



BACKGROUND ANALYSIS¹
Climate Change Adaptation and the Black Sea region²

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² The views expressed in this document are those of the author(s) and do not necessarily represent those of the United Nations, including UNDP, or their Member States.

Environment, Climate Change and the Black Sea Basin

The Black Sea Basin

The Black Sea is one of the most remarkable regional seas in the world. It is almost cut off from the rest of the world's oceans, is over 2200 m deep and receives the drainage from a 1.9 million km² basin covering about one third of the area of continental Europe. Every year, about 350 km³ of river water enters the Black Sea from an area covering almost a third of continental Europe and including significant areas of seventeen countries: Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Germany, Hungary, Moldova, Serbia, Slovakia, Slovenia, Romania, Russia, Turkey and Ukraine. Europe's second, third and fourth largest rivers (the Danube, Dnipro and Don) all flow to the Black Sea.

The length of the Black Sea shoreline is approximately 4,340 km. In a major part of the Black Sea Basin, the climate is similar to the Mediterranean (warm humid winters and hot dry summers) because the geography and macro circulation processes existing in the Mediterranean influence the climate of the Black Sea Basin. The southeastern part, surrounded by the mountains, is characterized by a humid subtropical climate (abundant precipitation, warm winter, hot summer). Because of its climate the Black Sea region is a productive farming area, where many varieties of plant crops are grown. For those countries having only a part of their territory included in the Basin, the national sub-basins (with a total catchment area of 1,257,969 km²) represent important components of their respective national agricultural production balance sheets.

The Black Sea countries coastal zones are estimated to be inhabited by about 20 million people. If the population of the Istanbul area is also included, the number increases to over 39 million people. The proportion of national populations living within Black Sea coastal administrative areas varies widely: 0.6% in Russia, 4.5% in Romania, 10.5% in Turkey (excluding Istanbul), 14.4% in Ukraine, 26.5% in Bulgaria, 37.1% in Turkey (including Istanbul) and 38.6% in Georgia. A coastal population of some 7 million inhabitants is connected to sewerage systems discharging directly into the Sea. The size of the urban population is increasing in all Black Sea countries, and as many towns and cities are in coastal areas, this will continue to result in increased pressure on the Sea itself.

Black Sea Priority Challenges

The Black Sea Transboundary Diagnostic Analysis (2007) reconfirmed four priority transboundary problems expressed in the Black Sea Strategic Action Plan of 1996 (amended 2002). These are: eutrophication/nutrient enrichment; changes in marine living resources; chemical pollution (including oil); and biodiversity/habitat changes, including alien species introduction.

This decrease in the importance of agriculture as an economic powerhouse of the region has been clearly shown by decreasing trends in livestock numbers and a shift from major livestock farms to smaller-scale or subsistence-level farming, indicating a decreasing pressure from **eutrophication**. Livestock numbers (excluding poultry) in 2004 were about two-thirds of those

present 1997, and about one-third of the numbers recorded in 1998. Inorganic fertiliser application rates also appear to have fallen substantially, with large areas of land (in some countries at least) left fallow. However, indicators suggest that this decline in agricultural productivity may have bottomed-out, so a gradual re-intensification of agricultural practices may begin in the near future.

Due to over fishing in the early 1970s-1980s, the structure of catches has shifted significantly. Total fish landings are now about half of what they were in the latter half of the 1980s. Commercially important **marine living resources** have been greatly affected by alien species introductions, eutrophication, over-fishing and habitats change/damage. Unsustainable fishing practices are still in relatively common use. The seafood industry is a major coastal employer, particularly for some countries. Aquaculture is not strongly developed in the region and there is scope for this to be expanded, providing environmental considerations are taken into account.

Relatively high contamination levels of some pesticides, heavy metals and PCBs are present at specific sites in the Black Sea, with illegal dumping/discharges (particularly of agrochemicals) being recognised as a particular problem. The historically poor enforcement of discharge standards and a failure to consider the Sea itself as a receiving water body for discharges to river are considered to be the principal reasons underlying the **pollution** status of the Sea. A huge increase in the volume of oil being transported across the Black Sea and oil/gas extraction from beneath the Sea itself have greatly increased the risk of oil pollution.

Of the 50 hot-spots related investments initially identified within the 1996 Transboundary Diagnostic Analysis, only 12 have been completed and 2 are no longer required. A decade later, work is in progress on another 10 point sources, but over half of the capital investments originally identified have either been insufficiently funded or not funded at all. Capital investment costs to address the identified 50 **hot-spots** were originally estimated to be almost \$400 million. By the end of 2005 at least \$143 million had been spent on addressing these point sources

Climate Change and the Black Sea

Recent studies have highlighted that climate change poses a considerable threat to the Black Sea basin (implemented by IPCC, WB or EC). Coastal areas are subject to impacts from both the sea and the land. This exposes them to the influence of climate change either directly (sea level rise, storm surges, floods, droughts), or indirectly through events that originate off-site but whose consequences propagate down to the coasts, like river floods and changes in the seasonality, pulses, and quality of runoff from inland sources. In the 21st century the Black Sea region will likely experience freshwater shortages originating from increasing temperatures and droughts, decreasing precipitation, decreasing runoff and diminishing groundwater levels, with consequent impacts on fisheries production, human health, tourism and agriculture. Erosion, floods, and infiltration of saltwater into aquifers already affect vulnerable lowland areas, river deltas, coastal wetlands, port cities, transport and energy infrastructure. Poor waste management practices have resulted in coastal pollution, worsened by the unregulated building of waste dumps and landfills. Shore erosion may increase the amount of pollutants and solid wastes flushed into the sea. Sea-level changes would further significantly impact the coastal socioeconomic system.

The 4th Assessment Report of the IPCC highlights that **sea-level rise** can have a wide variety of impacts on Europe's coastal areas, causing flooding, land loss, the salinisation of groundwater and the destruction of built property and **infrastructure**. In areas of coastal subsidence or high tectonic activity, as in the low tidal range Mediterranean and Black Sea regions, climate-related sea-level rise could significantly increase potential damage from storm surges and tsunamis. A World Bank report emphasized that sea level rise has been highest in the Black Sea, where it is threatening the numerous ports and towns along the Russian, Ukrainian, and Georgian coasts.

Sea-level rise will also cause an inland migration of Europe's beaches and low-lying, soft sedimentary coasts with high populations. Coastal flooding related to sea-level rise could affect large populations. 14-20% of the world's coastal **wetlands** could be lost by 2080 due to sea-level rise. The Baltic, Mediterranean and Black Sea coasts are most vulnerable to the impact of sea-level rise on intertidal habitats and eco-systems due to their low tidal range and limited scope for on-shore migration. In the worst case, intertidal eco-systems could be largely eliminated in these areas by the 2080s. Dry periods are projected to increase in length and frequency putting pressure on freshwater availability.

The Directorate-General for Maritime Affairs and Fisheries concluded in its study "economics of climate change adaptation in EU coastal areas" that 20% of the total EU coastline faces serious **erosion** problems and annually 15 km² of land is lost or seriously impacted by erosion. The coastlines of the Mediterranean Sea (30% erosion loss), the North Sea (20%) and the Black Sea (13%) have the most critical erosion hot-spots. According to the study, erosion is at present the most significant problem for the Bulgarian and Romanian coasts.

Vulnerability to climate change

Vulnerability is the degree to which a system is likely to experience harm due to exposure to a hazard. A general framework defines vulnerability as a function of exposure, sensitivity, and adaptive or coping capacity (according to the World Bank). **Exposure** is determined by the type, magnitude, timing, and speed of climate events and variation to which a system is exposed (e.g., changing onset of the rainy season or minimum winter temperatures, floods, storms, heat waves). **Resilience** is the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures (UN/ISDR, 2004).

The impact of a climate shock or change also depends on how sensitive a system is to that shock. The impact of a flood, for example, will depend on several factors: Do people live in the flood plain? Have toxic waste or water treatment plants been sited in the flood plain? Does the municipality have the organizational and financial resources to prevent the spread of waterborne diseases, help people access shelter, and quickly rebuild washed-out infrastructure, thereby reducing post-disaster loss of life and promoting faster recovery? **Sensitivity** depends also on how stressed the current system is. A system or a population already close to its limits will suffer great damages even from small shocks. These might include poor individuals without any savings; congested and poorly maintained transport systems; unhealthy populations; or water basins depleted of underground water resources.

Together, exposure and sensitivity determine the potential impacts confronting a community or a system—the impacts without considering adaptation. But vulnerability also depends on how capable a system is of adapting and coping. Adaptation can be planned or autonomous; it can be anticipatory or reactive. The ability to adapt is a function of organizational skills, access to and ability to use information, and access to financing. **Adaptive capacity** can be defined as “the ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with consequences” (UK Climate Impact Programme 2003). Adaptive capacity can be both at the country and local level: quality of corruption control, and effectiveness of regulatory environment, access to health care, education and information, and the presence of social networks. Exposure, sensitivity and adaptive capacity define at the end how resilient or vulnerable a system is to climate change impacts. Therefore, UNDP defines resilience very broad as a tendency to maintain integrity when subject to disturbance.

The World Bank developed a **vulnerability index** for countries in Eastern Europe and Central Asia (comprising 28 countries). According to the index of exposure to climate change, within the 12 countries most exposed to climate change in the region there are 8 BSEC Member States (Russia with the highest exposure, followed by Albania, Turkey, Armenia, Georgia, Serbia, Azerbaijan and Bulgaria). According to the index of sensitivity, within the 12 countries most sensitive to climate change in the region there are 8 BSEC Member States (Albania with the highest sensitivity, followed by Armenia, Georgia, Azerbaijan, Moldova, Turkey, Serbia and Bulgaria). According to the index of adaptive capacity, within the 12 countries weakest in terms of adaptive capacity there are 5 BSEC Member States (Azerbaijan having the weakest adaptive capacity, followed by Moldova, Georgia, Armenia and Ukraine). The remaining BSEC countries are situated in the middle field of the adaptive capacity index. And according to the overall index of vulnerability to climate change, within the 15 most vulnerable countries in the region there are 9 BSEC Member States (Albania as the most vulnerable, followed by Armenia, Georgia, Azerbaijan, Turkey, Moldova, Serbia, Russia and Bulgaria).

As part of the National Communications on Climate Change prepared under the umbrella of the UNFCCC, countries are required to develop vulnerability assessments and adaptation plans for key sectors. Intersectoral Adaptation Action Plans are in the best case developed as a summary of all sectoral action plans involving four major areas: Institutional and legal measures; identification, assessment, and mitigation of climate change negative impact; monitoring; and strengthening capacities at institutional, systemic, and individual levels. The selection of sectors is based upon availability of data and strategic sociopolitical and economic importance for the country. The following table shows the sectors covered within the National Communications developed by the BSEC Member States. This summary gives a good indication about the political awareness of, institutional and translational maturity as well as analytical capacity within certain sectors in the region related to climate change adaptation. Agriculture, Water Resources, Forestry, Biodiversity and Health are the most frequent sectors assessed. Coastal areas were researched – with a varying degree of depth and capacity – by six of the twelve BSEC Member States.

Country	Sectors
Turkey	Water Resources; Agriculture; Marine Ecosystems and Fisheries; Terrestrial, Freshwater Ecosystems, Wetlands and Biodiversity; Health; Land Degradation and Desertification
Moldova	Agricultural Ecosystems; Natural Ecosystems; Agricultural Sector; Human Health
Greece	Energy Sector; Agriculture; Tourism; Water Resources; Biodiversity; Desertification; Coastal Areas
Bulgaria	Agriculture; Forestry; Soils
Romania	Biodiversity; Agriculture; Water Resources; Forests; Infrastructure, Constructions and Urban Planning; Tourism; Energy; Industry; Transport; Health
Ukraine	Water Resources Sector; Coastal Resources Sector; Forest Resources Sector; Agricultural Sector
Serbia	Hydrology and Water Resources; Forestry; Agriculture; Biological Diversity and Natural Land Ecosystems; Health
Armenia	Water Resources; Agriculture; Biological Diversity and Natural Ecosystems; Settlements and Infrastructure; Human Health
Georgia	Vulnerability assessments were implemented on an intersectoral basis for specific regions; Coastal Zone and Health were done separately
Russia	Agriculture; Forestry; Water Resources and Sea-Level Change; Regions of Permafrost; Human Health
Albania	Coastal Areas; Water Resources; Agriculture; Forestry; Energy; Population and Tourism; Health
Azerbaijan	Water Resources; Agriculture; Coastal Areas; Human Health

Exposure and sensitivity to hazards in coastal areas

Coastal areas are complex environments where natural and socioeconomic systems are deeply intertwined. The climatic hazards initially affect the natural system and the magnitude of floods or erosion are mediated by the sensitivity of this system. For instance, the magnitude of sea erosion caused by sea-level-rise depends on the geological features of the coasts, in particular on the relief and the geology (beaches versus rocky reefs). Similarly, the extend of flooding caused by extreme rainfall events in the upstream catchments is mediated by the state of the basin, its hydrogeological characteristics and water resources in the aquifer.

The biogeophysical events triggered by climate change hazards, and mediated by the sensitivity of the natural system affect a range of natural and socioeconomic coastal sectors. The magnitude of the impacts on the socioeconomic system depends both on the type and the magnitude of the hazards hitting the system and its sensitivity (measured by a range of indicators such as population density, economic importance of fishery activities, and industries like tourism and shipping).

Extreme events, sea-level-rise, and changes in the precipitation all cause second level outcomes that include damages to housing, industrial, and transport infrastructure. Human health can be affected due to damages to water treatment systems and waste disposal sites. Ecosystems can be damaged. Sea storms may impact wetlands as saltwater infiltration into aquifers has been

proven to reduce resilience of coastal forests to storms. Increases in sea temperatures and acidification impact flora and fauna directly, causing consequences for biodiversity, fisheries, and aquaculture.

Hazards from sea-level-rise and storm surges result from a combination of global trends and local conditions, including tectonic uplift or subsidence of the coasts, local weather and pressure systems, changes in river run-off and evaporation patterns. It must be recognized that vulnerability to climate change of both natural and socioeconomic sectors of coastal areas will depend not only on the changes in climate, but also on the interaction between these stresses like pollution, overfishing, land use change, and habitat fragmentation, along with population increase and changes in governance, economics and cultural values. These external factors affect vulnerability by impacting either the sensitivity or the adaptive capacity of the coastal area systems.

The **Georgian** coast appears to be subsiding relative to the rest of the Black Sea basin, while the **Russian** coast with its numerous ports and high economic activity will be vulnerable to floods and salt water intrusion into the aquifers. **Ukraine** is already experiencing erosion problems that are prompting a loss of housing, arable land, and industrial and touristic sites. The Black Sea coast of **Turkey** is vulnerable mainly in a few deltaic areas. Storm surges are already affecting some settlements and worsening conditions may bring damages to the 23 ports along the Black Sea. Furthermore, storms, erosion and sustained flooding are predicted to damage the very important east-west road system that runs along the coast very near to the shoreline.

Mismanagement and unregulated development

Resilience to a changing climate—whether to a climate shock or to changing averages—depends heavily on the current state of the system it impacts, be it human, physical, or ecological. Decades of environmental mismanagement have diminished the region’s natural resilience. A World Bank report concludes therefore that vulnerability over the next ten to twenty years will be dominated by socio-economic factors and legacy in Eastern Europe and Central Asia. The environmental legacy of central planning is particularly dramatic for agriculture, greatly increases the sector’s vulnerability to climate change. Vulnerability in the Black Sea region is also exacerbated by on-going poor coastal management and existing stresses— pollution, overfishing, construction too close to the coast, and the damming of rivers, which prevents sediment flows from reaching the coast, worsening erosion.

The economically critical fishing industry is already threatened by overfishing and pollution, and will be further stressed by the projected increase in water temperatures. The Black Sea is also an important source, refinement point, and transport route for oil and gas, and there are fears that increased storminess and erosion will stress oil and gas infrastructure on the Russian, Ukrainian, and Georgian coasts. Accidents, in turn, would spread further pollution. In general, pollution magnifies the impact of climate change. Coastal landfills around the Black Sea, notably in Georgia, have been identified as pollution hotspots, and coastal erosion could increase the amount of pollutants flushed to sea, threatening a fishing industry already struggling with the consequences of overfishing and pollution. Projected warming trends and changes in precipitation patterns have the potential to impact the entire energy chain—from production, through transmission and distribution, to end use. With the likelihood of many more extreme

events—floods and droughts—water quality could be profoundly affected. This vulnerability is driven mainly by the poor condition of infrastructure.

Growth and economic development are in some cases exacerbating vulnerability. The damming and channeling of rivers, along with ill-managed coastal development, is altering the sediment balance and distribution, resulting in erosion problems. In Russia, Ukraine and Georgia, unregulated building close to the shore is also advancing erosion and increasing sensitivity to climate impacts. Buildings are being erected on sites exposed to coastal surge and storms. Times of more extreme heat, heavier precipitation, and occasional flooding carry implications for the planning, design, construction, and maintenance of transportation infrastructures.

Science, policy making and adapting to climate change in the Black Sea region

Adaptation actions are taken to cope with a changing climate, e.g. increased rainfall, higher temperatures, scarcer water resources or more frequent storms, at present or anticipating such changes in the future. **Adaptation** aims at reducing the risk and damage from current and future harmful impacts cost-effectively or exploiting potential benefits. Examples of actions include using scarce water more efficiently, adapting existing building codes to stand future climate conditions and extreme weather events, construction of flood walls and raising levels of dykes against sea level rise, development of drought tolerant crops, selection of forestry species and practices less vulnerable to storms and fires, development of spatial plans and corridors to help species migrate. Adaptation can encompass national or regional strategies as well as practical steps taken at community level or by individuals. Adaptation measures can be anticipatory or reactive. Adaptation applies to natural as well as to human systems. Ensuring the sustainability of investments over their entire lifetime taking explicit account of a changing climate is often referred to as ‘climate proofing’.

Many countries in north-west Europe have adopted the approach of developing detailed shoreline management plans that link adaptation measures with shoreline defence, accommodation and retreat strategies. But uncertainty as well as lack of awareness and coordination hampers proactive policy development for climate adaptation or coastal protection. Parts of the Mediterranean and Eastern European regions have been slower to follow this pattern and management approaches are more fragmented. At present, most countries situated in the Black Sea marine basin do not have dedicated coastal strategies or operational plans in place yet, but reduce risks mainly through ad-hoc actions. Exception to this is since recently *Romania*³. In most Mediterranean and Black Sea countries, specialised technical standards and guidelines for the design of coastal defence structures seem lacking. As a result, the investments in protective measures along these marine basins, if any, are mainly provided for ad-hoc hard defences such as breakwaters and groins, often resulting in mal-adaptation

³ The government of Romania prepared a study on the ‘Protection and the rehabilitation of the Black Sea shore’. The study’s objective is to formulate a coastal protection master plan for the southern coastal unit and to propose priority projects to halt coastal erosion and increase the value of the coastal zone with the creation of new beaches. The master plan and feasibility studies for the priority areas Mamaia Sud and Euforie Nord were completed in 2007. For these priority areas, the mast plan proposes the installation of new coastal protection infrastructures such as groins, breakwaters, jetties and artificial reefs as well as beach nourishments. Funding has been secured under Romania’s Sectoral Operational Programme ‘Environment’ for the period 2007-2013. Over this period of time, a total amount of close to € 250 million is going to be invested, of which about 80% is supported by the EU.

causing further impacts (i.e. rate of erosion) on other parts of the coastline. Clear exceptions are the actions undertaken to protect the south coast of Romania for which the most optimal protection options were extensively studied beforehand.

Most countries do not have additional national or sub-national scientific insights to build their strategies on. In countries such as Greece and Bulgaria, several institutes are performing research projects related to climate change but all within their own field of expertise and without much coordination between the different institutes. There are also countries that do not have research results on future climate change scenarios or specific vulnerability assessments available yet, due to the lack of appropriate infrastructure. As in most countries detailed knowledge about climate change, potential scenarios and negative consequences is not yet widespread, many (national) authorities tend to respond to climate change impacts along their coasts, mainly *flooding and erosion*, in a reactive manner. Especially the Mediterranean and Black Sea governments still consider changes in climate too uncertain to proactively invest in and (implicitly) adopt a 'wait and see' approach.

Scientific evidence of the potential changes in climate and related impacts can accelerate (proactive) adaptation. Nevertheless, current scientific research results are not always supportive enough to develop climate adaptation strategies and coastal protection plans and decide on the optimal adaptation measures. Even in countries more advanced in climate change research, the uncertainties with respect to meteorological changes cause severe discrepancies between estimates given by different institutions and hamper accurate policy development.

Preventive action brings clear economic, environmental and social benefits by anticipating potential impacts and minimizing threats to ecosystems, human health, economy and infrastructure. Although more specific information on the costs of adaptation is needed, several sources already indicate that the costs of taking action to address climate change (including mitigation and adaptation measures) will be much lower than the costs of inaction over the medium to long term (Stern Report 2006).

The next decade offers a window of opportunity for the BSEC region to make their development more resilient to climate change while reaping numerous co-benefits. While some impacts of climate change are already being felt, they will likely remain manageable over the next decade. This offers the BSEC region a short period to increase its resilience by focusing on "no-regret" beneficial actions. "**No regrets**" options are those which would be justified under all plausible future scenarios, including the absence of manmade climate change. "No regrets" options are also often seen as good examples of development. Regardless of climate change, the BSEC region will gain a lot by improving its water resource management, fixing its disastrous environmental legacy, upgrading neglected infrastructure and housing, and strengthening disaster management.

But the region should also develop strategies to reduce vulnerability to future changes—focusing on infrastructure, capacity-building and stronger institutions to support adaptation. Forward-looking decisions today help avoid locking countries or settlements into unsustainable patterns of development. Experiences from other countries, regions, or cities now developing and implementing adaptation plans offer valuable lessons and methodologies.

International Governance, Regional Approaches and National Challenges

All countries of the BSEC region are intertwined with the multilateral environmental policy landscape (Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Serbia, Turkey and Ukraine). The countries are required to fulfill their obligations under the international environmental agreements they have ratified and within the intergovernmental governance structures they are part of and/or aspire to join. Naturally, the degree of international embeddedness of environmental governance, national political commitment, institutional maturity to integrate climate change into development planning, the level of capacity to implement climate change projects as well as the vulnerability to climate change and the GHG mitigation potential varies from country to country.

UNFCCC and the Kyoto Protocol

All countries of the region have signed the United Nations Framework Convention on Climate Change and the associated Kyoto Protocol. Parties to the Convention must submit national reports on implementation of the Convention to the Conference of the Parties (COP). Through the national communications, both Annex I and non-Annex I Parties, developed greenhouse gas inventories and vulnerability assessments, generated climate change projections, produced mitigation and adaptation action plans, integrated climate change into national development planning and conducted capacity building initiatives. Article 4 of the UNFCCC stipulates that every effort must be made to adopt national or regional adaptation strategies.

Climate plans in the Black Sea focus mainly on mitigation and coastal protection is implemented ad-hoc. The minority of coastal states take a climate change scenario into account for development planning. **National Communications** on Climate Change submitted to the UNFCCC Secretariat by the countries bordering the Black Sea have not yet sufficiently recognized the Black Sea as a priority. An exception is **Georgia**, which has identified the Black Sea coastal zone as a priority for its vulnerability and adaptation assessments within the Second National Communication on Climate Change. This included the preparation of a Black Sea coastal zone adaptation strategy and can serve as a best practice for the region. In **Bulgaria**, coastal protection measures are mainly decided on and implemented in an ad-hoc fashion. National climate change strategies do exist but the focus is presently on mitigation rather than adaptation. **Turkey** developed a National Adaptation Strategy but did not include sea-level rise and its coasts as a focus area.

Excursus: Institutional infrastructure and the examples of Ukraine and Romania

Institutional infrastructure to tackle climate change is just evolving in the region and often chronically understaffed. The climate change institutional and operational arrangements in most countries lack sufficient capacity to coordinate and support adaptation and mitigation initiatives. Capacity and resource constraints are further compounded by a high staff attrition rate, which affects institutional memory at the national and local level. Another obstacle is the cross-cutting nature of climate change, which requires coordination across sectors and ministries. While national institutional arrangements for Climate Change have been established

in some countries to assist in coordination and implementation of climate change-related activities, in many cases, the arrangements are not effective as climate change is perceived to be solely an “environmental” issue. Many challenges exist with regards to coordinating the planning, designing and monitoring of Climate Change initiatives amongst key national institutions.

In most countries, institutional arrangements and the legislative framework to address climate change issues were established in accordance with the UNFCCC and its Kyoto Protocol. In some cases the mandate is too narrowly focused and does not encompass nor enforce many of the key areas that are critical to addressing climate change issues. For example, **Ukraine** established the appropriate legislative framework and institutional arrangements required by UNFCCC and its Kyoto Protocol. In practice these arrangements were only relevant for the initiation of carbon markets. The arrangements did not take into account the strong capacity needs and frameworks required in areas such as adaptation/mitigation, technology transfer, scientific research or public awareness. There are furthermore difficulties in the implementation of the market mechanisms of the Kyoto Protocol, for Ukraine the Joint Implementation (JI) mechanisms. Main reasons lie within the political instability and associated frequent reshuffling of top officials as well as economic strains, low awareness and capacities.

In **Romania**, overlapping institutional mandates undermine efforts to address climate change issues. The Ministry of Environment and Forests is the designated national focal point for UNFCCC and coordinates and develops the National Climate Change Strategy and Action Plan. It draws upon a number of consultative bodies: a) Interministerial Committee for Sustainable Development; b) Ministerial Committee for Emergency Situation; c) Technical-Economic Commission; d) National Commission for Climate Change. The National Agency for Environment Protection, under the Ministry of Environment and Forest, is the main authority responsible for the implementation and enforcement of policies and legislation in environment protection, at national level and at local level through its local regional and county level agencies. The Ministry of Economy, Commerce and Business Environment has important prerogatives related to development and implementation of policies in the fields of energy and industry and a key factor in the implementation of the relevant European Directives. The most important consultative body of the Ministry of Agriculture and Rural Development is the *National Committee for Combating Drought, Land Degradation and Desertification* entailing 45 members representing line ministries, national and regional agencies and academia, addressing desertification and drought also in the context of climate change.

The Romanian National Commission for Climate Change plays an important role in integrating climate change as a cross-cutting inter-sectoral issue. It is an inter-ministerial body functioning in coordination with the Inter-ministerial Committee for Agriculture, Rural development and Environment and its activity is related to the mandate of the Ministry of Environment and Forests. At national level, the line ministries, among which the Ministry of Environment and Forests as the main competent authority for climate change affairs, have different mandates and report to the Prime Minister. At local and regional level, they have decentralized offices. Local municipalities are tasked to integrate climate change adaptation measures into urban planning, development strategies, land use, water use, energy transport, infrastructure and emergency situations and to develop Joint Implementation (JI) projects. Other important Institutions are a) National Institute for Research and Development in Bucharest (ICIM); b) National Meteorology Administration; c) The Institute for Research and Forestry.

The European Union and Climate Change Adaptation

The transposition of the EU climate change, energy and environmental legislation is being taken into account by Member States of BSEC and BSC. The EU climate change, energy and environmental legislation provides a positive framework for accelerating climate change mitigation and adaptation in the region through directives on issues such as promotion of renewable energy, establishment of the EU ETS, reducing GHG emission from transport fuels, end-use energy efficiency and energy, environmental impact assessment, environmental liability, chemical waste management, integrated pollution prevention and control or integrated watershed management.

Bulgaria, Greece and Romania are EU Member States and therefore tied to the EU environmental *acquis communautaire* and the EU climate and energy policy. Albania and Serbia are potential candidate countries for EU accession and Turkey began full membership negotiations with the EU in 2005. Albania, Serbia, Moldova and Ukraine are part of the Energy Community, which intends to extend the EU internal energy market to South East Europe and beyond in line with the relevant *acquis*, including key EU legal acts in the area of electricity, gas, environment and renewable energy. According to the National Gap Analysis Report of the Russian Federation, a closer EU-Russia cooperation in the environmental field is found to be essential to move ahead the implementation of the objectives and priorities of the EU-Russia Common Economic Space Road-map.⁴

The economic challenge of environmental approximation alone is enormous, a prerequisite for reducing vulnerability to climate change. For example, the **Serbian** environmental approximation strategy estimates that the total cost of meeting the requirements of the environmental *Acquis* will be around €10.6 billion (between 2011 and 2030), the most demanding sectors being water (€ 5.6 billion), waste (€2.8 billion) and industrial pollution (€1.3 billion). An important part of the costs are operational ones, which cannot be covered by international sources and will have to be financed from public budgets, private sources or charges. The need of additional financing from Serbian public budgets is estimated to peak at around €360 million in 2018 and should steadily decrease thereafter until about 2025, when full

⁴ EU relations with Russia are not developed through the ENP or EaP, but in the framework of a bilateral Strategic Partnership covering four “common spaces”: the Economic Space (including the environment); the Space of Freedom, Security and Justice; the Space of External Security; and the Space of Research and Education. The EU and Russia concluded their first Partnership and Cooperation Agreement in 1994. Negotiations on a new EU-Russia Agreement were launched in 2008. The new agreement is expected to update and replace the existing Partnership and Cooperation Agreement from 1994. It will provide for an improved framework of the EU-Russia relations and will specify commitments in all areas of the partnership, including political dialogue, justice, freedom and security issues, economic cooperation, research, education and culture, trade, investment and energy. Meanwhile, the Russian Federation has developed its own policy/legislation for the integrated water resources management (IWRM) and environmental protection. Significant progress towards the IWRM has been achieved during the last years, with the approval of the National Strategy and the National Programme for Development of Water Resources until 2020 and of the Marine Doctrine of the Russian Federation until 2020. These documents identify the basic principles for the Black Sea basin management and planning, and for the protection of natural resources in the Russian Federation. Having adequate national policy/legislation and management of environmental protection, the Government of the Russian Federation sees no added value for the moment in approximation with the EU Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD). The latter does not mean that harmonization in the field of Black Sea environmental protection does not take place at the Black Sea regional level.

cost recovery can be achieved. Therefore, also the institutional challenge is significant. On the other side of the balance, the direct economic benefits arising from environmental compliance over the same period should outweigh the costs by the factor of approximately 2.4.

The White Paper on Adaptation: The EU embarked to establish a strategic framework for adaptation to reduce EU's vulnerability to the impact of climate change, including the development of many useful tools, guidelines and assessments concerning climate change. These efforts can provide valuable input for other regional inter-governmental initiatives. The White Paper builds on the wide-ranging consultation launched in 2007 by the Green Paper on Adapting to Climate Change in Europe and further research efforts that identified action to be taken in the short-term (like the PESETA research project)⁵. The white paper is accompanied by three sectoral papers on agriculture, health and water, coasts and marine issues.

The objective of the EU's Adaptation Framework is to improve the EU's resilience to deal with the impact of climate change. The EU's framework adopts a phased approach. Phase 1 (2009-2012) will lay the ground work for preparing a comprehensive EU adaptation strategy to be implemented during phase 2, commencing in 2013. Phase 1 will focus on four pillars of action: 1) building a solid knowledge base on the impact and consequences of climate change for the EU, 2) integrating adaptation into EU key policy areas; 3) employing a combination of policy instruments (market-based instruments, guidelines, public-private partnerships) to ensure effective delivery of adaptation and 4) stepping up international cooperation on adaptation.

The first two approaches and pillars are especially relevant for the intergovernmental governance structure of the Black Sea region at this stage and for the purpose of this project.

Building a solid knowledge base on the impact and consequences of climate change: To be able to take decisions on how best to adapt, it is essential to have access to reliable data on the likely impact of climate change, the associated socio-economic aspects and the costs and benefits of different adaptation options. More knowledge is needed on climate impact and vulnerability so that appropriate policy responses can be developed. A considerable amount of information and research already exists, but is not shared across Member States. An effective way to improve knowledge management would be to establish a Clearing House Mechanism as an IT tool and database on climate change impact, vulnerability and best practices on adaptation. A pro-active research and education policy is necessary to promote better understanding of climate change impacts and the development of skills, methods and technologies to cope with the consequences of climate. A recent Commission Staff Working Document provides detailed information on research needs, including on the impacts of climate change and adaptation. Moreover, climate change will be an important issue for the recently inaugurated European Institute of Innovation and Technology which is setting up a Knowledge and Innovation Community on climate change and adaptation. Methods, models, data sets and prediction tools, which can be enabled by information and communication technologies, assist in understanding

⁵ In the EU, PESETA (Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis) is contributing to a better understanding of the possible physical and economic effects of climate change in Europe over the 21st century. The assessment provides country level impact data (erosion, flood risk, coastal wetland loss/change, and salinisation) for European countries, enabling relative impacts to be assessed. Such analysis provides a valuable tool to support climate change adaptation, where activities can be focused in the most vulnerable areas. Unfortunately, paralleled information for the non-EU BSEC Member States is not readily available at this time (just for Bulgaria and Romania).

and forecasting climate impact, in identifying vulnerabilities and in developing appropriate adaptation measures.

Integrating adaptation into EU key policy areas: The EC concluded that adaptation needs to be mainstreamed into EU policies. This exercise has to be carefully prepared, based on solid scientific and economic analysis. In each policy area there should be a review of how policies could be re-focused or amended to facilitate adaptation. Adaptation options will vary by sector and will, in some cases, require financing. For each sector, further work needs to be done to improve understanding of the impact of climate change, assess appropriate responses and secure the necessary funding. In each policy area, the following key questions must be answered: i) What are the actual and potential impacts of climate change in the sector?; ii) What are the costs of action/inaction?; iii) How do proposed measures impact upon and interact with policies in other sectors? The sectors health and social policies; agriculture and forests; biodiversity, ecosystems and waters; coastal and marine areas; production systems and physical infrastructure are those with strong EU policy involvement for which adaptation strategies outlining the types of action are needed. Priority should be given to adaptation measures that would generate net social and/or economic benefits irrespective of uncertainty in future forecasts (no-regret measures). Priority should also be given to measures that are beneficial for both mitigation and adaptation.

Climate Change and Water, Coasts and Marine Issues; biodiversity and infrastructure: A number of existing EU policies can facilitate adaptation efforts and optimum use should be made of this legislation. The short-term adaptation measures in relation to **water** should therefore focus on ensuring that adaptation is fully integrated into the implementation of existing EU water legislation and policies, in particular, the development of river basin management plans under the Water Framework Directive as well as assessing the need for further measures to enhance the efficiency of water use and exploring the potential for policies and measures to boost ecosystem storage capacity for water in Europe. Work is on-going at a European level to develop comprehensive guidelines and a set of tools for incorporating climate change into future river basin management plans. The Water Framework Directive is complemented by the Floods Directive and the policy on water scarcity and droughts. These provide a more specific framework for adapting to the key water-related impacts of climate change.

Similarly for **coastal and marine areas**, adaptation should be integrated into key policies and legislation, including the EU Integrated Maritime Policy and its environmental pillar: the Marine Strategy Framework Directive. The Recommendation concerning Integrated Coastal Zone Management in Europe and the newly reformed Common Fisheries Policy will also have to factor in and address adaptation as a priority. As with the Water Framework Directive, the Marine Strategy Framework Directive can facilitate adaptation by ensuring that climate change considerations are incorporated into marine strategies and by providing a mechanism for regular updating to take account of new information.

A more coherent and integrated approach to coastal planning and management via integrated coastal zone management will assist adaptation efforts. The multi-disciplinary, interactive approach which underpins ICZM provides the flexible and multi-sectoral basis needed for developing effective adaptation measures. Nevertheless, as the IPCC highlighted, the lack of a Directive for coastal management reflects the complexity of socio-economic issues involved in coastal land use and the difficulty of defining acceptable management strategies for the

different residents, users and interest groups involved with the coastal region. In order to ensure a coordinated and integrated approach to adaptation in coastal and marine areas, taking into account trans-boundary issues, the Commission will develop guidelines on adaptation in coastal and marine areas. The follow-up to the Roadmap for Maritime Spatial Planning will incorporate adaptation to climate change in maritime and coastal management.

Regarding **habitats**, the impact of climate change must also be factored into the management of Natura 2000 to ensure the diversity of and connectivity between natural areas and to allow for species migration and survival when climate conditions change. Draft guidelines by 2010 on dealing with the impact of climate change on the management of Natura 2000 sites. Work is ongoing on drafting guidelines for Natura 2000 and climate change. The guidelines will not only assess the threats posed by climate change to Natura 2000 but also highlight the positive contribution it can make in mitigating the effect of climate change (e.g. carbon storage, flood protection). One of the 10 objectives of the EC Biodiversity Action Plan is to support biodiversity adaptation to climate change. A studies were carried out to provide an overview of the likely impact of climate change on biodiversity in the European Union and give recommendations for policy and research as well as on assessing the potential of ecosystem-based approaches to climate change adaptation and mitigation in Europe.

Protecting existing and future **infrastructure** from the impact of climate change will be predominantly a Member State responsibility. The EU nevertheless has an important role in promoting best practice, via support for infrastructure development and also in developing standards for construction. Improving the resilience of existing transport infrastructure and energy networks requires a common and coordinated approach for assessing the vulnerability of critical infrastructure to extreme weather events. This provides a basis for strategic choices regarding networks, back-ups and energy security, and for maintaining stable transport networks and services. Infrastructure projects which receive EU funding should take climate-proofing into account based on methodologies to be developed. Commission will work with Member States and stakeholders setting guidelines and exchanging good practice, to ensure that account is taken of climate change impacts when implementing the Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) Directives and spatial planning policies.

The Mediterranean Action Plan (UNEP/MAP) and Climate Change

Three of the BSEC Member States – Albania, Turkey and Greece - have adopted the Mediterranean Action Plan (MAP) and the Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention). Turkey has furthermore ratified the Convention on the Protection of the Black Sea Against Pollution and is a member state of the the Black Sea Commission which is tasked to implement the provisions of the Convention and the Black Sea Strategic Action Plan. Although the initial focus of the MAP was on marine pollution control, experience confirmed that socio-economic trends, combined with inadequate development planning and management, were the root of many environmental problems. Consequently, the focus of MAP gradually shifted to include integrated coastal zone planning and management as the key tool through which solutions are being sought.

Seven Protocols addressing specific aspects of Mediterranean environmental conservation

complete the MAP legal framework: i) Dumping Protocol (from ships and aircraft); ii) Prevention and Emergency Protocol (pollution from ships and emergency situations); iii) Land-based Sources and Activities Protocol; iv) Specially Protected Areas and Biological Diversity Protocol; v) Offshore Protocol (pollution from exploration and exploitation); vi) Hazardous Wastes Protocol; and the vii) Protocol on Integrated Coastal Zone Management (ICZM).

The **Mediterranean Commission on Sustainable Development** (MCSD) is an advisory body to the Contracting Parties. It has a unique structure of representatives of the 22 Contracting Parties as well as 15 rotating representatives from local authorities, business community and NGOs, forming, on equal footing, a think-tank on policies for promoting sustainable development in the Mediterranean Basin. The MCSD coordinated the preparation of the Mediterranean Strategy on Sustainable Development (MSSD), which was adopted by the Contracting Parties in 2005. The MCSD framework provides guidance for national decision makers to address sustainable development issues, implement international agreements and initiate partnerships. It is also a benchmark against which the entire Mediterranean community can monitor and assess its contribution to a common vision of a sustainable Mediterranean. The Strategy pursues four main directions: i) contribute to economic development while building on Mediterranean assets; ii) reduce social disparities and fulfill MDGs while strengthening diversity; iii) ensure sustainable management of natural resources and change consumption and production patterns; and iv) improve governance at local, national, regional levels. The MSSD identifies priority fields of action: water; energy; transport; tourism; agriculture; urban development, and; sea and coastal management. For each of these, orientations and possible actions are proposed. Since 2005, MAP supports technically and financially the formulation of national strategies for sustainable development.

During the 16th Meeting of the Contracting Parties to the Barcelona Convention and its Protocols held in Marrakesh in November 2009, adaptation to climate change in the Mediterranean coastal and marine environments was identified as a priority issue requiring attention. Accordingly, climate change adaptation in the coastal zone has been incorporated into the “**Marrakesh Declaration**” and the Regional Activity Centers were further tasked to implement associated climate change activities within the framework of the Mediterranean Strategy on Sustainable Development.

Six MAP Regional Activity Centres (RACs) are based in Mediterranean countries, each offering its own environmental and developmental expertise for the benefit of the Mediterranean community in the implementation of MAP activities. Climate change and green economy was consequently introduced into the focus areas and multi-annual work programmes of the Regional Activity Centers.

Within the MAP umbrella, the specific objective of the **Priority Actions Programme/Regional Activity Centre (PAP/RAC)** is to contribute to sustainable development of coastal zones and sustainable use of their natural resources. In this respect, PAP/RAC's mission is to carry out the tasks assigned to it in Article 32 of the Protocol on Integrated Coastal Zone Management in the Mediterranean (2008). In addition to its well-established role in supporting Integrated Coastal Zone Management in conjunction with Contracting Parties, the MAP is aware of the pressing need to address the impending impacts of changes in coastal climate and their implications for ongoing coastal resilience. In light of this, climate change adaptation has become an important new mandate of the PAP/RAC and has recently been adopted into its proposed five-year

Programme of Work of UNEP/MAP.

It is widely accepted that the key tool for implementation of adaptation initiatives within the Mediterranean Region under the UNEP/MAP structure will be the ICZM Protocol. In this context, the challenge that now faces MAP and in particular the PAP/RAC is the building of adaptive capacity throughout the region within the existing framework of this Protocol to allow effective mainstreaming at a range of temporal and spatial scales. Before MAP could commence with detailed planning of its upcoming initiatives to support vulnerability and adaptation, it was necessary to undertake a review exercise to determine the policies and strategies and projects and programmes active in the region at a range of temporal and spatial scales, including provision of an overview of impacts, threats and consequences of coastal climate change in the Mediterranean with a summary of the status of coastal adaptation initiatives around the globe to highlight best practice. A **position paper** was prepared to summarize the potential adaptation actions that could be undertaken by the Mediterranean countries in coastal zones, to develop options on how to link the ICZM Protocol and potential adaptation measures, and to provide suggestions on the sort of technical assistance of the MAP and in particular PAP/RAC to countries to adapt to climate change in coastal zones. Developing a Mediterranean Coastal Adaptation Framework is seen as a key priority in the position paper. This will encompass the need for sharing experiences and tools for adaptation - which is increasingly important at the regional level as work develops in the field – and for developing adjusted governance and management techniques as well as economic and financial mechanisms. Although vulnerability and adaptive capacity to climate change varies widely depending on the context, as do the initiatives to be undertaken, the need to share experiences and build capacity encourages the issue to be put on the regional agenda.

Other Regional Activity Centers are increasingly incorporating climate change within the respective mandates advancing a number of research initiatives and pilot projects, especially the Blue Plan Regional Activity Centre and the Cleaner Production Regional Activity Centre. The **Blue Plan Regional Activity Centre (BP/RAC)** adopts a systemic and prospective approach to Mediterranean environment and development issues using observation and evaluation tools and generating indicators. Experts produce scenarios for reconciling the environment and the realities of socio-economic development in a drive to help Mediterranean countries make decisions with the future in mind. BP/RAC produced a number of climate change studies, on e.g. adaptation in the water sector; energy efficiency and buildings; impacts of climate change on the water resources of four major Mediterranean catchment basins; and evaluation of the economic impacts of extreme events. It also achieved to include a chapter on climate change in the report State of the Environment and Development in the Mediterranean (2009).

The **Cleaner Production Regional Activity Centre (CP/RAC)** promotes the reduction of industrial waste from the Mediterranean industrial sector and disseminates tried-and-tested cleaner production techniques. The centre also organises training programmes, and promotes the exchange of experts, facilitating technology transfer within the region. CP/RAC initiated various pilot projects within the wider framework of green economy. It is the regional hub to move forward models of development that fit within the eco-system's carrying capacity and are low-carbon as shifting to sustainable consumption and production and thus decoupling development from environmental degradation and resource depletion becomes an urgent need due to the pressure that the economic development of the 21 regional countries is exerting on the local environment.

BSEC, BSC and Climate Change

There is a common understanding that transboundary threats require transnational approaches and solutions. The IPCC is the prime example for the need to cooperate internationally and to achieve a binding global agreement to tackle climate change in the long run. There is a growing interest from intergovernmental organizations and regional initiatives around the world to take up the topic of climate change and to use regional governance spaces for fighting transboundary related climate change threats, to incentivize transnational technology transfer or to harmonize UNFCCC negotiation positions. For example, and as highlighted above, the EU embarked to develop a regional adaptation framework and UNEP/MAP is on the way to integrate climate change into the sustainable development policy framework of the Barcelona Convention.

Climate change is not yet fully integrated within the strategies and action plans of the two main regional multilateral bodies covering the Black Sea region, the Black Sea Economic Cooperation Organization (BSEC) and the Black Sea Commission (BSC). Despite the existing scientific knowledge and on-going research projects, no major attempt has been made so far to compile the climate change relevant information and to move it up to the regional policy level. Nevertheless, the interest of BSEC and BSC to develop a strategic framework for tackling climate change and to incorporate climate change into its strategies and action plans is growing, indicated by recently adopted declarations and launched initiatives on the matter.

Black Sea Economic Cooperation Organization

On 25 June 1992, the Heads of State and Government of eleven countries: Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Turkey and Ukraine signed in Istanbul the Summit Declaration and the Bosphorus Statement giving birth to the Black Sea Economic Cooperation (BSEC). It came into existence as a unique and promising model of multilateral political and economic initiative aimed at fostering interaction and harmony among the Member States, as well as to ensure peace, stability and prosperity encouraging friendly and good-neighbourly relations in the Black Sea region.

The principal regular decision making organ of the Organization of the Black Sea Economic Cooperation is the Council of the Ministers of Foreign Affairs. The chairmanship-in-office is executed on a rotating basis for the duration of six month by the Member States (July-December 2010: Greece; January-June 2011: Romania; July-December 2011: Russia; January-June 2012: Serbia).

The BSEC Headquarters – the Permanent International Secretariat of the Organization of the Black Sea Economic Cooperation (BSEC PERMIS) – was established in March 1994, is located in Istanbul and accommodates the executive management units of the BSEC Working Groups. There are eighteen Working Groups established, including on the following areas of cooperation: Banking and Finance; Energy; Emergency Assistance; Communications; Culture; Education; Science and Technology; Tourism; Trade and Economic Development; Agriculture and Agro-industry; SMEs; Customs Matters; Environmental Protection; Combating Crime; Health Care and Pharmaceuticals; and Institutional Renewal and Good Governance. Working Groups are

in general guided by so-called joint ministerial declarations, comprised by focal points of the Member States and operate under an action plan or work programme coordinated by an executive manager.

BSEC furthermore consists of BSEC related bodies and BSEC affiliated centers. The BSEC related bodies that have their own budgets shall perform their functions in accordance with their basic instruments and with due respect to the principles of the BSEC set forth in the “Summit Declaration on Black Sea Economic Cooperation” of 25 June 1992 and in this Charter, e.g. Parliamentary Assembly of the Black Sea Economic Cooperation (PABSEC), the BSEC Business Council, the Black Sea Trade and Development Bank and the International Center for Black Sea Studies.

A positive step towards embracing the topic of climate change was done by the BSEC Council of Ministers of Foreign Affairs adopting a Joint **Declaration on Combating Climate Change in the wider Black Sea** (26 November 2010). This political initiative was inspired by the Hellenic Chairmanship-in-Office (July-December 2010) which started to promote new regional policy and development concepts under the motto “The Black Sea turns Green”. The declaration recognizes the importance of developing and implementing regional approaches as appropriate for combating the negative impacts of climate change as well as for reversing continuing trends of biodiversity loss and ecosystem degradation. It acknowledges that environmental technologies and practices aiming at protecting the land and marine environment, biodiversity and natural resources can secure a future of welfare for the region. At the same time the declaration emphasizes that the response to climate change is an opportunity for promoting green economy, creating new prospects for enhanced regional cooperation and economic development in the region, by also focusing on a gradual turn towards new technologies, including cleaner energy and higher energy efficiency projects.

Through the declaration, the BSEC Council of Ministers of Foreign Affairs agreed to i) develop regional policy approaches on mitigating climate change with respect to the capabilities of the countries concerned and at the same time ensuring energy security and a sustainable development process providing for growth, employment and welfare; ii) strive to develop common approaches on climate change demonstrating leadership and strong commitment to action in the international arena, aiming at contributing to international and regional agreements through seeking the possibility of developing common policy positions, as well as project- based initiatives; and iii) to strengthen collaboration on addressing common challenges by elaborating shared plans and initiatives concerning the implementation of models of environmental risks assessment, especially early warning prediction models, with the aim of taking joint measures and increasing safety precautions against disasters in the wider Black Sea area.

The Joint **Declaration of the Ministers in Charge of Environmental Protection** of the BSEC Member States (Bucharest, 31 May 2011) acknowledges the global challenges in the 21st century, particularly the impacts of climate change which require regional concerted actions in the field of environmental protection and environmental risk management. *It underlines* the importance of an enhanced cooperation among the BSEC Member States, particularly by harmonizing the environmental approaches at the regional level, by promoting exchange of good practices and transfer of technical know-how and by concrete measures and projects related to biodiversity conservation, integrated coastal zone and river management, tackling of

pollution sources, as well as to environmental integration monitoring, research and eco-innovation activities. It *stresses* the need to improve the monitoring system using common indicators of the state of environment in our Member States which is essential for the establishment of further actions and measures required in order to protect and, if necessary, rehabilitate the environment. It *expresses* the determination to enhance the cooperation with EU in the field of environmental protection and to use Environment Partnership of the Black Sea Synergy as an opportunity for future development of environmental projects. BSEC intends to initiate and promote cooperation with other regional organizations, institutions and initiatives, such as the Commonwealth of Independent States (CIS), the Central European Initiative (CEI), the Council of Baltic Sea States (CBSS) and UNEP Mediterranean Action Plan (UNEP-MAP) to cooperate with BSEC in the development of concrete environment projects focused on common problems. BSEC aims to enhance further the co-operation between BSEC and the Commission on the Protection of the Black Sea against Pollution.

BSEC is considering climate change to be a new area within the BSEC Working Group on Environmental Protection. The BSEC Action Plan for Cooperation in the Field of Environmental Protection is a general framework to promote cooperation in the field of environment among the BSEC Member States. The Plan determines the main directions of environmental cooperation among the BSEC Member States. The decision to up-date the BSEC **Action Plan on Environmental Protection** was taken. This will allow including a programmatic and strategic climate change agenda in it. According to the Action Plan, the main directions for cooperation include:

- i) promoting incorporation of environmentally important approaches in the economic and social development;
- ii) Developing a harmonized environmental legislation in the BSEC Member States, based on the best practice and experience existing in the Pan-European region, taking into account the legislative framework of the European Union;
- iii) Improving the functioning of the institutional network of BSEC and the coordination with regional organizations, institutions and initiatives, in particular with the Commission on the Protection of the Black Sea against Pollution;
- iv) Strengthening cooperation in the Black Sea basin in pollution prevention and biodiversity conservation with particular attention to the areas not covered by the Bucharest Convention;
- v) Promoting the use of economic incentives and tools in the field of the environmental protection in order to ensure funding for projects of mutual interest;
- vi) Promoting development of innovative, environmentally friendly and resource saving technologies;
- vii) Establishing a regional Clearing House Mechanism among the BSEC Member States.

The priority fields of activities encompass five main areas: regional cooperation, international cooperation, harmonization of environmental legislation, protection of the Black Sea marine and coastal environment and environmental education and training. Within the first priority area, there is the intention to e.g. i) explore ways of developing an Ecotourism Network in the BSEC region in coordination with the Working Group on Cooperation in Tourism, and if appropriate with other BSEC Working Groups; ii) streamline the BSEC activities towards exploring investment programs directed at preservation of the region's environment, as well as the development of

green technologies; iii) to seek ways of complementary cooperation with the Commission on the Protection of the Black Sea against Pollution; and iv) to provide the mechanisms of integrated management of the rivers' ecosystems of international importance which are covered by the sphere of BSEC activities.

Green Economy is expected to experience a boost in the region, especially promoted through the BSEC regional initiatives and recently adopted declarations. The BSEC Green Energy Initiative has set up a Green Energy Task Force within the BSEC Working Group on Energy. The BSEC Working Group on SME adopted an Action Plan for the Black Sea Economic Cooperation focusing on green entrepreneurship and sustainability. The Black Sea Trade and Development Bank (BSTDB) is discussing the establishment of a multilateral Environmental Fund focusing on financing renewable energy and energy efficiency projects. The BSEC Business Council adopted the "Green Agenda" and is creating a "Green Business Network in the BSEC Region" focusing on renewable energy sources. The International Center for Black Sea Studies (ICBSS) published a policy brief on greening the Black Sea economies, organized bilateral energy forums and networks and is embarking to launch a green trade project focusing on sustainable agriculture.

Black Sea Commission

The Commission on the Protection of the Black Sea Against Pollution via its Permanent Secretariat is the intergovernmental body established in implementation of the Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), its Protocols and the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea (SAP 2009). **The Commission on the Protection of the Black Sea Against Pollution** acts to: (a) Promote the implementation of this Convention and inform the Contracting Parties of its work, (b) make recommendations on measures necessary for achieving the aims of this Convention, (c) consider questions relating to the implementation of this Convention and recommend such amendments to the Convention and to the Protocols as may be required, including amendments to Annexes of this Convention and the Protocols, (d) elaborate criteria pertaining to the prevention, reduction and control of pollution of the marine environment of the Black Sea and to the elimination of the effects of pollution, as well as recommendations on measures to this effect, (e) promote the adoption by the Contracting Parties of additional measures needed to protect the marine environment of the Black Sea, and to that end receive, process and disseminate to the Contracting Parties relevant scientific, technical and statistical information and promote scientific and technical research and (f) cooperate with competent international organizations, especially with a view to developing appropriate programmes or obtaining assistance in order to achieve the purposes of this Convention.

The basic objective of the **Convention on the Protection of the Black Sea Against Pollution** is to substantiate the general obligation of the Contracting Parties to prevent, reduce and control the pollution in the Black Sea in order to protect and preserve the marine environment and to provide legal framework for co-operation and concerted actions to fulfill this obligation. In particular: i) to prevent pollution by hazardous substances or matter; Annex to the Convention; ii) to prevent, reduce and control the pollution from land-based sources; Protocol to the Convention; iii) to prevent, reduce and control the pollution of the marine environment from vessels in accordance with the generally accepted rules and standards; iv) to prevent, reduce and control the pollution of the marine environment resulting from emergency situations;

Protocol to the Convention; v) to prevent, reduce and control the pollution by dumping; Protocol to the Convention; vi) to prevent, reduce and control the pollution caused by or connected with activities on the continental shelf, including exploration and exploitation of natural resources; vii) to prevent, reduce and control the pollution from or through the atmosphere; viii) to protect the biodiversity and the marine living resources; Draft Protocol on the biodiversity; ix) To prevent the pollution from hazardous wastes in transboundary movement and the illegal traffic thereof; x) to Draft Protocols to the Convention; and xi) to provide framework for scientific and technical co-operation and monitoring activities.

As executive body of BSC, the Secretariat coordinates activities of the **Advisory Groups** to the Black Sea Commission, which are its main source of expertise, information and support. There are six advisory groups (AG): AG on Pollution Monitoring and Assessment (PMA); AG on Control of Pollution from Land Based Sources (LBS); AG on Conservation of Biological Diversity (CBD); AG on Environmental Aspects of the Management of Fisheries and other Marine Living Resources (FOMLR); AG on Environmental Safety Aspects of Shipping (ESAS); AG on Development of Common Methodologies for Integrated Coastal Zone Management (ICZM).

The activities of Advisory Groups are supported by respective **Regional Activity Centers**, which were established in accordance with SAP-1996 in Black Sea countries as follows: RAC PMA in Ukraine, RAC LBS in Turkey, RAC CBD in Georgia, RAC FOMLR in Romania, RAS ESAS in Bulgaria and RAC ICZM in Russia. In fact, the Activity Centers are not active at the moment due to lack of funding. The Advisory Groups are the main active instrument within the BSC to support policy development and implementation.

Where the Bucharest Convention sets out the overall objectives and obligations of the Parties, the actual implementation of each of these is to be done through more detailed and specific **Protocols**. To date, the Black Sea States have ratified or adopted four implementing protocols dealing with land-based sources of pollution, emergency situations, dumping and conservation of biodiversity. Since 2001 many more policy documents have been developed, yet pending for adoption. These are for example the draft regional Strategic Action Plan for the Biodiversity Protocol⁶, the draft regional Integrated Coastal Zone Management Strategy and Action Plan, the draft legally binding Document for Fisheries and Conservation of Living Resources of the Black Sea or the Marine Litter Action Plan.

The need for harmonization of environmental legislation and policy of all Black Sea coastal states is stipulated by the Bucharest Convention and its Protocols. The cooperation between EU member and non-member states in the Black Sea region in harmonization of policies in environmental protection has been significantly improved lately under the umbrella of the BSC. The latter was well reflected in the readiness of the Black Sea states to implement the new **Black Sea Strategic Action Plan** (SAP 2009).

This document represents an agreement between the six Black Sea Coastal states (Bulgaria,

⁶ The Biodiversity Protocol was ratified by 4 of the 6 Member States and entered in place 2011 (it was produced and proposed in 2004). The corresponding strategy was developed in 2004, thus already out-dated and currently in the process of being re-drafted. It is planned to develop the draft strategy by spring 2012 (in line with the new Strategic Action Plan). Adoption is planned for autumn 2012.

Georgia, Romania, the Russian Federation, Turkey and Ukraine) to act in concert to assist in the continued recovery of the Black Sea. The SAP provides a brief overview of the current status of the Sea, based largely on information contained within the 2007 Black Sea Transboundary Diagnostic Analysis (BS TDA), and taking into account progress with achieving the aims of the original (1996) Black Sea Strategic Action Plan (BS SAP). This SAP builds upon BS SAP signed in 1996 (updated in 2002), by re-organizing the priorities and actions therein considering the progress in the region and the current state of the environment. The updated (2009) version of the BS SAP describes the policy actions required to meet the major environmental challenges now facing the Sea, and includes a series of management targets.

Recently new paradigms in environmental protection emerged, incorporating “market-based” instruments — principally pollution taxes and tradable permits — rather than so-called “command and control” instruments. Designing standards, which require the use of clean technologies and phasing-out high waste and waste-generating technologies, was recommended to improve the management of land-based sources of pollution. New environmental management approaches were identified, these are: i) Integrated Coastal Zone Management (ICZM); ii) The Ecosystem Approach; and iii) Integrated River Basin Management (IRBM). All these new visions became a core of the new Black Sea Strategic Action Plan, based on sound understanding of the priority Black Sea transboundary environmental problems⁷ and consequent formulation of ecosystem quality objectives⁸. The BSSAP2009 also includes short-, mid- and long-term targets to tackle the sources of possible degradation – municipal, industrial and riverine discharges, overfishing, habitat destruction, ballast waters, illegal discharges from ships and other ship-related threats, climate change, lack of integrated coastal zone management and spatial planning, and others. The intention is to reach ‘Good environmental status’ of the whole Black Sea and to sustain it as likewise stated in the European Community Marine Strategy Framework Directive.

BSC PS serves as a regional data center for environmental and socio-economic data and information collected by the AGs and within the **Black Sea Integrated Monitoring and**

⁷ The Black Sea TDA-2007 reconfirmed four priority transboundary problems expressed in the BS SAP 1996, amended 2002. These are: eutrophication/nutrient enrichment; changes in marine living resources; chemical pollution (including oil); and biodiversity/habitat changes, including alien species introduction.

⁸ The Ecosystem Quality Objectives (EcoQOs) are statements regarding the Vision that reflect how stakeholders would like the state of the Black Sea to be over the long term, based on a resolution of priority problems identified in the Transboundary Diagnostic Analysis. In more detail:

EcoQO 1: Preserve commercial marine living resources.

EcoQO 1a: Sustainable use of commercial fish stocks and other marine living resources.

EcoQO 1b: Restore/rehabilitate stocks of commercial marine living resources.

EcoQO 2: Conservation of Black Sea Biodiversity and Habitats.

EcoQO 2a: Reduce the risk of extinction of threatened species.

EcoQO 2b: Conserve coastal and marine habitats and landscapes.

EcoQO 2c: Reduce and manage human mediated species introductions

EcoQO 3: Reduce eutrophication.

EcoQO 4: Ensure Good Water Quality for Human Health, Recreational Use and Aquatic Biota.

EcoQO 4a: Reduce pollutants originating from land based sources, including atmospheric emissions.

EcoQO 4b: Reduce pollutants originating from shipping activities and offshore installations

Assessment Programme (BSIMAP). BSIMAP is implemented since 2001. It is addressed to the main transboundary environmental problems in the Black Sea region: eutrophication, water pollution and water quality, biodiversity change and decline, habitats destruction. The main activities for the implementation of the BSIMAP comprise of: i) reaching consensus on common principles for regional monitoring and assessment programmes; ii) establishment of an initial affordable program to harmonize assessment methodologies, analytical techniques, reporting formats, etc.; iii) harmonization of assessment methodologies on a regional level; iv) elaboration of environmental quality criteria/objectives; v) development and establishment of mechanisms of integration scientific results into the assessment process; vi) elaboration of mechanisms and procedures for quality assurance quality control; and vii) elaboration and maintenance of the Black Sea Information System for supporting decision making process of the Black Sea Commission.

The Advisory Groups and BSIMAP provide data to the BSC annually in standardized formats. The reported data are loaded into the Black Sea Information System and used to evaluate changes over time in the coastal and marine environment. Crucial issues in the improvement of the BSIMAP are the better coordination between authorities involved, less complicated organization and a strategy for integrated monitoring developed at the national level, using best available examples (e.g. the system in Romania) and assuring sustainable financial assistance for better planning of activities. The work carried out within the BSIMAP should furthermore become transparent, interact with and enjoy the confidence of all stakeholders, including local authorities, industry, nongovernmental organizations, scientific institutions, public and others.

Climate change has not yet been considered in the Protocols, Strategies and Reports within the framework of the Bucharest Convention. Only the Strategic Action Plan recognized climate change as a cross-cutting issue recommending the preparation of a regional climate change analysis. Nevertheless, attached to the BSC there are on-going research projects touching also the issue of climate change and its biannual conference provides a regional platform for climate change research exchange.

Regional Research Projects

Some of the most relevant regional projects with climate change relevance are as following:

The **PEGASO Project** (full project title: People for Ecosystem-based Governance in Assessing Sustainable development of Ocean and coast) is funded by the European Union within FP7. The main objectives of the PEGASO project are to identify the instruments needed, and build the capacity for implementing the principles of the ICZM Protocol in order to help countries to put the Protocol into practice. The Protocol for Integrated Coastal Zone Management (ICZM) in the Mediterranean was signed in 2008. It is an agreement that formalizes an integrated coastal management between the riparian countries based on the ecosystem approach. The ICZM Protocol offers, for the first time in the Mediterranean, an opportunity to work in a new way, and a model that can be used as a basis for solving similar problems elsewhere, such as in the Black Sea. Tools, instruments and best practices shall be transferred to the Black Sea coastal states in order to – in the absence of a formal ICZM Protocol –support the development of regional ICZM soft law and to stimulate national ICZM policy development.

The work package (WP2) is led by the Priority Actions Programme Regional Activity Centre (PAP/RAC). PAP/RAC was established in Split, Croatia with the specific objective to contribute to sustainable development of the Mediterranean's coastal zones and the use of their natural resources as part of the Mediterranean Action Plan. The Protocol on Integrated Coastal Zone Management in the Mediterranean (the "ICZM Protocol") in 2008 formalized this role of PAP/RAC. The ICZM Protocol is a unique legal instrument which will allow countries of the region to better manage their coastal zones, as well as to deal with the emerging coastal environmental challenges, such as climate change. Subsequently, climate change is mainstreamed into the PEGASO Project through the work of UNEP/MAP Regional Activity Centers, who have already integrated climate change into their priority areas of action (see above). The project started in 2010 and will be completed within four years.

The **enviroGRIDS project** - Building Capacity for a Black Sea Catchment Observation and Assessment System supporting Sustainable Development – aims to assess the water resources in the Black Sea catchment in the past, the present and the future, according to different development scenarios. With 30 partners distributed in 15 countries, the enviroGRIDS project is contributing to the Global Earth Observation System of Systems (GEOSS) by promoting the use of web-based services to share and process large amounts of key environmental information in the Black Sea catchment (2.2 mio. km², 24 countries, 160 million inhabitants). The objective is also to develop datasets that are compatible with the European INSPIRE Directive on spatial data sharing across Europe. The data and metadata gathered and produced on the Black Sea catchment will be distributed through the enviroGRIDS geoportal. The challenge is to convince and help regional data holders to make available their data and metadata to a larger audience in order to improve our capacity to assess the sustainability and vulnerability of the environment. The project is going to implement a set of models and tools for the production of demographic, climatic and land cover change scenarios at the Black Sea Catchment scale. These individual scenarios will be integrated with a descriptive storyline in concordance with global scenarios such as those proposed in the UNEP Global Environment Outlook or the IPCC reports. It furthermore involves the analysis of the impacts of the climate, land use and demographic scenarios on river catchment processes, primarily water quality and quantity. Based on this analysis the impacts of all these changes will be assessed on selected Societal Benefit Areas in the present and the future. The emphasis will be on impacts on ecosystems, biodiversity, agriculture, health and energy sectors. The project runs from April 2009 to March 2013, and it has a total budget of € 8.1m (€ 6.2m EC contribution).

The ODEMM Project (Total Cost: 8.271.981€; EC Contribution: 6.499.132.90€; Duration: 42 months; Start Date: 01/03/2010) – Options for Delivering Ecosystem-based Marine Management – aims of to develop a set of fully-costed ecosystem management options that would deliver the objectives of the Marine Strategy Framework Directive, the Habitats Directive, the European Commission Blue Book and the Guidelines for the Integrated Approach to Maritime Policy. The key objective is to produce scientifically-based operational procedures that allow for a step by step transition from the current fragmented system to fully integrated management. Major steps forward in methodology and knowledge base related to sustainable management and regional governance of the European marine environment will be made in this project. In addition to this a number of key results or expected outputs are to be delivered within the project: i) Technical report of the 'Current State of Knowledge on the Sustainability of European Seas'; ii) Web-based model of cost-benefit appraisal across the four study regions; iii) An accessible web-based guide to the toolkit for marine management scenario evaluations;

iv) A costed implementation plan documented in the report 'Ecosystem-Based Marine Management – A Practical Implementation Plan: Getting There from Where We Are Now'; and
v) An ODEMM regional roadshow disseminating the major outputs from the project – the implementation plan and evaluation toolkit.

The MEECE Project (Project start: September 2008; Project end: September 2012) – Marine Ecosystem Evolution in a Changing Environment – is an European FP7 project that uses predictive models to explore the impacts of both climate drivers (acidification, light, circulation and temperature) and human induced drivers (fishing, pollution, invasive species and eutrophication) on marine ecosystems. The implementation of the EU's Marine Strategy Framework Directive (MSFD) requires the application of an ecosystem-based approach to the management of human activities. Underpinning the delivery of the MSFD is the scientific challenge of investigating and understanding the sensitivities and potential responses of marine ecosystems, to both climatic change and the direct effects of human activity. If we do not understand how the ecosystem will respond to these multiple drivers we will find it very difficult to manage marine ecosystems. A major focus of the MEECE project is the assessment of model accuracy to enable us to confidently use our simulations for science and policy applications. The project will develop methods to integrate the dynamic response of marine ecosystems to the combined effects of various anthropogenic and natural drivers in order to provide decision making tools to support the EC Marine Strategy, EC Maritime Policy and the EC Common Fisheries Policy.

The general scientific objectives of **SESAME IP** (2006-2011), supported by the European Commission, are to assess and predict changes in the Mediterranean and Black Sea ecosystems as well as changes in the ability of these ecosystems to provide goods and services. SESAME studied the effect of the ecosystem variability on key goods and services with high societal importance like tourism, fisheries, ecosystem stability through conservation of biodiversity and mitigation of climate change through carbon sequestration in water and sediments. The innovative character of SESAME is reflected in the close merging of economic and natural sciences to study the changes in the western and eastern Mediterranean and the Black Sea within the period from 50 years in the past to 50 years in the future. SESAME created a platform for disseminating the research results to all levels of society. It stimulated and strengthened international cooperation in the Mediterranean and Black Sea regions through the participation of research organizations from Member States, Associated States, Associated Candidate countries, non-EU Mediterranean and NIS countries as well as international organizations.

The **UP-GRADE BS-SCENE project** is an FP7 EU funded project running from 2009-2011 that is building and extending the existing research infrastructure (developed under FP6 project BlackSeaScene) with an additional 19 marine environmental institutes/organizations from the 6 Black Sea countries. UP-GRADE BS-SCENE is undertaken by 51 partners of which 43 are located in the Black Sea countries. The predecessor FP6 RI **Black Sea SCENE project** established a Black Sea Scientific Network of leading environmental and socio-economic research institutes, universities and NGO's from the countries around the Black Sea and developed a distributed virtual data and information infrastructure that is populated and maintained by these organisations to improve the identification, access, exchange, quality indication and use of their data and information about the Black Sea. Project BlackSeaScene has run from 2005-2008. The UP-GRADE BS-SCENE project aims: a) To extend the existing research infrastructure with an additional 19 marine environmental institutes/organizations from the 6 Black Sea countries.

b) To implement the results of the Joint Research Activities of the FP6 RI SeaDataNet project (common communication standards and adapted technologies to ensure the datacenters interoperability). c) To network the existing and new Black Sea datacenters, active in data collection, and provide integrated databases of standardized quality on-line. d) To realize and improve on-line access to in-situ and remote sensing data, meta-data and products. e) To adopt standardized methodologies for data quality checking to ensure the quality, compatibility and coherence of the data issuing from so many sources.

SEAS-ERA (2010-2013) is an EU funded project under the FP7 ERA-NET Scheme. The project is a partnership of the leading Marine Research and Technology Development (RTD) Funding Organizations in 18 countries. SEAS-ERA aims at coordinating the national and regional marine RTD activities in these countries. SEAS ERA will bring together, through several mechanisms, the four European sea basins working within two different levels: regional and pan European. This work structure will enable to harmonize common priorities and needs in marine and maritime research while respecting diversities between regions. Project Work Package 1 aims at identifying and prioritizing emergent disciplinary and interdisciplinary marine scientific issues of European strategic importance, initiating analysis and studies in support of the regional and pan-European Research Strategies at the research technology and research-policy interfaces. This strategic analysis will empower all regional nodes to develop a Strategic Research Plan, and to establish a pan-European strategic forum for Marine Research Funding Organisations and science end-users, in adherence with the concept of defragmentation of the European Research Area. A Strategic Research Agenda (SRA) has been developed under the Black Sea Work Package of the SEAS ERA Project, including the topic of climate change. The partner countries of the Black Sea Work Package are Turkey, Bulgaria, Romania, Ukraine and Georgia.

The Black Sea Commission and the Black Sea Synergy Project are jointly organizing the **biannual Black Sea scientific conference**. The scope of the second biannual conference (2008) was to initiate a concerted effort to use science, information technology and policy measures to understand and deal with the consequences of global warming in the Black Sea towards better governance, sustainable exploitation of resources and conservation of the marine environment. The objectives were to i) synthesize regional and basin-wide studies and provide a forum for the integration of climate change -related results, data and hypotheses; ii) discuss and evaluate climate forcing mechanisms of physical, biological and biogeochemical processes at various time-spatial scales; iii) formulate projections and future scenarios of economic and sociological impacts of a changing ecosystem on the coastal communities and resource users; and iv) to frame scientific, technological and policy measures against global warming towards sustainable ecosystem management. The third biannual conference (2011) included again one session on climate change bringing together 36 paper presentations from researcher across the region and beyond. The Black Sea scientific conference is an outstanding forum for getting up-dated on climate change related scientific research developments covering the Black Sea and is offering a wealth of research information and contacts to local expertise.

General Conclusions

The decisions taken at the 17th Conference of the Parties (COP17) to the United Nations Framework Convention on Climate Change (UNFCCC) made it clear that country-led, regional and private sector climate action will become the main driver for the transition to resilient and low-carbon societies as an all-inclusive global legal deal won't be in force for the next eight years.

Recent studies have highlighted that climate change poses a considerable threat to the Black Sea basin and the BSEC Member States (implemented by IPCC, WB, EC or the National Communications on Climate Change submitted to the UNFCCC). At the same time, there is already considerable experience in terms of institutional and policy development, analytical capacity and project implementation experience related to climate change in the region. Naturally, the degree of international embeddedness of environmental governance, national political commitment, institutional maturity to integrate climate change into development planning, the level of capacity to implement climate change projects so as the vulnerability to climate change and the GHG mitigation potential varies from country to country.

All countries of the region have signed the United Nations Framework Convention on Climate Change and the associated Kyoto Protocol. Parties to the Convention must submit national reports on implementation of the Convention to the Conference of the Parties (COP). Through the national communications, both Annex I and non-Annex I Parties, developed greenhouse gas inventories and vulnerability assessments, generated climate change projections, produced mitigation and adaptation action plans, integrated climate change into national development planning and conducted capacity building initiatives. Article 4 of the UNFCCC stipulates that every effort must be made to adopt national or regional adaptation strategies.

The EU adaptation policy framework and the Mediterranean Action Plan provide another positive learning opportunity for BSEC and BSC. BSEC Member States that are intertwined with the EU and the Mediterranean Action Plan have already gained a wealth of experience in climate change matters which can be transferred into the regional governance arenas of BSEC and BSC. Bulgaria, Greece and Romania are EU Member States and therefore tied to the EU environmental *acquis communautaire* and the EU climate and energy policy. Albania and Serbia are potential candidate countries for EU accession and Turkey began full membership negotiations with the EU in 2005. Albania, Serbia, Moldova and Ukraine are part of the Energy Community, which intends to extend the EU internal energy market to South East Europe and beyond in line with the relevant *acquis*, including key EU legal acts in the area of electricity, gas, environment and renewable energy. Three of the BSEC Member States – Albania, Turkey and Greece - have also adopted the Mediterranean Action Plan (MAP) and the Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention). Turkey has furthermore ratified the Convention on the Protection of the Black Sea Against Pollution and is a Member State of the Black Sea Commission which is tasked to implement the provisions of the Convention and the Black Sea Strategic Action Plan.

On-going regional research activities are another source of learning for the BSEC Member States and create access to scientific evidence of the potential changes in climate and related impacts which can thus accelerate (proactive) adaptation. The PEGASO project, the enviroGRIDS project,

the ODEMM project, the MEECE project, the SESAME IP project, the UP-GRADE BS-SCENE project or the SEAS-ERA project are opportunities in this regard and are mainly financed by the EU's Framework Programme for Research and Technological Development, the major tool to support the creation of the European Research Area.

But this growing experience and knowledge has hardly been extrapolated to the Black Sea regional level. Climate change is not yet integrated within the strategies and action plans of the two main regional multilateral bodies covering the Black Sea region, the Black Sea Economic Cooperation Organization (BSEC) and the Black Sea Commission (BSC). Despite the existing scientific knowledge and on-going research projects, no major attempt has been made so far to compile and harmonize the available climate change information, to integrate it into on-going and planned regional initiatives and to move it up to the regional policy level.

There is the opportunity for BSEC and BSC to utilize their mandate in order to support the climate change agenda on the regional level by capitalizing on the already existing national experience. BSEC came into existence as a unique model of multilateral political and economic initiative aimed at fostering interaction and harmony among the Member States, as well as to ensure peace, stability and prosperity, moving progressively towards embracing the sustainable development paradigm. The Commission on the Protection of the Black Sea Against Pollution via its Permanent Secretariat is the intergovernmental body established in implementation of the Convention on the Protection of the Black Sea Against Pollution, its Protocols and the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea.

Due to the regional variability and severity of climate impact most adaptation measures will be taken at national, regional or local level. However these measures can be supported and strengthened by an integrated and coordinated approach at BSEC and BSC level. BSEC and BSC have a particularly strong role when the impact of climate change transcends the boundaries of individual countries. As key regional arenas promoting knowledge transfer, harmonized policies and joint initiatives in many areas prone to climate change, BSEC and BSC can act as important accelerators for the integration of climate change into the regional development of the Black Sea, for the harmonization of negotiation positions or for developing a unified regional climate change research and monitoring framework. While a number of BSEC Member States have prepared national adaptation strategies, others have yet to do so. BSEC and BSC are well placed to facilitate coordination and the exchange of best practices between Member States on climate change.

Programmatic Conclusions

Preventive action brings clear economic, environmental and social benefits by anticipating potential impacts and minimizing threats to ecosystems, human health, economy and infrastructure (Stern Report 2006). The next decade offers a window of opportunity for the BSEC region to make the development more resilient to climate change while reaping numerous co-benefits by focusing on “no-regret” actions. But the region should also develop strategies to reduce vulnerability in the long run. Forward-looking decisions today help avoid locking countries or settlements into unsustainable patterns of development. Experiences from other regions now developing and implementing adaptation frameworks, strategies and action plans offer valuable lessons and methodologies.

The EU climate change, energy and environmental legislation provides a positive framework for accelerating climate change mitigation and adaptation in the region through directives on issues such as promotion of renewable energy, establishment of the EU ETS, reducing GHG emission from transport fuels, end-use energy efficiency and energy, environmental impact assessment, environmental liability, chemical waste management, integrated pollution prevention and control or integrated watershed management. The EU embarked to establish a strategic framework for adaptation to reduce EU's vulnerability to the impact of climate change, including the development of many useful tools, guidelines and assessments concerning climate change. These efforts can provide valuable input for other regional inter-governmental initiatives. The white paper is accompanied by three sectoral papers on agriculture, health and water, coasts and marine issues.

The objective of the EU's Adaptation Framework is to improve the EU's resilience to deal with the impact of climate change. The Phase 1 (2009-2012) will focus on four pillars of action: 1) building a solid knowledge base on the impact and consequences of climate change for the EU, 2) integrating adaptation into EU key policy areas; 3) employing a combination of policy instruments (market-based instruments, guidelines, public-private partnerships) to ensure effective delivery of adaptation and 4) stepping up international cooperation on adaptation.

The first two approaches and pillars are in particular relevant for the Black Sea region at this stage and for the purpose of this project. First, it is important for BSEC and BSC to build a solid knowledge base on the impact and consequences of climate change. It is essential to develop a common perspective about the likely impact of climate change, the associated socio-economic aspects and the costs and benefits of different adaptation options. A shared perspective as well as more knowledge is needed on climate impact and vulnerability so that appropriate policy responses can be developed. As explained above, a considerable amount of national experience, information and research already exists, but is not shared across BSEC and BSC Member States. An effective way to improve knowledge management would be to establish a Clearing House Mechanism as an IT tool and database on climate change impact, vulnerability and best practices on adaptation. A prime example for such an instrument on the global level is the Adaptation Learning Mechanism (ALM) launched by UNDP along with other agencies partners (e.g. UNFCCC, WB and UNEP). It is a response to the information gap and seeks to provide stakeholders with a common platform for sharing and learning. Furthermore, it is crucial to identify the knowledge gaps and research needs necessary to gain better understanding of climate change impacts and to develop skills, methods and technologies to cope with the consequences of climate. Methods, models, data sets and prediction tools, which can be enabled by information and communication technologies, assist in understanding and forecasting climate impact, in identifying vulnerabilities and in developing appropriate adaptation measures. Further work is necessary to identify the gaps and needs and to promote the integration of climate change into up-coming regional research projects, especially within the European research area (ERA) and international development assistance programmes. A proactive step in this direction by BSEC and BSC will increase translational research efforts and the policy effectiveness of future research.

Second, it is important for BSEC and BSC integrate adaptation into key policy areas. This has to be carefully prepared, based on solid scientific and economic analysis. In each policy area there should be a review of how policies could be re-focused or amended to facilitate adaptation. Adaptation options will vary by sector and will, in some cases, require financing. For each sector,

further work needs to be done to improve understanding of the impact of climate change, assess appropriate responses and secure the necessary funding. In each policy area, the following key questions must be answered: i) What are the actual and potential impacts of climate change in the sector?; ii) What are the costs of action/inaction?; iii) How do proposed measures impact upon and interact with policies in other sectors? The sectors health and social policies; agriculture and forests; biodiversity, ecosystems and waters; coastal and marine areas; energy; tourism; production systems and physical infrastructure are those promoted by BSEC and BSC for which climate change mainstreaming efforts and adaptation strategies outlining the types of action are needed. Priority should be given to adaptation measures that would generate net social and/or economic benefits irrespective of uncertainty in future forecasts (no-regret measures). Priority should also be given to measures that are beneficial for both mitigation and adaptation.

Three of the BSEC Member States – Albania, Turkey and Greece - have adopted the Mediterranean Action Plan (MAP) and the Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention). Although the initial focus of the MAP was on marine pollution control, the focus gradually shifted to include sustainable development, and more specifically integrated coastal zone planning and management, as the key approach through which solutions are being sought. Climate change was added recently on the list of priority areas and a rigorous process to integrate climate change into the strategic and operational spheres of MAP was initiated. During the 16th Meeting of the Contracting Parties to the Barcelona Convention and its Protocols held in Marrakesh in November 2009, adaptation to climate change in the Mediterranean coastal and marine environments was identified as a priority issue requiring attention. Accordingly, climate change adaptation in the coastal zone has been incorporated into the “Marrakesh Declaration” and the Regional Activity Centers were further tasked to implement associated climate change activities within the framework of the Mediterranean Strategy on Sustainable Development (MSSD). The MSSD identifies priority fields of action such as water, energy, transport, tourism, agriculture, urban development, sea and coastal management. Since the Marrakesh Declaration climate change is another issue to be addressed. MAP supports technically and financially the formulation of national strategies for sustainable development and thus possesses the tool to promote climate change adaptation within the MAP Member States. Furthermore, six MAP Regional Activity Centres (RACs) are based in Mediterranean countries, each offering its own environmental and developmental expertise for the benefit of the Mediterranean community in the implementation of MAP activities. Climate change and green economy was consequently introduced into the focus areas and multi-annual work programmes of the Regional Activity Centers. In this context, the Priority Actions Programme/Regional Activity Centre (PAP/RAC), covering the area of sustainable development of coastal zones and sustainable use of their natural resources, PAP/RAC recently integrated climate change into its five-year Programme of Work and commissioned a “position paper” to summarize the potential adaptation actions that could be undertaken by the Mediterranean countries in coastal zones, and to provide suggestions how MAP and in particular PAP/RAC can best support the contracting parties to adapt to climate change in coastal zones. Developing a Mediterranean Coastal Adaptation Framework was proposed as a key priority in the position paper. To develop a strategic framework for climate change adaptation within BSEC and BSC would be a natural first step to take up the challenges posed by climate change in an organized, structured and well planned manner.

There are many lessons learned from other initiatives aimed to integrated climate change into development planning. For example, adaptation must be encompassed within a comprehensive management and institutional framework. A framework is useful to ensure a consistent approach to adaptation. The lessons learned of existing tools and approaches should be utilized in this process. Capacity building and climate change mainstreaming are important tools to support effective climate change adaptation and any approach to adaptation should combine top-down and bottom-up approaches to increase sustainability and ownership. Furthermore, the key to effective pilot projects is knowledge management and dissemination to ensure that lessons learned in the pilot project can be widely shared to promote uptake beyond the pilot site.

At the same time climate change cannot effectively be addressed through its own policy. Instead, climate change needs to be mainstreamed into other policies, frameworks and associated programmes. If it is not mainstreamed, there is a risk that other policies and frameworks will be undermined by climate change or, at worst, those policies and frameworks may inadvertently increase the vulnerability of social and natural systems, thereby exacerbating the potential risks of climate change.

Recognising this to be the case, a number of organizations and countries have undertaken climate screening of policies and frameworks, and analysed the extent to which climate change has been mainstreamed into projects and programmes, often supported by bi- and multilateral development assistance. For example, the OECD made a declaration on Integrating Climate Change Adaptation into Development Cooperation, for which a global stocktake of progress was done. The World Bank and other regional development banks have also screened their project portfolios for investment risk relating to climate.

The various approaches to screening range from analyses of agency documents on whether they make reference to climate impacts, to assessments of the exposure of investments to climate risks, to examining the actual implications of climate change (either mitigation, or adaptation, or both) on projects and programmatic activities or promoted policies. Reflecting these methodological questions, a number of different tools and guidelines have been devised in order to undertake climate screening and mainstreaming. These include UNDP's Adaptation Policy Framework; OECD Guidance on Integrating Climate Change Adaptation into Development Co-operation; USAID's Climate Adaptation Manual; World Bank ADAPT (Assessment and Design for Adaptation to Climate Change: A Prototype Tool); DFID's Opportunities and Risks from Climate Change and Disasters (ORCHID); UKCIP Adaptation Wizard; or the Community-Based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL).

Each of these tools differs in their target context. The UKCIP Adaptation Wizard, for example, focuses on organizations assessing climate risks to their activities. OECD's Guidance on Integrating Climate Change Adaptation into Development Cooperation, World Bank ADAPT, USAID's Climate Adaptation Manual and DFID's ORCHID are all intended for use at strategic level in the screening of development projects and programmes; whilst CRiSTAL was developed to for use in projects at the community level to ensure participation in risk assessment. UNDP's Adaptation Policy Framework includes climate screening as a prerequisite for the design process for adaptation projects. However they are all based on the same principles. These include i) screening the risks of climate change to the project/programme/organization or policy; ii) identifying the potential options to respond to those risks; iii) evaluating those options; iv)

implementing a risk reduction/adaptation measure, and then monitoring that option for its effectiveness.

Beside the hands-on experience of several Member States gained already within the contexts of EU and MAP, these tools offer BSEC and BSC valuable resources to develop a strategic climate change adaptation framework and to start conceptualising climate change into its activities. Beside the fact that climate change is not yet integrated into BSEC and BSC, there is a mounting interest to take up this challenge. The BSEC Council of Ministers of Foreign Affairs adopted the Joint Declaration on Combating Climate Change in the wider Black Sea (26 November 2010). Through the declaration, the BSEC Council of Ministers of Foreign Affairs agreed to i) develop regional policy approaches on mitigating climate change with respect to the capabilities of the countries concerned and at the same time ensuring energy security and a sustainable development process providing for growth, employment and welfare; ii) strive to develop common approaches on climate change demonstrating leadership and strong commitment to action in the international arena, aiming at contributing to international and regional agreements through seeking the possibility of developing common policy positions, as well as project- based initiatives; and iii) to strengthen collaboration on addressing common challenges by elaborating shared plans and initiatives concerning the implementation of models of environmental risks assessment, especially early warning prediction models, with the aim of taking joint measures and increasing safety precautions against disasters in the wider Black Sea area.

This gives green light to the BSEC Secretariat and its associated Working Groups to start up developing a strategic climate change adaptation framework and integrating climate change into its work programmes and activities. There are eighteen Working Groups established, from which the following cover priorities for initiating the climate change mainstreaming effort: Banking and Finance; Energy; Emergency Assistance; Education; Science and Technology; Tourism; Trade and Economic Development; Agriculture and Agro-industry; Environmental Protection; and Health Care. Working Groups are in the best case guided by so-called joint ministerial declarations. Working Groups are comprised by focal points of the Member States and operate under an action plan or work programme coordinated by an executive manager. This provides for a clear structure with several entry points and the opportunity to capitalize on a number of specific tools for climate change mainstreaming. Currently the leadership to integrate climate change adaptation into BSEC is taken by the Working Group of Environmental Protection. Similar like for MAP the PAP/RAC, the BSEC Working Group of Environmental Protection can be an important player to propose a strategic framework for climate change adaptation and to act as a role model by starting to integrate climate change into its Action Plan.

BSEC furthermore consists of BSEC related bodies and BSEC affiliated centers. The BSEC related bodies that have their own budgets, perform their functions in accordance with their basic instruments and with due respect to the principles of the BSEC. The BSEC related bodies are the Parliamentary Assembly of the Black Sea Economic Cooperation (PABSEC), the BSEC Business Council, the Black Sea Trade and Development Bank and the International Center for Black Sea Studies. These related bodies are further entry points and multipliers for advancing the climate change mainstreaming agenda in the region. An adequate approach needs to be developed in order to capture their roles and responsibilities within a wider strategic BSEC adaptation framework. Output 2 of this project will identify and enforce linkages with the BSEC Business

Council, the Black Sea Trade and Development Bank and the International Center for Black Sea Studies.

The Commission on the Protection of the Black Sea Against Pollution via its Permanent Secretariat is the intergovernmental body established in implementation of the Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), its Protocols and the Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea. As executive body of BSC, the Secretariat coordinates activities of the Advisory Groups to the Black Sea Commission, which are its main source of expertise, information and support. There are six advisory groups (AG): AG on Pollution Monitoring and Assessment (PMA); AG on Control of Pollution from Land Based Sources (LBS); AG on Conservation of Biological Diversity (CBD); AG on Environmental Aspects of the Management of Fisheries and other Marine Living Resources (FOMLR); AG on Environmental Safety Aspects of Shipping (ESAS); AG on Development of Common Methodologies for Integrated Coastal Zone Management (ICZM). As well as for the BSEC, there is the need to develop a strategic framework for climate change adaptation, to identify key players as well as their roles and responsibilities, and to start mainstreaming climate change into its activities based on the experience of its Member States, the EU and MAP, while capitalizing on existing climate change assessment as well as policy tools and instruments.