10 / national projects:** **- National Programme of Research, Development and Innovation (PNCDI-II), 2007-2014:** - GRIMPCLIM: Ways to mitigate climatic change impacts on wheat crops in Southern Romania. - **Sectoral Plan of the Ministry of Agriculture and Rural Development – ADER 2020 (2011-2014)** - ADER 1.1.1: Geo-referential indicators system at different spatial and temporal scales to assess the vulnerability and adaptation of agro-ecosystems to global changes - ADER 3.3.1: Monitoring and assessment system of the indicators regarding the agreement with the EU Agro-environmental Directives specific to semi-subsistence farms
Serbia	RHMSS is currently involved in 2 projects coping with Climate Change: **- The ORIENGATE project** aims to implement concerted and coordinated climate adaptation actions across South Eastern Europe (SEE). The partnership comprises 19 financing partners, 11 associates and three observers, covering 13 countries, that together will explore climate risks faced by coastal, rural and urban communities, contributing to a better understanding of the impacts of climate variability and climate change on water regimes, forests and agroecosystems. As a general trend in the SEE region, the frequency and seriousness of extreme climatic events is increasing due to climate change. Even though climate change affects countries, territories and localities differently, there are common and typical challenges. **- SEERISK project** takes into account specific risks and horizontal challenges as well. The countries involved are territorially coherent: the project concentrates on the Middle and Lower Danube Basin, where a wide range of risk types occur. There are localities where flashflood is the predominant risk factor (e.g. in Srbac), whereas in other project territories, unforeseeable thunderstorms cause serious damages (e.g. to tourism in Siófok) or frequent draughts cause damage to agriculture. Low level of awareness (addressed via risk assessment), week preparedness (to be addressed through better information flow, awareness raising, cooperation) and institutional gaps (to be addressed by institutional analysis) and weak territorial planning are common, horizontal challenges in those regions.
Ukraine	OSENU is currently involved in the **LAGOONS Project "Integrated water resources and coastal zone management in European lagoons in the context of climate change"** received funding from the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement n°283157 (http://lagoons.web.ua.pt/). The main objective of the LAGOONS project is to contribute to a science-based seamless strategy - in an integrated and coordinated fashion - of the management of lagoons seen under the

	land-sea and science-policy-stakeholder interface

4. Main Conclusion

Mitigation and adaptation represent two complementary international strategies to undertake climate change and related impacts.

Mitigation addresses the causes of the climate change, in particular, it is oriented to reduce or, at least stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that prevents further human-induced global warming.

Adaptation acts on the climate change effects, and it regards interventions, practices and measures that enhances ecosystem resilience and its capacity to adjust to changes, aiming, in particular, to reduce the negative climate change impacts and catching favourable opportunities.

Whereas mitigation concerns have been already addressed by international community for a long time, in fact the development of well structured mitigation plans is already widespread and consolidated; adaptation is becoming a priority, but until now it has been tackled in a fragmented way, being lacked structured policy guidelines and a central government coordination. In Europe, the adoption of the EU Adaptation Strategy Package in April 2013 has filled the gap between governments and local policy making, providing guidelines to develop a National Adaptation plan, and stimulating all Member States to start the implementation process.

In the South East Europe only few countries have already equipped with national plans to undertake climate change. This status along with the fragmented approach to climate change adopted so far, in particular relatively to adaptation, necessitates to have a clear and complete picture of specific policies measures adopted on the territory, as preparatory action to the implementation of an adaptation and mitigation plan.

To this end, in this report a comprehensive survey on mitigation and adaptation sectorial actions in the SEE OrientGate countries was provided through a careful analysis of all sectorial plans. In particular, the analysis focused on all national/regional territorial and sectorial plans looking for those interventions classifiable as climate change mitigation and/or adaptation measures, with particular attention to adaptation.

From the comparison of the measures adopted in the different SEE OrientGate countries a basic set of measures to reduce the impacts of climate change through mitigation and adaptation was identified and reported in Table 4.1 and Table 4.2

Table 4.1: Basic set of measures for mitigation.

	Mitigation
Agriculture	- Supporting a more sustainable land use and more efficient use of fertilisers. - Promotion of more efficient livestock farming and manure treatment methods to decrease methane emissions
Air quality	- Target of GHG reduction - Geological carbon capture and storage
Energy and Households & Services	- Feed-in tariff for electricity by renewables (wind, PV and CHP) - White Certificates system as instrument aimed at promoting energy efficiency - Promotion of energy efficiency and the use of renewables both in demand side and in power production. - Increase in the energy performance of the existing building stock

	- Increase of co-generations', new low-carbon heating systems; **energy efficiency in transport** - Establishment of feed-in tariffs for renewables - CHP installations - Employ energy managers and to deliver an energy consumption report - Introduction of the smart controls for public buildings
Land use and Forestry	- Afforestations and reforestation activities - The application of certain silviculture methods could increase carbon sequestration in tree biomass and enlarge forest area by reforestation of bare lands, therefore increasing the overall annual biomass increment.
Industry	- Replace partially fossil fuels with alternative fuels
Spatial Planning	- Energy labelling is obligatory for new buildings - Strategy on energy efficiency of buildings: financial support is provided for changing windows, insulation, modernisation of heating systems and water heaters, and the use of renewable energy sources - Promotion of low-energy-housing - Roof greening, networking of green areas in settlements, planting of inner courtyards
Socio-economic	- Creation of new job - Green jobs - Green Public Procurement - GPP for sustainable consumption in public administration.
Transport	- Improving Energy Efficiency of vehicle stock - Expansion of public transport - Promoting of alternative vehicles and mobility management - Development/improvement/extension of cycling lanes, awareness raising campaigns and introduction of a public bicycle sharing system - Measures to increase the share of public transportation - Development of the car sharing; - Purchasing new buses and natural gas vehicles.
Waste management	- Recycling and reuse, - MSW separate collection, - Recovery energy from incinerator, - Recovery biogas from landfill.
Community involvements	- In Hungary, the **Eco school network** was founded in 2000 to promote in schools a more sustainable lifestyle among students and extra-curricular activities are setting. - promoting cycling as a daily transport mode.

Table 4.2: Basic set of measures for adaptation.

	Adaptation
Agriculture	- Developing irrigation systems and supporting infrastructure - Changes in agriculture cultivations - Changes in crop mix - Modification of crop rotation - Inclusion of agriculture in water management programmes - Construction of reservoirs and canals for agricultural needs - Use of drip irrigation techniques - Increase capacity of farming community - Diversification of activities and production, - Risk early warning system for floods, landslides, overflowing.
Biodiversity	- Creation of more protected areas - Development of monitoring systems
Costal zone	Some measures used to protect coastal zones from sea level rise, increased erosion and other impacts: - Technical measures (e.g. dykes), - Behavioural strategies (e.g. changing location of recreational facilities), - Managerial interventions (e.g. changing agricultural practices in areas prone to floods), and - Political decisions (e.g. land use planning). The range of traditionally implemented coastal defence measures includes: - Artificial reefs (shore parallel rockmound structures), - Near shore breakwaters, - Artificial channelling and drainage and, - Sand feeding (generally in high-profit touristic areas).
Land use and Forestry	- Afforestation - Forest fire prevention - Reforestation measures
Hydrogeology	- Mapping of hydrological risks - River Basin Management plan to provide water reservoirs and improve water beds for flood management purposes. - Reviewing the municipal drainage systems to ensure the uptake of an increased amount of stormwater run-off - Forecast, early warning systems, disaster management, adapted hazard zone mapping, awareness raising - Flood protection
Human health	- Early warning system for extreme weather events - Institution of a toll free telephone number to face up heat waves - Installation of drinking water fountains in public spaces - Daily online publication of UV index during summertime
Water	- Developing irrigation systems to water saving - distribution of water saving appeals among the population, in areas, where drought problems occur.

From a critical review of the collected policies and plans it emerges that adaptation and mitigation are usually addressed in different policy and institutional contexts, and that policies are implemented at different spatial and temporal scales (Tol, 2005). Moreover, it can be considered that the implications of adaptation can be both positive and negative for mitigation and vice versa.

In particular, adaptation strategy such as, for example, afforestation could make a positive contribution to mitigation. In contrast, adaptation actions that require increased energy use from carbon-emitting sources (e.g., indoor cooling) would affect mitigation efforts negatively (IPCC, 2007).

This warns that in the implementation of mitigation or adaptation strategies, it should always take into account possible reciprocal negative influences minimizing them, and at the same time the existing synergies and trade-off should be identified, analysed and exploited in order to define an integrated response to climate change.

In conclusion, both adaptation and mitigation are now essential in reducing the expected impacts of climate change on humans and their environment.

The action on adaptation is necessary at every level of government (local, regional, national, European and international) and requires the involvement of public authorities, the private sector and individual citizens. Adaptation is already taking place, but in a fragmented way. It should, instead, a more strategic approach to ensure that adaptation measures are taken in time and are effective and consistent across different sectors and levels of governance.

Moreover, the integration of adaptation into existing and future national and regional policies represents an important step to reduce the vulnerability in all sectors.

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