SOUTH EAST EUROPEAN CLIMATE CHANGE FRAMEWORK ACTION PLAN FOR ADAPTATION

Prepared by representatives and nominated experts from:

The Republic of Albania

Bosnia and Herzegovina

The Former Yugoslav Republic of Macedonia

Montenegro

The Republic of Serbia

The Regional Environmental Centre for Central and Eastern Europe

The South East European Virtual Climate Change Centre hosted by
Republic Hydrometeorological Service of Serbia

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Leading Authors:
Regional Team Leader: Ms. Danica Spasova
National Team Members:
Albania – Ms. Ermira Fida, Ms. Englantina Bruci
Bosnia and Hercegovina – Mr. Martin Tais, Mr. Goran Trbić, Ms. Milena Marković, Mr. Senad Oprašić
Former Yugoslav Republic of Macedonia – Ms. Teodora Grncarovska, Ms. Dragana Ilijevska, Mr. Marjan Mihajlov
Montenegro – Ms. Biljana Djurović, Ms. Mirjana Ivanov
Serbia – Ms. Jelena Cvetković, Ms. Danijela Božanić, Ms. Tatjana Savić, Mr. Borivoj Rajković, Mr. Vladimir Djurdjević, Mr. Mihailo Andjelić

Coordinating Institutions:
SEE/VCCC – South East European Virtual Climate Change Center: Mr. Milan Dacić
REC – Regional Environmental Center: Mr. Jovan Pavlović
RHMSS – Republic Hydrometeorological Service of Srerbia

Editorial Board:
Mr. Jovan Pavlović , REC
Mr. Milan Dacić, SEE/VCCC
Ms. Danica Spasova, SEE/VCCC

Publishers:
SEE/VCCC
REC
RHMSS

For Publishers:
Mr. Jovan Pavlović, REC
Mr. Milan Dacić, RHMSS, SEE/VCCC

Design and illustrations:
Dušan Đurđic

Page layout:
Mirjana Arsenović Dacić

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Joint Statement

by the Ministers responsible for environment of the Republic of Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and the Republic of Serbia on combating climate change in South East Europe

Sarajevo, Bosnia and Herzegovina, November 14, 2008

The Ministers responsible for environment of the Republic of Albania, Bosnia and Herzegovina, The Former Yugoslav Republic of Macedonia, Montenegro and the Republic of Serbia – observed by representatives of donor countries, international organisations, institutions and NGOs – met in Sarajevo to discuss and agree upon voluntary participation in the **South East European Climate Change Framework Action Plan For Adaptation** under the framework of the Regional Cooperation Council (RCC).

The Ministers acknowledged that:

- Addressing climate change problems that threaten the future well being of the citizens of the region is a matter of urgency. Climate change is projected to worsen conditions by the increased frequencies, magnitudes and damages caused by floods, droughts, forest fires, heat waves and other climate related hazards, reductions in crop yields, decreased water availability, reduced hydropower potential, increased number of people exposed to vector and water-borne diseases, etc. Adaptation could significantly reduce these effects.
- There are numerous climate change related international agreements and initiatives at the global level that have to be implemented in the South East European (SEE) region, e.g. the United Nations Framework Convention on Climate Change, the Kyoto Protocol, the Millennium Development Goals, the Bali Action Plan, and many others.
- Environmental cooperation between the SEE countries under the framework of the RCC will give higher priority to combating climate change on national and regional agendas.
- The comprehensive process within the framework of the RCC offers a unique opportunity to integrate environmental and human health concerns into the

economic sectors, thus contributing to the implementation of the concept of sustainable development.

- The work performed by the Regional Environmental Centre for Central and Eastern Europe (REC) within the UNFCCC and Kyoto Protocol, followed by the Belgrade Initiative launched in 2007 on enhancing regional cooperation of interested South East European countries in the field of climate change, provide a good strategic framework for future work.

The Ministers supported the **South East European Climate Change Framework Action Plan for Adaptation** (SEE/CCFAP-A) document as presented at this meeting. The SEE/CCFAP-A sets out a framework for achieving key adaptation priorities that address the short term needs as well as long term objectives of the region in a cost effective manner. The Ministers welcome the greater focus of the SEE/CCFAP-A on capacity building and its linkage with the UNFCCC wider climate change agenda.

The **overall coordination** of the implementation of the SEE/CCFAP-A implementation will be realised by an ad-hoc working group comprising representatives and nominated experts from the interested SEE countries. The REC and SEE Sub-regional Virtual Climate Change Centre (SEE/VCCC), hosted by the Republic Hydrometeorological Service of the Republic of Serbia, will provide a secretariat and technical support to this group. The SEE/VCCC expressed interest to perform a variety of other tasks related to maintaining the web site, fundraising, drafting correspondence, report preparations, news releases, brochures, fact sheets, expert opinions etc.

The coordination of the specific work under Chapter 4 “Continuous update of SEE climate change perspective” will be performed by SEE/VCCC. The projects and activities under Chapter 5 “Development and implementation of programmes for adaptation” will be directed by different interested countries. During the SEE/CCFAP-A preparatory process, the countries expressed preliminary views on the leadership. The Republic of Albania expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in the hydropower sector, which has a mitigation potential as well. Bosnia and Herzegovina expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in the energy and agriculture sector. The Former Yugoslav Republic of Macedonia expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in water management and agriculture sectors. Montenegro expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in tourism and coastal zones. The Republic of Serbia expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in water management, forestry, agriculture, public health, land use, biodiversity and buildings. The REC in cooperation with the SEE/VCCC expressed interest to coordinate projects and activities under SEE/CCFAP-A Chapter 6 “Cross-cutting issues”.

Montenegro is also interested in supporting the establishment of the Balkan Regional Climate Change Forum (BRCCF) for political and policy dialogue to facilitate the coordination of the activities on adaptation and mitigation in the region. This Forum should be used the UNFCCC focal points and the informal Open Balkan Group to obtain endorsement from the Ministers for joint regional actions in the global climate change process as well as for a better understanding of the policies they need to develop and implement with the involvement of other ministries (energy, economy, agriculture, etc.).

The Ministers stressed that the SEE/CCFAP-A will be a living document, responding to the changing needs and circumstances in the region and agreed to work together to develop it further and implement it. The scope and the magnitude of the SEE/CCFAP-A will further develop in the light of the EU accession process.

The process of the implementation of the SEE/CCFAP-A, including the work on its future revisions, should be open to all countries including countries, beyond SEE, international organisations, institutions and NGOs which can make a contribution to its success. The Ministers invited SEE and neighbouring countries to discuss modalities for cooperation.

The Ministers encouraged the establishment of a Working Group "Climate Change" under the Regional Environmental Network for Accession (RENA).

The Ministers invited the donor countries and the European Community to consider urgent support for the implementation of the SEE/CCFAP-A.

In order to strengthen the negotiating position of the SEE countries at the Conference of the Parties (COP) to the UNFCCC, the Ministers agreed to:

- Consider using the Open Balkan Group to unify efforts of SEE countries in order to facilitate their participation in negotiations under the umbrella of the UNFCCC and Kyoto Protocol. Invite the Republic of Bosnia and Herzegovina to act as the first coordinator of the Open Balkan Group.
- Invite the Republic of Serbia to present this Statement, SEE/CCFAP-A, Executive Summary and Action Plan to the COP-14 of the UNFCCC in Poznan in December 2008.

The Ministers expressed their gratitude to the Royal Ministry of Foreign Affairs of Norway for their support in the development of the SEE/CCFAP-A.

The Ministers congratulated the host, Regional Cooperation Council and the Regional Environmental Centre for Central and Eastern Europe for bringing forward the framework programme "Roadmap for environmental cooperation in South Eastern Europe" and in particular this first Ministerial thematic conference on combating climate change.

The Ministers congratulated SEE governmental officials and nominated experts, the SEE Sub-Regional Virtual Climate Change Centre and the Regional Environmental Centre for Central and Eastern Europe for excellent work in developing the SEE/CCFAP-A.

The Ministers expressed gratitude to the Council of Ministers of Bosnia and Herzegovina for hosting this meeting and creating a constructive atmosphere for fruitful discussions.

Executive Summary

1. The present document contains the sub-regional South-East European Climate Change Framework Action Plan for Adaptation (SEE/CCFAP-A) and represents the outcome of a joint effort of the interested South East European (SEE) countries in creating a common platform for sub-regional cooperation in climate change. The SEE/CCFAP-A was developed with the financial support of the Royal Ministry of Foreign Affairs of Norway within the Regional Environmental Reconstruction Programme for south eastern Europe.

2. The purpose of the SEE/CCFAP-A is to ensure that the SEE population build their resilience capacity to the risks and impacts of climate change through implementing adaptation actions; improving understanding of climate change and its effects; education and awareness raising; improving decision making and good governance; developing and strengthening partnership and cooperation; and to support the SEE Countries in the implementation of Articles 5 and 6 of the United Nations Framework Convention on Climate Change (UNFCCC) and its Framework for Capacity Building and the Nairobi Programme of Work on Impacts, Vulnerability and Adaptation.

3. The objectives are: to understand the main characteristics of climate variability and hazards in the SEE region; to understand existing programmes/projects and institutional arrangements for addressing climate change; to identify adaptation activities to climate hazards and climate change. The SEE/CCFAP-A will establish a framework for current and future regional project initiatives in terms of adaptation to the impacts of climate change. It will be revised and updated to reflect changes in climate sciences and in economic conditions in the SEE countries and emerging technologies. By taking action to address climate change, the SEE Governments will be taking action towards the development of a more sustainable society and economy.

4. The SEE/CCFAP-A was drafted as the result of a comprehensive consultation process involving a broad range of important governmental stakeholders from the SEE region based on various official documents and relevant literature (IPCC published refereed reports, UNFCCC decisions, EU-refereed electronic publications, as well as the inputs coming from SEE countries).

5. The development of the SEE/CCFAP-A follows the first recommendation within the so-called Belgrade Initiative for the enhancement of sub-regional cooperation in the field of climate change. The Initiative, as a result of the SEE Ministerial consultation process, was adopted by the Sixth Ministerial UNECE Conference "Environment for Europe" held in Belgrade in October 2007, (see document ECE/BELGRADE.CONF/2007/20).

6. Under the Belgrade initiative, the Ministers agreed: (i) that the interested countries of SEE should strengthen their political support for the implementation of the SEE/CCFAP-A (ii) that the interested countries shall support the SEE pilot project aimed at setting up the functions of the Sub-Regional Virtual Climate Change Centre hosted by the Republic Hydrometeorological Service of Serbia, which will contribute to the coordination of the implementation of the SEE/CCFAP-A; (iii) that in order to develop and implement the SEE/CCFAP-A programmes, the

SEE countries will establish partnerships with relevant international organizations; (iv) to invite the SEE countries, international organizations, financial institutions, donors, and other stakeholders to join this open-ended initiative and to be fully involved in sharing their experience and providing much needed support for sub-regional climate change activities.

7. The Ministers of the SEE countries took full advantage of the Environment for Europe process to establish the SEE Sub-regional, Virtual Climate Change related Centre for Research and Systematic Observation, Education, Training, Public Awareness and Capacity Building (SEE/VCCC) hosted by the Republic Hydrometeorological Service of Serbia. The SEE/VCCC is a network of national institutions of the participating countries (ministries, hydrometeorological services, scientific institutions, NGOs, and other stakeholders).

8. As the latest Assessment Report of the UN Intergovernmental Panel on Climate Change (IPCC) shows, the projections of global climate changes made for various scenarios of anthropogenic emissions of greenhouse gases indicate that the average global warming of the surface atmosphere at the end of the 21st century will range from 1.8 °C to 4.0 °C, compared to the year 2000. It is expected that such an increase in the mean annual temperature in Europe will be higher than that at the global level (on the European continent, an increase in the mean annual temperature will be between 2.2 °C to 5.1 °C by the end of the 21st century).

9. In addition to changes in the mean values of the climate parameters, changes in the frequency and intensity of climate extremes (storms accompanied by floods and destructive effects of wind, drought, extremely high or low air temperatures, heat waves, snow storms, avalanches, landslides, forest fires, etc.) have been projected for South Eastern Europe. As a consequence of such negative effects on food and energy production, water supply, biological diversification, hydropower potential, summer tourism, crop productivity and human health, the IPCC Fourth Assessment report recognized the region of southern Europe as highly vulnerable to climate change.

10. The increasing vulnerability to climate change and other natural disasters in the countries of South-Eastern Europe necessitated the further strengthening of regional and international technical and scientific cooperation in providing more successful climate change monitoring and forecasting, as well as the assessment of climate change impacts on human health, economic activities, availability of water and other natural resources, and the need for timely problem identification and adoption of measures and strategies to adapt to the changed climate conditions.

11. All SEE countries are in the process of preparation for full EU membership. The standard of living, unemployment rates and relatively modest economic growth rates are the central economic problems. One of the key challenges is the implementation and acceleration of economic reforms as well as a balanced economic development; challenges to the improvement of the standard of living and poverty reduction are closely related. The integration of climate change issues into development policies will represent a special challenge. Raising the awareness and capacity building for the inclusion of the concept of climate change in sustainable development strategies are of utmost importance.

12. The SEE/CCFAP-A will complement the existing SEE countries' policy objectives and commitments to sustainable development. The SEE/CCFAP-A will establish a framework for current and future regional project initiatives in terms of adaptation to the impacts of climate change. The SEE/CCFAP-A is intended to be a "living document". It will be revised and updated to reflect

changes in climate sciences and economic conditions in the SEE countries, including the emerging technologies. By taking action to address climate change, the SEE Governments will also be taking action towards the development of a more sustainable society and economy.

13. **Timeline**. The SEE/CCFAP-A runs from 2009 to 2015 and is consistent with the timeframes of the *Millennium Declaration, the Johannesburg Plan of Implementation* and subsequent work of the UN Commission on Sustainable Development, the "Hyogo Framework for Action 2005 – 2015: Building the Resilience of Nations and Communities to Disasters"; as well as the EU Green Paper on Adaptation, Water Initiative, etc. The Framework Action Plan will be subject to a mid-term review in 2012 in order to determine the overall progress and identify the emerging gaps requiring priority action and adjustment of priorities in the future.

14. The SEE/CCFAP-A covers different sectors and areas of activity. The first three chapters are dedicated to general issues such as the purpose and methodology for drafting the plan, vulnerability and adaptation circumstances of the SEE countries, the timeline of SEE/CCFAP-A, the objectives and expected results and the present status of climate change policy frameworks in the field of adaptation.

15. **Chapter 4 of the SEE/CCFAP-A** reflects the conclusions and actions identified within the SEE Disaster Reduction Management Initiative (SEE DRMI) by the UN International Strategy for Disaster Reduction (UN/ISDR) and the Regional Association VI (Europe) Strategic Plan of the World Meteorological Organization. In this Chapter, a continuous update of the SEE climate change perspective is given together with the identified actions and needs taken from other initiatives (SEEDRMI, WMO RA-VI Action Plan). It comprises (i) Climate Observations, Monitoring and Forecasting in SEE; (ii) Climate Modelling and Scenarios in SEE; (iii) Reduction of Climate Related Risks in SEE; and (iv) Socio-Economic Information on Climate Impacts in SEE. The UNFCCC has recognized the importance of research and systematic observation aimed at reducing uncertainties regarding the effects of climate change and impacts and responses to it. As part of this recognition, the Conference of the Parties to the UNFCCC invited the Global Climate Observing System (GCOS) to identify the priority capacity-building needs and identify gaps in regional systematic observation (FCCC/SBSTA/2006). Regional GCOS action plans for eastern and central Europe and for the Mediterranean Basin were developed, highlighting the need for a better knowledge base, better forecasting and climate services, and the need to improve observations at all levels in order to enhance the ability of countries to adapt. In addition, early warning and risk management systems are recognized as efficient contributors that can facilitate adaptation to climate variability and change.

16. The list of the identified actions and needs taken from other initiatives (SEEDRMI, WMO RA-VI Action Plan) has to be continuously updated. It is presented in Table 1, Action Plan Part A

17. **Chapter 5 of the SEE/CCFAP-A** consists of the programmes for adaptation and defines the proposed actions and needs in different sub-regional programmes. These focus on the following sectors: (i) public health, safety and emergency preparedness; (ii) water resources management; (iii) agriculture and forestry; (iv) land use, buildings and transportation; (v) tourism; (vi) coastal zones; (vii) biodiversity and ecosystems; and (viii) energy.

18. The proposed actions and needs in eight sub-regional programmes corresponding to different strategic foci are given in Table 2, Action Plan Part B. They are public health, water management, agriculture and forestry, land use, buildings and transportation, tourism, coastal zones, biodiversity and ecosystems, and energy.

19. **Chapter 6 of the SEE/CCFAP-A** contains the important cross-cutting issues which are relevant to actions related to continuous climate change update in SEE and for all sub-regional programmes from Chapter 5. These common cross-cutting activities comprise: SEE cooperation in adaptation; capacity building in SEE; education, training and public awareness in SEE; preparation of a roster of experts in SEE; and building partnerships in climate change. Priority actions are presented in Table 3, Action Plan Part C. In **Chapter 7,** implementation modalities for SEE/CCFAP-A are given.

20. Preparation of a sub-regional **roster of SEE experts** is important for increasing capacity to deal successfully with climate change issues in the SEE region (see Annex 2 of SEE/CCFAP-A). The roster of experts will serve as the main source of knowledge for the development and implementation of programmes and projects under the SEE/CCFAP-A and its monitoring. The currently proposed list of experts from Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Montenegro and Serbia is presented in the open list of the experts from the SEE region in Annex 2 to the SEE/CCFAP-A. Under the SEE Roster of experts, the development of a directory of organizations and individuals is envisaged (with an indication of their experience and expertise relevant to Articles 5 and 6, Framework for Capacity Building and the Nairobi Work Programme on Impacts, Vulnerability and Adaptation, with the view of building active networks involved in the implementation of CCFAP activities). In addition, a list of the countries, institutions and experts contributing to the development of the SEE-CCFAP-A is presented in Annex 4.

21. **Funding** is of vital importance for the preparation and implementation of adaptation plans and projects. The basic conclusion of the Stern Review was that the costs of strong and urgent action on climate change would be lower than the avoided costs of the impacts of climate change under business as usual. All countries, rich and poor, need to adapt to climate change, and this will be costly. Developing countries, the hardest hit by climate change already, have little (both in terms of human and financial resources) to adapt. The hitherto research indicates that climate change may have a major effect on the SEE countries' water resources, agriculture, forestry, coastal management, tourism, energy, land use, buildings, transportation, natural ecosystems, and human health.

22. The possible sources of funding the implementaton of the Climate Change Framework Action Plan for Adaptation in the SEE region (SEE/CCFAP-A) are, but not limited, to: UNFCCC/GEF, including Strategic Priorities for Adaptation (SPA) to which the region is eligible and the Adaptation Fund under the Kyoto Protocol. In addition, there are other funds set up recently by the UNDP, UNEP, WB, FAO, UNESCO, EU (Instrument for Pre-Accession Assistance – IPA, Seventh EU Framework Programme – FP7), WMO Programme for Technical Cooperation, SEE Initiative for Disaster Reduction and Adaptation through the World Bank, and bilateral financial and technical assistance (ODA) funds. Other opportunities, such as Multilateral Environmental Agreements (MEAs), the areas of work of which could be synergetic with adaptation, may also provide further funding for adaptation. These MEAs include the Convention on Biological Diversity, the UN Convention to Combat Desertification and Drought and the Ramsar Convention on Wetlands. Other specific assistance to cooperative projects include Project-Type Technical Cooperation, Climate Technology Initiative (CTI), different bilateral programmes of technical assistance, SEE countries' national funds and private foundations, as well as in-kind contribution from the participating SEE countries. The Republic of Serbia, through the Republic Hydrometeorological Service of Serbia, as a government authority hosting the SEE/VCCC, con-

tributes to the virtual Centre in kind with its personnel, communications, computer and technical infrastructure resources, including premises with the necessary office equipment.

23. Resilience to climate change impacts will require a high degree of coordination among states, national and local authorities, business leaders, and residents. In some areas of regional vulnerability, such as water management, agriculture, forestry, coastal zones, biodiversity, energy, infrastructure, tourism and health, the need for coordination is especially high. Thus, the goals and actions in this plan simply represent SEE actions in the context of necessary cooperation and partnerships.

24. The **overall coordination** of the SEE/CCFAP-A will be realised by an ad-hoc working group comprising the representatives and nominated experts from the interested SEE countries. The REC and SEEVCCC will provide the secretariat and technical support to this group. The SEEVCCC expressed its interest to perform various of other tasks related to maintaining the web site, fundraising, draft correspondence, preparation of reports, news releases, brochures, fact sheets, expert opinions, etc.

25. The coordination of the specific work under Chapter 4 "Continuous Update of the SEE Climate Change Perspective" will be realised by the SEE/VCCC. The projects and activities under Chapter 5 "Development and Implementation of Adaptation Programmes" will be managed by different interested countries. During the SEE/CCFAP-A preparatory process, the countries expressed preliminary views on leadership. The Republic of Albania expressed its intention to coordinate sub-regional adaptation projects and activities in the hydro power sector, which also has a mitigation potential. Albanian vulnerability and adaptation experts performed in-depth studies in this field. Bosnia and Herzegovina expressed its intention to coordinate sub-regional adaptation projects and activities in the energy and agricultural sectors. The Former Yugoslav Republic of Macedonia expressed its intention to coordinate sub-regional adaptation projects and activities in the water management and agriculture sectors. Montenegro expressed its intention to coordinate sub-regional adaptation projects and activities in tourism and coastal zones. The Republic of Serbia expressed its intention to coordinate sub-regional adaptation projects and activities in water management, forestry, agriculture, public health, land use, biodiversity and building. The REC, in cooperation with the SEE/VCCC, expressed its interest to coordinate projects and activities under SEE/CCFAP-A Chapter 6 "Cross-cutting issues".

26. Montenegro is also interested in supporting the establishment of the Balkans Regional Climate Change Forum (BR CCF) for political and policy dialogue to facilitate the coordination of adaptation and mitigation activities in the region. This Forum should be used by the UNFCCC focal points and the informal Open Balkan Group to obtain endorsement from the Ministers for a joint regional action in the global climate change process and a better understanding of the policies they should develop and implement, with the involvement of other ministries (energy, economy, agriculture, etc.).

27. The expression of interest in coordination of implementation by different interested countries should be based on national priorities set in national strategic and planning documents and existing legal, institutional and technical capacities. The official letter of interest by the Minister of Environment should follow the proposed programmes, projects and/or activities, based on previous support by the relevant beneficiaries. In the case of research programs, links with governmental institutions can be established through the inclusion of the relevant ministries or other governmental institutions as programme/project partners. Keeping the ministry responsi-

ble for climate change informed is of crucial importance for maintaining a proper national project base on climate change adaptation activities in the country.

28. An additional effort will be invested in the presentation and dissemination of the SEE/CCFAP-A and information on its findings and activities to the relevant governmental SEE institutions and agencies and interested environmental stakeholders.

29. The SEE-CCFAP-A and its different adaptation programmes will ensure faster and better cooperation and exchange of information among experts and countries in the region. In addition, SEE cooperation in adaptation will contribute to capacity building and public awareness in all SEE countries. At the same time, cooperation will accelerate the development and implementation of cost-effective adaptation measures in the participating countries, as well as in the region as a whole.

30. The Ministers of south eastern Europe have recognized the importance of adaptation to climate change for sustainable development and poverty eradication in the SEE region and the significance that the integration of climate change considerations into the development of the key economic sectors may have for environmental protection.

The SEE/CCFAP-A is a practical and specific regional response of the SEE countries to the achievement of concrete results in the field of adaptation to climate change. Further support may be provided to the region by the interested countries and international donor community, as appropriate.

The SEE/CCFAP-A provides an identification of the initial climate change actions that could be implemented in a cost-effective way and could serve as the basis for building widespread support for additional long-term actions. The countries find the SEE-CCFAP-A the basic document for future regional cooperation as it lays the foundation for urgent measures and clarifies the required support.

SOUTH EAST EUROPEAN CLIMATE CHANGE FRAMEWORK
ACTION PLAN FOR ADAPTATION

– Action Plan –

Table 1: A summary of the necessary needs and actions identified within other initiatives (SEEDRMI, WMO RA-VI Strategic Plan) for the continuous update of SEE climate change (Part A: relevant to the SEE/CCFAP-A, Chapter 4):

A1. CLIMATE OBSERVATIONS, MONITORING AND FORECASTING IN SEE

A.1.1. Promotion of systematic observations, focusing on the issues relating to the impacts, vulnerability and improvement of SEE sub regional data exchange:	Facilitate the implementation of a Regional project for the modernization of the National Meteorological and Hydrological Services of all West Balkan countries (WMO/WB/ISDR SE European NMHS);
	Facilitate the implementation of projects listed in GCOS Regional Action Plans for central and eastern Europe and for the Mediterranean Basin;
	Facilitate assistance for the maintenance of meteorological equipment to ensure reliable ongoing data at the national level;
	Provide routine climate analysis and monitoring products of temperature and precipitation for the SEE region; make a special sub-regional climate analysis and monitoring products focused on snow cover, drought, and severe weather and climate events in SEE.
	Create systematic archives of climate extremes in the SEE region (extreme air temperature, heat waves, intense rainfall and floods, persistent drought conditions, intense snowstorms, extreme seasonal snow accumulations and rapid melt events, severe thunderstorm conditions and associated lightning, hail, intense short duration rainfall, damaging winds, freezing rain, forest fires, *etc*.).
	Compile historical hydrological data on water levels, sediment transport and flow regime, including the extremes for all international water bodies (rivers and lakes) in the region.
A.1.2. Improvement of the quality and database management of climate data and climate prediction products and promotion of data exchange among the SEE countries:	Provide an interpretation and assessment of seasonal forecasting (three-month and six-month) products from global prediction models focusing on the SEE region;
	Routinely generate and distribute user-tailored products to meet NMHSs needs (one-month forecast, etc., statistically downscaled point-wise probabilistic prediction products, for both precipitation and temperature, at some major points in SEE); publish a regular sub-regional climate outlook;
	Undertake product verification (in accordance with the WMO guidelines) and the necessary exchange of basic data, including both hind cast and observation data for verification;
	Develop a sub-regional SEE climate alert system with the objective to support the introduction of climate information and predictions into early warning and disaster prevention systems (various climate indices forecast: uv index, heat index and heat wave early warning system, forest fire index, drought and flood indices, etc.); encourage greater exchange, harmonisation and integration of early warnings for weather and water hazards, climate extremes and disasters; promote integration into the national preparedness systems.
	Develop the capacity to produce climate forecasts through human resources development, training activities, education and training fellowships organized by the Sub-regional Climate Change Centre in cooperation with the WMO and partner, national and international institutions (group training courses for staff of the SEE NMHSs; programme of special assistance on cooperation and exchange of seasonal and inter annual forecast methods between the NMHSs, international conferences and seminars);
	Improve the capability of the database service on (meta) data management and provide the public with climate monitoring analysis and prediction products through Internet Web sites.
	Promote free and unrestricted use of and access to data for the agreed purposes in the context of WMO Resolutions 25 and 40; Develop a regional climate data policy for access to and distribution of climate data.

A.1.3. Enhancement of the capacity to supply/use the data – regional and national impact assessments + exchange of info on the observed regional impacts + outreach activities:	Provide capacity building workshops for the use of data and scenarios for climate impact and other related research in cooperation with the IPCC;
	Assist end users in specifying their needs and requirements for climate data and products, including the organization of workshops and other forums on the needs of users in cooperation with WMO, IPCC, etc. (SEE Regional Climate Outlook Forum).
	Improve climate information explanation during sub-regional workshops on dissemination of products and strengthen coordination and cooperation with the NMHSs in the SEE region.

A.2. CLIMATE MODELLING AND SCENARIOS IN SEE

A.2.1. Identify gaps in the development of regional and sub-regional climate scenarios, including the necessity for, and availability and applicability of climate models:	Develop climate change scenarios using climate models, especially those providing subregional and regional specificities, such as the regional climate models PRECIS, ClimNMM-B, etc., including data downscaled from general circulation models.
A.2.2. Identify practical opportunities to improve access to, and use of outputs of different models, including training opportunities:	Enhance capacity and experience in the use of different models, statistical approaches and outputs through human resource development, planned training activities, education and training fellowships (one of the planned projects is the GCOS Project No.10. Capacity Building in Regional Downscaling and Modelling – A Proposal for an International Workshop – fundraising negotiations are in the final phase);
	Encourage and enhance the participation of experts from the SEE region in scientific assessment under IPCC and research under WMO, EU/FP7 programmes.
A.2.3. Improve the availability and applicability of climate change modelling and downscaling data for use by policy makers at all levels:	Provide data archiving and improved accessibility to information on climate model output and climate change scenarios for the SEE region considering the user needs at all levels;
	Promote the use of climate model outputs in simulating the response of water resources (ground and surface water regime) in the SEE region to possible climate change scenarios;
	Promote the use of GIS (Geographic Information System) technology.

A.3. REDUCTION OF CLIMATE RELATED RISKS IN SEE

A.3.1. Improvement of the knowledge of biophysical and socio-economic changes in human systems that would affect the ability to cope with the future climate:	Enhance the capacity to understand, assess and predict the current and future climate variability, trends in long-term climate change, occurrence and scale of extreme events and their impacts through human resource development, planned training activities, education and training fellowships;
	Assist in the adoption, calibration and validation of impact models for agriculture, water resources, biodiversity and coastal zones, which can be used to assess the impacts of climate change;
	Provide investigations of weather and water hazards, climate extremes and disasters in the SEE region, including an economic evaluation of the damage.
A.3.2. Enhancement of the capacity to assess climate-related risks through vulnerability and natural hazards assessments:	Enhance the capacity to assess climate related risks through vulnerability-based assessments, human resources development, planned training activities, education and training fellowships;
	Enhance the capacity to assess climate related risks through natural hazard-based assessments, through the development of human resources, planned training activities, education and training fellowships;
A.3.3. Exchange and use of information on analyses and experience in climate risk assessment and management:	Enhance the capacity in climate risk assessment and management through planned training activities, international seminars and conferences;
	Production of climate change risk maps.
A.3.4. Promotion of the use of tools and systems for these purposes.	Enhance the capacity to use tools and systems for climate risk assessment and management through planned training activities.

A.4. SOCIO ECONOMIC INFORMATION ON CLIMATE IMPACTS IN SEE

A.4.1. Identification of the existing approaches and available data, needs, gaps, barriers and constraints, ways and means of improving the availability of, and access to, relevant socio-economic information and its integration into impact and vulnerability assessments:	Enhance the capacity to use tools and systems for the development of socio-economic scenarios and their integration into impact and vulnerability assessments through planned training activities;
	Provide data archiving and improved accessibility to information on socio-economic scenarios and other relevant information.
A.4.2. Enhancement of the capacity to understand the importance of socio-economic aspects of climate change, and integration of this information into impacts and vulnerability studies:	Enhance the capacity to understand the importance of socio-economic aspects of climate change through human resource development, planned training activities, education and training fellowships.

Table 2: A summary of the proposed needs and actions in the relevant climate change adaptation sub-programmes (Part B: relevant to SEE/CCFAP-A, Chapter 5):

SUBREGIONAL PROGRAMME / STRATEGIC FOCUS	Needs for information exchange and technology transfer	Needs for additional research	Specific needs
B.1. Climate Change and Public Health, Safety and Emergency Preparedness	**B.1.1:** • improving current information on the health impacts of weather and climate extremes; • perform regular health monitoring, establish emergency alert systems and data sharing. There should be health surveillance monitoring in extreme cases of weather, e.g. to observe the possible effects of hot dry summers or flooding on human health; • facilitate the sharing of data and lessons learnt, e.g. awareness raising with the examples of the best and good practices; • help addressing the climate change issues in health adaptation in health and non-health policy areas (water, building, etc.); • incorporate climate change adaptation measures into national environmental health action plans; • incorporate climate change adaptation measures into national action plans on environment and children's health; • improve access to information for the stakeholders and the public.	**B.1.2:** • impact assessment (health-related effects of temperature increase, air pollution, probabilities of future risks from flooding, infectious diseases, etc.*);* • adaptation assessment (surveillance and monitoring of pathogens, epidemiological studies on exposure and relative risks, risk and (cost-benefit modelling, etc.); • mapping of vector-borne diseases at the sub-regional level, produce risk maps to aid direct activities in potential risk areas.	**B.1.3:** • establishment of national early warning systems for the notification of harmful effects of weather variables on human health; • strengthening of capacities at the national and local levels (education, awareness raising and the creation of legal frameworks, institutions and an environment that enables people to make well-informed decisions for the long-term benefit of their society).

SUBREGIONAL PROGRAMME / STRATEGIC FOCUS	Needs for information exchange and technology transfer	Needs for additional research	Specific needs
B.2. Climate Change and Water Resource Management, Freshwater Quantity and Quality and Water Supply	**B.2.1:** • share information and research outputs within sub-regional countries (current climate trends and extremes and their impacts on water resource management, freshwater quantity and quality, and water supply, cost-benefit analyses and cross-sectoral studies - if any); • share the lesson learnt for the connection between water issues and land-use planning, particularly in relation to flood risk management.	**B.2.2:** • establish a high-quality climate and hydrological database, archival and reference data sets; • employ unified methods of data quality control, analyses of historical data for climate change detection studies, trend analyses, model development/validation; • research on the assessment of anthropogenic influences on hydrological changes; • assessment of climate-induced changes in the hydrological cycle and cost-benefit analyses of adaptation options (this requires major research advances in the fields of climatology, hydrology, land use planning, socio-economy and multi-objective decision-making under conditions of uncertainty; • development of the methodology for ground water vulnerability assessment; • employment of high resolution models for climate change projections; • simulation of water balance under climate change conditions • development of methodologies to evaluate the efficiency of measures for flood and drought management; • research on the improved design standards for each domain of intervention (irrigation, water supply, flood and droughts, erosion and sedimentation, water resource management, monitoring and water quality); • flooding and erosion risk mapping.	**B.2.3:** • development of a database on extremes (droughts and floods) and establishment of an early warning system for floods and droughts; • incorporate climate change adaptation measures into relevant national strategic and planning documents; • training and equipment for national/local water management organizations and operators; • modernization/construction of irrigation systems in drought-prone areas; • refurbishment of the existing and construction of new flood protection and drainage systems; • enlargement and modernization of the existing network of meteorological and hydrological stations, including ground water monitoring system (quality and quantity); • improvement of national insurance schemes against flood and drought damage; • strengthening of the capacities of the National Hydrometeorological Services, particularly their observation networks, telecommunications, processing, forecasting and early warning systems.

SUBREGIONAL PROGRAMME / STRATEGIC FOCUS	Needs for information exchange and technology transfer	Needs for additional research	Specific needs
B.3. Climate Change and Agriculture and Forestry	**B.3.1:** • dissemination of available information on the coping of agriculture and forestry with the current climatic variability; • dissemination of available information on vulnerability from extreme events and their cost evaluation, and "no regret" measures; • organization of awareness and information campaigns, training programmes for decision makers and potential users, farmers and foresters, relating to the environmental and socio-economic implications of climate change, etc.; • training of institutions and farmers for adopting the best available practices for climate change adaptation.	**B.3.2:** • research on the impact of climate change on planting dates and cultivars; • research on the impact of climate change on crop and forest yield, pests and diseases; • research on the impact of climate change on the effects of extreme events, such as forest fires, on agriculture and forestry directly and on the market for agricultural and forestry products, etc.; • development of a database on droughts and forest fire and risk mapping; • identification and development of adaptation measures and techniques to combat the negative effects of climate change on agricultural production and forestry.	**B.3.3:** • construction/upgrade of monitoring/warning systems to survey fires, insects, diseases and other disturbances in forestry/agriculture. • development of monitoring tools for drought sensitivity and other indicators of vulnerability to climate change impacts; • incorporate climate change adaptation measures into national agricultural and forestry strategic development documents; • development of adaptation programmes on climate change in the forestry sector; • enlargement and modernization of the existing network of meteorological/agro meteorological stations for drought and establishment of a forest fire early warning system; • preparation of basic regional maps in GIS format (soil, vegetation, erosion, drought and forest fire risk map, *etc*).
B.4. Climate Change and Land Use, Buildings and Transportation	**B.4.1:** • dissemination of available information on coping with land use, building and transportation with the current climatic variability; • organization of awareness and information campaigns, training programmes for support to policy-makers in the spatial development sphere and planners, in particular, on the environmental and socio-economic implications of climate change, requirement for new building codes, etc.; • raising awareness of the need for the protection of cultural resources, such as historical buildings, cultural monuments, and archaeological sites, from the damage caused by climate change impacts, such as flooding, erosion and storm events;	**B.4.2:** • evaluation and planning relating to the potential impacts of coastal flooding associated with sea level rise; • evaluation of land-use change under climate changes conditions; • cost calculation of potential adaptation measures and assessment of no-action costs; • improved design standards for buildings; • incorporation of climate change impacts info into construction, operations and maintenance of infrastructure projects (Road Strategic Plans and Standards, Project Management Manual, Design Procedure Manual, Transportation System Strategy. Plan, Surface Water Design Manual, etc.).	**B.4.3:** • regularly updated risk maps as a planning tool for regional planning work; • risk and vulnerability assessments at the regional level; • incorporation of climate change adaptation measures in the spatial plan; • incorporation of climate change adaptation measures into physical and urban plans; • incorporation of climate change adaptation measures into strategic impact assessment.

SUBREGIONAL PROGRAMME / STRATEGIC FOCUS	Needs for information exchange and technology transfer	Needs for additional research	Specific needs
B.5. Climate Change and Tourism	**B.5.1:** • dissemination of available information on the coping of tourism with current climatic variability; • organization of awareness and information campaigns, training programmes for support both for policy-makers and tourism practitioners, relating to the environmental and socio-economic implications of climate change; • introduce education and awareness programmes for all tourism stakeholders – in the public and private sectors – as well as for consumers; • raising awareness of the need for protection of cultural resources, such as historical buildings, cultural monuments, and archaeological sites, from damage caused by climate change impacts, such as flooding, erosion and storm events.	**B.5.2:** • evaluation and planning relating to the potential impacts of coastal flooding associated with sea level rise; • development of efficiency standards in new tourist facilities, as well as mechanisms for energy conservation; • development of regional and local climate information services tailored to the tourism sector and promotion of their use among tourism stakeholders. Capacity building for the interpretation and application of this information; • assessment of the suitability of the SEE climate for tourism in 2020, 2050, 2080, based on existing models and scenarios.	
B.6. Climate Change and Coastal Zones	**B.6.1:** • sharing of information, knowledge, experience and best practices relating to adaptation measures in coastal zones; • dissemination of available information on the coping of the development of coastal zones with current climatic variability; • organization of awareness and information campaigns, training programmes for the support of policy-makers and the public relating to the environmental and socio-economic implications of climate change to coastal areas; • raising awareness of the need for protection of coastal areas from damage caused by climate change impacts, such as flooding, erosion and storm events.	**B.6.2:** • evaluation and planning relating to the potential impacts of coastal flooding associated with sea level rise; • evaluation of the impacts of sea level rise on ground water and water availability; • evaluation of the impacts of climate change on fisheries and other marine species; • development and transfer of adaptation technologies.	**B.6.3:** • construction/upgrading of monitoring/warning systems to survey vulnerabilities in coastal areas; • integrated impact scenarios for coastal areas; • improvement of early warning and response systems.

SUBREGIONAL PROGRAMME / STRATEGIC FOCUS	Needs for information exchange and technology transfer	Needs for additional research	Specific needs
B.7. Climate Change and Biodiversity and Ecosystems	**B.7.1:** • share experience for addressing the impacts of climate change on biodiversity and for the development of strategies for adaptation to increase resilience and provide accommodation for biodiversity under climate change; • dissemination of available information on the coping of biodiversity with current climatic variability; • organization of awareness and information campaigns, training programmes for support for both policy-makers and local communities relating to the impact of human-induced activities and climate change on biodiversity and ecosystems; • raising the awareness of the need to protect biodiversity and ecosystems from the damage caused by climate change impacts, such as flooding, erosion and storm events; • distribution map of the major types of ecosystems, map of biomes and mapping of habitats and types of vegetation for the precise inventory of biodiversity	**B.7.2:** • research on the impact of climate change and extreme weather events on species survival; • research on the impact of climate change on changes in the composition of habitats, including the expected increase in invasive species and diseases; • research on the impact of climate change on changes in seasonal timings that will affect the dependencies and reproduction of species; • research on the impact of climate change on land use, agriculture, water and forestry, as well as on biodiversity; • development of scientific tools to evaluate the effects of climate change on local fish and wildlife populations and habitats; • assessment of climate change impacts on SEE wetland ecosystems; • assessment of climate change impacts on SEE mountain ecosystems	**B.7.3:** • development and update of regional climate scenarios and projections; • enhancement of the capacity to use tools and impact assessment models for biodiversity; • risk and vulnerability assessments for the protected areas in the SEE region; • enlargement and modernization of the existing network for monitoring the status of biodiversity components by monitoring the phenology of bioindicator species; • enlargement and modernization of the existing network of mountain meteorological stations with vertical and slope distribution for biodiversity vulnerability assessment.
B.8. Climate Change and Energy	**B.8.1:** • dissemination of available information on the impact of current climatic variability on energy production and consumption (supply and demand); • organization of awareness and information campaigns, training programmes for support to both policy and energy decision makers, and users relating to the socio-economic implications of climate change; • raising the awareness of the need to use alternative sources of energy;	**B.8.2:** • integrated research on the climate impact on water resources (precipitation, runoff) and energy production/consumption; • research on the climate change impact on the potential of renewable energy sources (wind, solar energy maps, hydro, geothermal, biofuel, etc.); • development of a methodology for the evaluation of the climate impact on energy production and consumption;	**B.8.3:** • development and update of high resolution regional climate scenarios and projections; • unified methodology for the evaluation of the climate impact on the energy sector, cost-benefit analysis and assessment of no-action costs; establishment of the capacities to monitor and respond to the anticipated climate change impacts at the institutional and community levels; • incorporation of climate change adaptation measures into national energy strategic and planning documents.

Table 3: The summary of the priorities for action in cross-cutting areas (Part C: relevant to SEE/CCFAP-A, Chapter 6):

C.1. General priorities for actions to support SEE/CCFAP-A implementation:
1. Joint activities to support the revision of the national development strategies taking into consideration climate changes , vulnerabilities and adaptation; appropriate integration of climate change impacts should be made an obligatory standard requirement in regional development;
2. Joint activities in capacity building and strengthening of meteorological and hydrological monitoring and forecasting systems, both at the national and sub-regional levels;
3. Joint activities to increase the capacity for data collection and data quality, and the enhancement of data sharing between the countries in the SEE sub-region;
4. Joint activities in the development, installation and maintenance of weather/climate/hydro early warning systems in the SEE region, as part of the EU early warning systems;
5. Sub-regional workshops to allow for knowledge dissemination and sharing, and to encourage further sub-regional cooperation.
6. Joint activities, through the LEAP process, in the capacity building of local communities, including the most vulnerable groups in the SEE countries;
7. Outreach activities related to the promotion of the SEE/CCFAP-A.

Table 3: cont'd

C.2. General priorities for capacity building in the SEE/CCFAP-A:
1. Raising the climate change issue to a higher SEE sub-regional level;
2. Enhancement of SEE cooperation in climate change research, development and transfer of technologies, know-how and practices;
3. Capacity building in the SEE region for the UNFCCC negotiation process and, specifically, for the on-going AWG process. The SEE region has a very delicate and specific status and requires assistance in understanding the process and addressing the relevant issues; setting the indicators for measuring capacity building among countries, which is an issue under discussion in the AWG LCA process.
4. The provision of bases for sustainable capacities to deal with climate change in SSE countries;
5. Modernization of the national hydrometeorological services in the SEE countries;
6. Improvement of the collection, management, exchange, access to and use of observational data and other relevant information on the current and historical climate and its impacts for SEE;
7. Development/application of climate models, access to and use of information and data on the projected climate change for SEE;
8. Provide capacity building workshops and training programmes on the use of tools and systems for the development of socio-economic scenarios and their integration into impact and vulnerability assessment;
9. Promotion of understanding the impacts of climate change and vulnerability to climate change; enhancement of the capacity to supply and use the data, especially at the regional and national levels, and exchange information on the impact of the observed climate change;
10. Provide capacity building workshops on adoption, calibration and validation of impact models for agriculture, water resources and biodiversity, which can be employed to assess the climate change impacts;
11. Training of experts in modern adaptation technologies is also required so as to overcome the gap in personnel capacities; promotion of the understanding, development and dissemination of information on practical measures, methodologies and tools aimed at increasing economic resilience and reducing the reliance on vulnerable economic sectors;
12. Facilitating communication and cooperation among the SEE countries and relevant organizations, business, civil society, decision makers and other stakeholders;
13. Training and equipment for water management organizations and operators;
14. Training of institutions and farmers for the adoption of the best available adaptation practices.

Table 3: cont'd

C.3. Education, training and public awareness in the SEE/CCFAP-A:
1. Encourage the integration of climate change into national educational systems:
2. Applying new, sub-regional and bilateral programmes for education and training and other forms of capacity building for junior staff in the SEE countries, within the existing international framework and the development of the regional partnership proposed in this Initiative (SEE/CCFAP-A).
3. Facilitate, develop and implement regional education and training programmes focused on climate change, targeting the youth in particular, and including personnel exchange to train experts;
4. Facilitate, develop and implement regional public awareness programmes on climate change and its effects on the SEE regional and national levels by encouraging contributions and personal action in addressing climate change, supporting climate-friendly policies and fostering behavioural changes, including the use of popular media;
5. Facilitate public access to data and information by providing information on climate change initiatives, policies and results of SEE/CCFAP-A actions, required by the public and other stakeholders to understand, address and respond to climate change,;
6. Promote public participation in addressing climate change and its effects, and in developing adequate responses by facilitating feedback, debate and partnership in climate change activities and governance;
7. Organize training for local authorities and communities;
8. Raise awareness among national decision makers and local authorities to integrate adaptation measures for the current climate vulnerabilities (caused by the extremes) into national development plans;
9. Enhance sub-regional, regional and international cooperation in undertaking the activities within the work programme related to Article 6 of the UNFCCC, and further enhance synergies between the Rio Conventions and improve the effectiveness of all sustainable development efforts;
10. Develop institutional and technical capacity to identify gaps and requirements for the implementation of Article 6, assess the effectiveness of SEE activities related to Article 6 and consider the linkages between Article 6 activities, implementation of policies and measures to mitigate and adapt to climate change, and other commitments under the Convention, such as technology transfer and capacity building;
11. Under the auspices of the SEE roster of experts, develop a directory of organizations and individuals, including the data on their experience and expertise relevant to Article 6 activities, with the view of building active networks for the implementation of these activities.

I. INTRODUCTION

I.I THE PURPOSE AND SCOPE OF THE ACTION PLAN

Climate change is a global phenomenon with local implications. Southeast European governments and people are currently experiencing the adverse effects of climate change on their development and way of life. The projected changes in climate could have major consequences on hydrology and water resources, agriculture and food security, terrestrial and freshwater ecosystems, coastal zones and marine ecosystems, and human health. Adverse impacts include increased flood and drought magnitude and damages in SEE, reductions in crop yields, decreased water availability, and an increased number of people exposed to vector and water-borne diseases. Adaptation could significantly reduce these effects. To reduce the vulnerability of SEE countries to climate change, the resilience of their socio-economic, ecological and cultural systems needs to be enhanced. This can be achieved through building institutional capacity and implementing suitable adaptation measures and actions at the sectoral level.

The Southeast European Climate Change Framework Action Plan for Adaptation (SEE/CCFAP-A) is focused on building and/or strengthening existing capacities to jointly deal with climate change issues in SEE Countries. Decision 11 of the First Conference of the Parties (11/CP. 1)[1] laid out three stages of adaptation. Stage I focuses mainly on planning and impact studies and appropriate capacity-building; Stage II on measures for implementation, including further capacity-building, and Stage III on actions to facilitate adequate adaptation, including insurance and other adaptation measures, as envisaged by Article 4.1(b) and Article 4.4 on the resilience of vulnerable ecosystems.

The project on CCFAP development is the first type of project related to Stage III to be developed in the SEE region. It is the first regional project that is actually aimed at achieving improvements in the capacity of SEE countries to deal with risks associated with climate change. Hence, this is the first document that brings together common actions of all interested SEE countries related to climate change into a single strategic action plan.

The development of the SEE/CCFAP-A follows the first recommendation within the so-called Belgrade Initiative[2] for enhancement of SEE sub-regional cooperation in the field of climate change. The Initiative, as a result of the SEE Ministerial consultation process, was adopted by the Sixth Ministerial UNECE Conference "Environment for Europe" held in Belgrade in October 2007.

As part of the effort to support the implementation of the Belgrade Climate Change Initiative, the Regional Environmental Centre (REC) has received a grant from the Royal Norwegian Ministry of Foreign Affairs for the project: "Preparation of the Climate Change Framework Action Plan for the SEE Region (SEE/CCFAP)", which was implemented by the REC and the SEE Sub-regional, Virtual

1 UNFCCC Decision 11/CP.1: paragraph 1. (d) Regarding adaptation

2 DECLARATION "*Building Bridges to the Future*" by the Ministers of the region of the United Nations Economic Commission for Europe (UNECE) (Doc. ECE/BELGRADE.CONF/2007/8); Belgrade Initiative: Enhancing Regional SEE Cooperation in the Field of Climate Change - Climate Change Framework Action Plan for the SEE Region, and the Establishment of a Sub-Regional, Virtual Climate Change Related Centre for Research and Systematic Observation, Education, Training, Public Awareness and Capacity Building (ECE/BELGRADE.CONF/2007/20)

Education, Training, Public Awareness, and Capacity Building (SEE/VCCC) hosted by the Republic Hydrometeorological Service of Serbia, in cooperation with representatives of the interested countries from the SEE Region.

SEE/VCCC is a network of national institutions of participating countries (ministries, hydrometeorological services, scientific institutions, NGOs, and other stakeholders).

The purpose of the Southeast European Climate Change Framework Action Plan for Adaptation is to ensure that the population of SEE build their resilience capacity to the risks and impacts of climate change through implementing adaptation actions; improving understanding of climate change and its effects; education and awareness; improving decision making and good governance; developing and strengthening partnerships and cooperation; and to support the SEE Countries in the implementation of Article 5 and Article 6 of the United Nations Framework Convention on Climate Change and its Framework for Capacity Building[3] and the Nairobi Programme of Work on Impacts, Vulnerability and Adaptation[4].

More specifically, the objectives are: to understand the main characteristics of climate variability and hazards in the SEE region (flood, drought, windstorm, landslides, forest fire, etc.); to understand existing programmes/projects and institutional arrangements for addressing climate change; to identify short-, medium- and long-term adaptation activities to climate hazards and climate change.

The SEE Climate Change Framework Action Plan will complement many of the ongoing policy objectives and commitments to sustainable development of the Governments of SEE. This Action Plan will establish a framework for current and future regional project initiatives in terms of adaptation to the impacts of climate change. The Action Plan is intended to be a "living document". It will be revised and updated to reflect changes in climate sciences, in economic conditions in the SEE countries and emerging technologies. By taking action to address climate change, the SEE Governments will be taking action towards the development of a more sustainable society and economy.

In this Southeast European Climate Change Framework Action Plan for Adaptation (SEE/CCFAP-A), Southeast European Countries refers to the Republic of Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Montenegro and the Republic of Serbia. The SEE/CCFAP-A will be open for the participation of other interested SEE countries. In the SEE/CCFAP-A, climate change refers to any change in climate over time both as a result of human activity and natural variability.

3 FCCC/CP/2006/5/Add.1, Capacity-building under the Convention, Decision 4/CP.12 http://unfccc.int/; FCCC/CP/2001/13/Add.1, Capacity building in countries with economies in transition, Decision 3/CP.7, <http://unfccc.int/>.

4 Decision 2/CP.11: Five-year programme of work of the Subsidiary Body for Scientific and Technological Advice on impacts, vulnerability and adaptation to climate change; The COP decided to rename the programme as the "Nairobi Work Programme on Impacts, Vulnerability, and Adaptation to Climate Change" (see FCCC/CP/2006/5, Section V, E. Implementation of Article 4, paragraph 8 and 9, of the Convention)

1.2 METHODOLOGY

The SEE/CCFAP-A action plan was drafted as a result of a comprehensive consultation process involving a broad range of important governmental stakeholders from the Southeast European region (National Focal Points for the UNFCC, representatives of the National Hydrometeorological Services and national experts for vulnerability and adaptations/strategic planning). As the UNFCCC Nairobi Work Programme (NWP) covers a multitude of issues related to impacts, vulnerability and adaptation to climate change, together with their cross-cuttings, the proposed action plan attempts to apply the modular approach to the creation of regional adjusted work plans. Basically, it consists of scaling down the complexity of the problems associated with NWP themes and sub-themes to particular, isolated activities which, if accomplished, may contribute to the overall goals of the SEE Framework Action Plan for Adaptation.

The basic steps in a regional process to plan adaptation to the impacts of climate change include: assess system vulnerability, risk level and capacity on the country level; assess likely climate impacts in the SEE region; identification of major obstacles and barriers as well as the actions required in the short and longer term to ensure that the region is adapted to cope with the impacts of climate change; identification of ongoing adaptation work and urgent action for key sectors and for the region; develop a framework for a strategic sectoral action for adaptation; and assess the modality for the implementation of the plan. Various literature, IPCC published refereed reports, UNFCCC decisions, EU-refereed electronic publications, as well as the input of SEE countries, serve to highlight the effect of current and future climate change in the SEE region and identify broad adaptation actions across specific sectors linked to weather and climate.

1.3 VULNERABILITY AND ADAPTATION IN SEE

1.3.1 SEE climate baseline (current trends) and future climate change scenarios

1.3.1.1 Observed climate changes

a) Temperature

The Earth's surface has experienced extraordinary and rapid warming since the late 1800s. At the global, continental and regional levels, numerous long-term changes in climate have been observed. Observations of increases in the global average air and ocean temperatures, widespread melting of snow and ice and global rising of the sea level, and warming of the climate system in recent decades have confirmed that global climate change is occurring and is projected to continue. The 100-year trend in the global average surface temperature (1906 – 2005) was a warming of 0.74 °C, with a more rapid warming trend over the past 50 years (0.13 °C per decade). In addition, new analyses show warming rates in the lower- and mid-troposphere that are similar to the rates on the surface.

On the continental scale, significant warming was observed over the past 50 years averaged over each of the continents, except Antarctica. The mean annual temperature across the land in Eu-

rope generally increased by 1.4 °C, i.e., Europe warmed more rapidly than the global average. Particularly significant warming was observed over the Iberian Peninsula; south-eastern Europe, including Turkey; north-western Russia; and the Baltic region (Table 1.3.1). Widespread changes in extreme temperatures were observed over the last 50 years. In the past 100 years, the number of cold and frost days has decreased in most parts of Europe, including south-eastern Europe, whereas the number of days with temperatures above 25 °C (summer days) and of heat waves increased.

Temperature changes observed in countries across the SEE region according to national contributions to SEE/CCFAP-A development are the following:

Albania: A decrease up to the mid '80 of the average air temperatures was observed, followed by an increase up to 2000. During the last 15 years, a positive trend was observed over almost the entire territory. It is related to an increase of the minimum rather than the maximum air temperatures. An analysis of the linear trend, performed for the normal period 1961-90, showed no significant trend in the temperature. In this case, there is insufficient evidence to determine whether the trends do exist, probably because the series are relatively too short to draw the correct conclusions. At low altitudes, the highest number of days with absolute maximum temperatures over the threshold 35 °C was observed. The lowest value refers to the high altitudes. A similar analysis for the minimum temperatures for the same areas shows that up to 1982, days with extreme minimum temperatures – 5 °C were very frequent. Thereafter, the value of this indicator has been decreasing.

Bosnia and Herzegovina: Meteorological stations in B&H show an increasing trend of temperature in the 20th century. In this area, the temperature increased by 0.6 °C during the period 1925 – 2000. A significant increase in temperature occurred during the decades 1970 – 2000. The seasonal mean temperature for the summer months of the 1990s was 1 °C higher than the mean 1961 – 1990 normal value, whereas in the winter months, the increase was smaller (about 0.3 °C). The summer of 2003 was the warmest in B&H during last 100 years and 2000 was the warmest year in Bosnia and Herzegovina in the 20th century with the mean annual temperature 2.0 °C above the normal for the period 1961 – 1990. In addition, widespread changes in extreme temperatures were observed over the last 50 years. Cold days, cold nights and frost became less frequent, while hot days, hot nights and heat waves became more frequent. The number of tropical days registered during 2003 was approx. two times higher than the annual average.

FYR[5] of Macedonia: The period 1971 – 2000, at an annual level, was warmer than the period 1961 – 1990 for almost all climate areas in the territory of the country. Differences in the average mean annual air temperatures for the mentioned thirty-year periods are in the range of – 0.1 °C to 0.2 °C. The highest values of the mean annual deviations of the air temperature were recorded in the sub-Mediterranean zone (Valandovo 0.7 °C, Gevgelija 0.5 °C and Nov Dojran 0.2 °C). The warmest year recorded in the territory of Macedonia was 1994, which was warmer than the multi-annual average by 2.0 °C (in Skopje), 1.8 °C (in Demir Kapija) and 1.6 °C (in Bitola). Significantly higher mean annual temperatures were

5 The constitutional name of the country is the Republic of Macedonia (according to Country input).

also recorded in 1999, 2002 and 2003, with the most dramatic variations of the temperature recorded during the summer period. The recorded values for the period 1996 – 2005 were higher by 1.3 °C for Demir Kapija and Prilep, 1.4 °C for Stip and Bitola, and 1.5 °C for Skopje. The absolute maximum air temperature of 44.8 °C was recorded in Demir Kapija in July 2000, which was surpassed in July 2007, with a recorded 45.7 °C in Demir Kapija and 45.3 °C in Gevgelija. The absolute minimum air temperature of –30.4 °C was measured in January 1993 in Bitola. An increase in the annual sum of insolation (comparing the data series 1971 – 2000 to the series 1961 – 1990) was registered in the regions with a sub -Mediterranean and a moderate continental climate and also in the region with an Alpine mountainous climate (Source: Report on the Second Communication on Climate and Climate Changes and Adaptation in the Republic of Macedonia).

Montenegro: Changes in temperature during the last decade of the 20th century were observed in many parts of Montenegro. Over this period, the temperature increased significantly. Deviations relative to 1961 – 1990 indicate an increasing trend in temperature. Results from the analysis indicate that the average annual maximum and minimum temperatures for the period 1991 – 2007 differed statistically significantly with respect to the 1961 – 1990 climatological means. The summers of 1994, 2000, 2003 and 2007 were extremely hot throughout the major part of Montenegro. Compared to long-term averaged values (1961 – 1990 reference), changes in the distribution of daily temperatures, the seasonal diurnal temperature range anomaly and the annual maximum and minimum temperatures during the summer 1991 – 2007 were analysed. The frequency of very hot days and nights was higher; the small difference between the number of days with minimum and maximum temperatures higher than the 80th, 90th and 95th percentile showed there was no significant changes in the frequency of minimum temperatures relative to maximum temperatures (from the reports of the Hydrometeorological Institute of Montenegro).

Serbia: According to the data recorded in the meteorological station network in the territory of Serbia, similar changes within the basic climate parameters, induced by global and regional climate changes, were registered at the local level. Fourteen of the last twelve years were among the warmest on record and 2000 was the warmest year on record in Serbia. The results of an analysis of the average annual air temperature showed a positive trend in the deviation temperature in the period 1955 – 2005 in relation to the normal values for period 1961 – 1990. The increase was significant for northern Serbia and Timocka Krajina (0.6 °C for 50 years). A decrease in the mean annual temperature was attained for south-eastern Serbia. All stations showed a decrease in the average temperature in the autumn. Since the mid-eighties of the last century, the trend of the number of tropic days with temperature exceeding 30 °C and days with temperature exceeding 35 °C was also observed. The mentioned temperatures induced heat stresses in plant growth and affected the intensity and consequences of drought occurrence. High temperatures are particularly harmful if they last consecutively several days (heat waves). In the middle of July 2007, the Balkan Peninsula was hit by a wave of extremely high temperatures. The highest temperature of 44.9 °C, registered in Smederevska Palanka station on 24 July 2007, exceeded the historical temperature maximum in Serbia. The severe

drought in July and August 2007, accompanied by the longest registered wave of extremely high air temperatures in July (10 - 17 days with extremely high air temperatures from 35 to 45 °C), caused great material damage.

b) Precipitation

Long-term precipitation trends from 1900 to 2005 have been observed in many large regions. In much of North America, northern Europe and northern and central Asia, annual precipitation increased during the 105 years beginning with 1901. Drying was observed in the Mediterranean, southern Europe, Sahel and southern Africa and parts of southern Asia.

The amount of annual precipitation in Europe varies widely, depending on the geographical location. In the 20th century, it increased in northern Europe (by 10 – 40 %), in the Arctic region (by 8 %) and in the Russian Federation, while southern Europe became up to 20 % drier.

Changes in the annual river run-off in many European catchments have been observed over the past few decades. In some regions, including eastern Europe, the run-off has increased, while in others, including southern Europe, it has fallen.

The recent precipitation trends recorded in SEE countries according to national contributions to SEE/CCFAP development, are the following:

Albania: The total mean annual precipitation in Albania is about 1485 mm/year; their spatial distribution vomes widely. The southeastern part of the country receives the smallest amount of precipitation (the annual value reaches up to 600 mm), followed by the coastal area, which receives about 1000 mm/year. The highest total precipitation is recorded in the Albanian Alps, where the values reach up to 2800 – 3000 mm/year. Another centre with abundant rainfall is the mountainous southwest zone, with a total precipitation of up to 2200 mm. The precipitation displays a clear annual course with the maximum in winter and the minimum in summer. The highest total precipitation (about 70 %) is recorded during the cold months (October – March). The month with the highest precipitation in the whole territory is November, while the lowest are July and August. The number of rainy days (>1.0 mm) per year varies from 80 – 120 days. The time and spatial distribution of this element generally follows that of precipitation.

Generally, the total annual precipitation shows a slight downward trend. This is mainly due to a decrease in precipitation during winter and spring. Autumn is an exception to this general trend as the coastal stations (Shkodra and Vlora) registered positive trends in the precipitation, while the Tirana, Korça and Kukesi stations displayed a very slight downward trend.

Bosnia and Herzegovina: The precipitation in Bosnia and Herzegovina, especially in Herzegovina and the eastern part of B&H, recorded a downward trend during the 20th century, which was due to a reduction in precipitation in the summer, spring and winter months. During the period 1925 – 2000 in the Nevesinje-Trebinje area in Herzegovina, there was a 6 – 7 % reduction in precipitation, but this is not statistically significant.

FYR Macedonia: Precipitation is generally characterized by an uneven spatial and temporal distribution over the country, due to a complex orography which affects

the pluvious regime during the months, seasons and years. Such a distribution is accompanied by alternating periods of long droughts and of high intensity rainfalls. These dramatic alterations contribute to soil erosion and land degradation. The area with the highest precipitation is the area of the mountain massifs in western Macedonia, the area of the mountains Sar Planina, Bistra and Stogovo, as well as the mountain massifs Jakupica, with its peak Solunska Glava, and Baba, with its peak Pelister, where the total annual precipitation is about 1000 mm. The most arid areas are Ovce Pole, Tikves and the surroundings of Gradsko, with the total annual precipitation of about 400 mm.

Based on the total annual precipitation, a linear decreasing trend at all meteorological stations was registered. At the annual level, during the last twenty years, compared to the period 1961 – 1990, a decrease in precipitation was recorded, especially in 1988 – 1990, 1992 – 1994, 2000 and 2001. A decrease in precipitation was registered in May, especially from 1985 onward. The November monthly sums of precipitation decreased at the meteorological stations Stip, Bitola, Demir Kapija and Ohrid. (Source: Report on the Second Communication on Climate and Climate Changes and Adaptation in the Republic of Macedonia).

According to the distribution of precipitations and temperatures, the climate in Macedonia is classified as being semi-arid.

Montenegro: The results of a statistical analysis show that the annual sum of precipitation is unchanged. The mean annual precipitation slightly declined during 1990 – 2005 with respect to the climatological mean, but without a significant difference with respect to the 1961 – 1990 reference. On the basis of an analysis of the maximum annual precipitation in northern Montenegro, it was concluded that a systematic increase in extreme precipitation was not observable.

Serbia: An analysis of the annual and seasonal precipitation sums for the period 1955 – 2005 in relation to the normal values for the period 1961 – 1990 showed mostly negative trends, except in the autumn, when it was positive at most stations in Serbia. Positive trends in the annual precipitation were found at the Zlatibor (14 mm), Belgrade, Novi Sad and Loznica stations (1 mm). The remaining stations in Serbia recorded a negative trend in annual precipitation. The maximum negative trend in the total annual precipitation was recorded in Negotin (–35 mm), Vranje (–33 mm) and Zajecar (–31 mm) in the eastern part of the country. The minimum negative variation for the annual precipitation in relation to the normal values for the period 1961 – 1990 was evidenced in central Serbia (from –4 mm to –7 mm). In Vojvodina, a decrease in the annual precipitation ranged from 3 mm (Zrenjanin) to 13 mm (Sremska Mitrovica). In winter and spring, the precipitation trend was negative at all stations, except Zlatibor where the trend was positive (26 mm). In autumn, the precipitation trend at most stations was positive, from 2 mm (Krusevac) to 44 mm (Novi Sad). A decrease in precipitation in the autumn at some station in Serbia ranged from 2 mm (Kraljevo) to 50 mm (Negotin).

The mean annual discharges calculated for the observed period (1950 – 2005) point to a downward trend. During the same period, on the Danube up to the Tisa River, the smallest discharges were recorded in 1971, 1953, 1990 and 2003, and the largest in 1965, 2006 and 2002. Down-

stream from the Tisa, the smallest discharges were recorded in 1990, 2003 and 1971, and the largest in 2006, 1981 and 1965.

c) Sea Level

The global mean sea level increased between the mid-19th and the mid-20th century. The average rate was 1.7 mm/y for the 20th century, 1.8 mm/y for 1961 – 2003 and 3.1 mm/y for 1993 – 2003. Spatially, the change was very non-uniform. Sea levels around Europe increased between 0.8 mm/year and 3.0 mm/year in the last century.

Since the late nineteenth century, the global average sea surface temperature has increased by 0.6 °C, which is consistent with an increase in global air temperature. Over the past 15 years, the Baltic and North Seas and the western Mediterranean recorded a slight warming of about 0.5 °C.

d) Climate Extremes

During the last decades, the frequency of major disasters caused by the impact of natural hazards and the losses caused by them increased significantly. Worldwide, the number of disasters grew from 100 in 1975 to about 400 in 2006. The economic costs of major disasters are estimated at being 15 times higher as compared to the 1950s, i.e., in the 1990s, material losses amounted to $652 billion.

South-eastern Europe (SEE) is exposed to a variety of natural hazards, including floods, droughts, forest fires, wind storms, heat waves, earthquakes and landslides.

The Hotspots Project initiated by the World Bank, based on historical losses (as recorded in EM-DAT across all events from 1981 – 2000) for six major natural hazards: earthquakes, volcanoes, landslides, floods, drought and cyclones, identified the SEE region as one of a major natural hazards disasters hotspots. Risks of economic losses for all hazards combined are given in Figure 1. Disasters impose costs in addition to human and economic losses. Additional costs in-

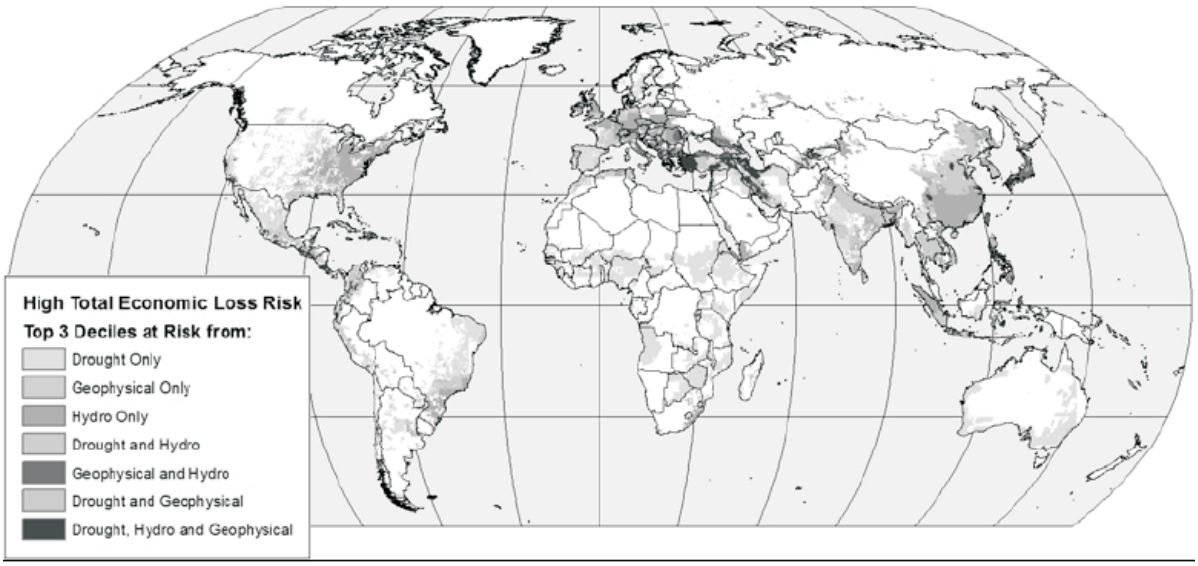

Figure 1. *Total economic loss risks for six major natural hazards combined within each region in the world during the period 1981 – 2000 (Source: Natural Disaster Hotspots: A Global Risk.*

clude expenditures for disaster relief and recovery and for rehabilitation and reconstruction of damaged and destroyed assets. In major disasters, covering these additional costs require external financing or international humanitarian assistance.

A recent hazard risk assessment made for the countries of south-eastern Europe[6] dealt with the occurrence of different risks in each country. All countries are prone to seven or more of the following hazards: flood, landslides, drought, extreme temperature, windstorm, wild fire, earthquakes, epidemic, technological.

The recent climate extremes recorded in SEE countries (according to the country level assessment given in EM-DAT[7], SEEDRMI/Desk Study Review Risk Assessment, in South-Eastern Europe[8] and National contributions to SEE/CCFAP-A development are given in the section below.

Flood and related hazards

Ninety (90) percent of the area of SEE countries falls within transboundary river basins, including the Danube, Drin, Sava, Struma/Strimon,Vardar/Axios and others. Shared lake basins include Doiran, Ohrid, Prespa, and Shkoder. The SEE Region is also characterized by a large number of transboundary groundwater aquifers. All SEE countries face high flood risk due to flood. Some major floods in SEE countries observed during the last two decades are the following: 1992 (Albania, Montenegro), 1995 (Albania, Macedonia), 1997 (Albania), 1999 (Serbia), 2000 (Montenegro, Serbia), 2001 (Bosnia and Herzegovina), 2002 (Albania, Montenegro, Serbia), 2004 (Albania, Bosnia and Herzegovina, Macedonia), 2005 (Albania, Bosnia and Herzegovina, Macedonia, Montenegro, Serbia), 2006 (Macedonia, Serbia).

The mountainous terrain, poor land use and river basin management practices, as well as deteriorating infrastructure have increased the vulnerability of SEE countries to floods and landslides (Pusch, 2004).

Drought and related hazards

Drought and drought-related hazards are severe in many countries in SEE.

Some major droughts in the SEE countries are the following: 1989 – 1991 (Albania, Macedonia, Montenegro, Serbia), 1993 (Serbia, Macedonia), 2000 (Montenegro, Serbia), 2003 (Bosnia and Herzegovina, Macedonia, Montenegro, Serbia), 2007 (Serbia).

All SEE countries are highly vulnerable to extreme temperature and prone to fire-related hazards. The GFMC reported fire events in almost all countries in the region.

Wind storms with lightning, hail storms

The studies show that, during 1974 – 2006, the share of these hazard events in the total number of natural hazards observed in SEE countries ranged from 4 to 15 %. Thus, Albania, Bosnia and Herzegovina, Macedonia, Montenegro and Serbia are also vulnerable to these hazard events.

6 *Synthesis Report on South Eastern Europe Countries Disaster Risk*; RMSI; 2007

7 EM-DAT: http://www.em-dat.net

8 SEEDRMI/Desk Study Review Risk Assessment, in South-Eastern Europe – Final Report (ISDR,WB,2007)

A substantial number of the population in the SEE region is exposed to flood, drought and other climate related disasters. The major perils, such as drought, flood, heat waves and forest fire, in the region are transboundary by nature, emphasizing the need for regional cooperation and policy approach.

The World Bank hotspot studies[9], as well as the National Geophysical Data Centre[10] and other published research papers on hazards and vulnerability in the region were used.

1.3.1.2 Projections of Climate Change

a) Temperature

The burning of fossil fuels and deforestation by humans are causing an increase in the concentrations of greenhouse gases in the Earth's atmosphere. There is a broad consensus among scientists that this is leading to an unprecedented climate change. According to most scenarios, the continued anthropogenic emissions of greenhouse gases at the current and projected levels will bring about even more dramatic changes in the Earth's natural climate patterns .

Given the continued rate of emissions and atmospheric lifetime of these emissions, global temperatures are expected to rise and climate change is expected to worsen even if the emission of greenhouse gases were immediately and completely ceased. Moreover, as reported by the IPCC in AR4, 2007, a warming of about 0.2 °C per decade is expected for in foreseeable future, and even if greenhouse gases were "kept constant at the year 2000 levels, a further warming of about 0.1 °C per decade would be expected."

The IPCC AR4[11] global average surface warming projections for the end of the 21st century (2090 – 2099), relative to 1980 – 1999, show that the best estimate for temperature change for the low scenario (B1) is 1.8 °C on average, for the medium scenario (A1B) is 2.8 °C on average and for the high scenario (A1F1) is 4.0 °C on average (the projected surface warming ranges from 1.8 °C to 6.4 °C).

The annual mean temperatures in Europe are likely to increase more than the global mean.

Under the A1B scenario, the simulated annual mean warming from 1980 – 1999 to 2080 – 2099 varies from 2.3 °C to 5.3 °C in northern Europe and from 2.2 °C to 5.1 °C in southern Europe and the Mediterranean. The warming in the Mediterranean and south-eastern Europe is highest in the summer. The lowest winter temperatures are likely to increase more than the average winter temperature in northern Europe, and the highest summer temperatures are likely to increase more than the average summer temperature in southern and central Europe. It is projected that hot extremes and heat waves will continue to become more frequent.

b) Precipitation

In 2100, based on IPCC climate change simulations in the A1B scenario, increases in the amount of precipitation are expected in high latitudes, while decreases are expected in most subtropical land regions.

9 http://geohotspots.worldbank.org/hotspot/hotspots/disaster.jsp

10 NOAA, National Geophysical Data Centre: www.ngdc.noaa.gov/ngdcinfo/onlineaccess.html

11 IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II, III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, Geneva, Switzerland (IPCC, AR4)

In the A1B scenario, annual precipitation will increase in the greatest part of northern Europe and decrease by –12 % on average in most of the Mediterranean and southern Europe. Precipitation varies substantially from season to season and across regions. It is expected that summer precipitation will decrease in some parts of the Mediterranean and southern Europe by up to 24 % in the A1B scenario, or up to 30 – 45 % in the IPCC SRES A2 scenario. The annual number of precipitation days will decrease in the Mediterranean and southern Europe, as will the risk of summer drought.

The snow season is very likely to be shortened in all Europe and snow cover is likely to decrease in most of Europe.

It is projected that climate change will also have an impact on water resources. In southern Europe (south of 47° N), the runoff is projected to decrease by 0 – 23 % up to the 2020s and by 6 – 36 % up to the 2070s (for the A2 and B2 scenarios).

c) Climate extremes

The report released by the Intergovernmental Panel on Climate Change in 2007 (IPCC, AR4) shows that climate change will lead to exacerbation of natural hazards associated with hydro-meteorological conditions, such as floods, droughts, heat waves and forest fires. The key implications of climate change are increasing magnitudes and frequencies of climatic extremes, which lead to the higher probabilities of floods, landslides, avalanches, drought, heat waves, and soil erosion with the associated damages.

The effect of climate change is a very important development issue for Europe since in the period 1991–2005 human and economic losses in the region were mostly derived from hydro-meteorological events, as compared to geological ones. The already hot and semi-arid climate of southern Europe is expected to become still hotter and drier, threatening its waterways, hydropower, agricultural production and timber harvests.

The regions especially prone to an increase in drought risk are the Mediterranean, southern Europe and some parts of central and eastern Europe, where significant increases in drought frequencies are projected.

The regions especially prone to a rise in flood frequencies are central and eastern Europe, then northern Europe, and the Atlantic coast and central Europe. In some regions, such as southern Europe, both the risks of floods and droughts are projected to increase simultaneously.

The combined effects of higher temperatures and reduced mean summer precipitation would enhance the occurrence of heat waves and more frequent and more intense droughts and forest fire in the SEE region.

Projections of climate change at the country level in the SEE region are shown in Table 1.3.1 below.

The observed evidence on climate change and projections at the country level differ with respect to place and time; they are not uniform and regionally comparable due to different methodologies, time horizons and SRES scenario. Climate related extremes and hazards often cross national borders. Further detailed investigations and high resolution regionalized predictions are thus critically important for drafting preparedness and adaptation policies. The existing risks

should be reduced by implementing specific regional adaptation policies and measures. Coherent and comprehensive transnational action plans and programmes should be elaborated for the whole SEE area, defining the necessary instruments and the costs of implementing the proposed measures. This issue is dealt with in greater detail in the forthcoming sections.

Table 1.3.1. Climate projections on the global/regional scale and in the SEE countries (based on IPCC, AR4, 2007; available Initial National Communications; national contributions for SEE/CCFAP-A development, July 2008; SEEDRMI, Final Report, ISDR, WB, 2007; EM-DAT).

Climate driven phenomena	Observed change	Projected change
Climate change in means		
Temperature (in °C)		
Global:	Increase in the average global temperatures of 0.74 °C during the period 1906–2005; 1990s – the warmest decade in 150 years; 1998 and 2005 warmer than any year since 1850;	Global: global average surface warming ranged from 1.8 to 4.0 °C during this century (range of 1.1 – 6.4 °C) (IPCC 4AR,2007);
Europe and SEE country level:	Mean annual increase 1.4 °C; winter increase larger than summer one; largest increase in the Iberian Peninsula, Southeast Europe and the Baltic states;	Europe: mean increase of 2.1 – 4.4 °C by 2080 (range of 2.0 – 6.3 °C) with higher increases in northern and eastern Europe. In southern Europe warming is projected to peak in summer, with local increases of 6 °C;
Albania	A decrease in average air temperatures was observed up to the mid 1980s, followed by an increase up to 2000. During the last 15-year period, a positive trend was observed in almost the entire territory. An analysis of the linear trend, made for the normal period 1961 – 90, recorded no significant trend in temperature.	According to the climate scenarios for Albania, developed within the SNC, milder winter, warmer springs, hotter and drier summers and drier autumns are likely to be expected. The annual increase in temperature is expected to be 1.0, 2.0 and 4.1 °C by 2025, 2050 and 2100, respectively. For 2025, an average increase of 0.8 °C is expected in winter and spring, and of about 0.9 °C and 1.3 °C for autumn and summer. A similar trend is expected for 2050 and 2100; an average increase in annual temperature of up to 2.0 °C and 4.0 °C is, respectively, expected. A high warming in summer, up to 2.8 °C (2050) and 5.6 °C (2100) might be expected. The outputs of the SRES A2 scenario[12] project an increase of up to 4.5 –5 °C for the 2080s in the territory of Albania. A dramatic increase in temperature (4.0 °C–7.3 °C) is projected for summer.
Bosnia and Herzegovina	Meteorological stations in B&H recorded an upward trend in temperature in the 20th century. In this area, the temperature increased by 0.6 °C during the period 1925 – 2000. A significant increase in temperature was recorded during the decades 1970 – 2000.	Under the IPCC AR4, A1B scenario, the simulated annual mean warming from 1980 – 1999 to 2080 – 2099 varies from 2.2 °C to 5.1 °C. The projected changes in seasonal temperature are: an increase in temperature from 1.7 °C to 4.6 °C in winter and an increase in temperature from 2.7 °C to 6.5 °C in summer;
Macedonia	The period 1971 – 2000 was warmer than the period 1961 – 1990 at the annual level in almost all climate areas in the country. Differences in the average mean annual air temperatures for the mentioned thirty-year periods ranged from –0.1 °C to 0.2 °C.	Climate change projections for Macedonia were made using direct GCM output and empirical downscaling, both in combination with pattern scaling. The average predicted increase in temperature was between 2.9 °C in 2075 and 3.8 °C in 2100, compared to the reference period 1961 – 1990.

12 The high-resolution regional climate projections SRES A2 scenarios were provided by the Hadley Centre, UK for the project "**Climate Change Projection for South Eastern Europe", WB.**

Montenegro	Trends in temperature during the last decade of the 20th century were observed in many parts of Montenegro. During this period, the temperature increased significantly. Deviations relative to the period 1961–1990 indicate an upward trend in temperature.	Under the IPCC AR4, A1B scenario, the simulated annual mean warming from 1980–1999 to 2080–2099 varies from 2.2 to 5.1 °C. Projected changes in the seasonal temperature are: an increase in temperature from 1.7 to 4.6 °C in the winter season and an increase in temperature from 2.7 to 6.5 °C in the summer season.
Serbia	In the territory of Serbia, similar changes induced by global and regional climate changes were registered at the local level. Fourteen of the last twelve years were among the warmest on record, and 2000 was the warmest year on record in Serbia. The results of an analysis of the average annual air temperature showed a positive trend of the deviation temperature for the period 1955 – 2005, relative to the normal values for the period 1961 – 1990.	Using a coupled regional climate model (Eta limited area model and POM limited area model for the ocean), projections of temperature at the end of the 21st century (2070 – 2100), following the A1B SRES scenario were made. For the winter season in Serbia, warming in the range of 2 – 2.2 °C was predicted. To the west of Serbia, the signal was about 0.2 ° stronger, presumably due to local orography. For the summer season, stronger warming in the range of 3.4 – 3.8 °C was forecast. The warmer area is in southern Vojvodina.
Precipitation		
Global:	Global: highly variable trends in space and time were observed during the last century. On average, the annual precipitation increased by 2 % between 1900 and 2000 on the global scale. The annual snow cover of the northern hemisphere has decreased by about 10 % since 1966.	Global: average (land and ocean) precipitation is projected to increase by 2 – 7 % between 1990 and 2100 The snow cover of the northern hemisphere is projected to decrease further during the 21st century.
Europe and SEE country level:	Europe: Annual precipitation in northern Europe increased by 10 – 40 % in the period 1900 – 2000, while precipitation in some parts of southern Europe experienced a decrease of up to 20 %.	Northern Europe: annual precipitation is projected to increase by 1 – 2 % per decade. Decrease in summer precipitation. Southern Europe: annual precipitation is projected to decrease by up to 12 % (a decrease of 50 % may occur in summer).
Albania	The total annual precipitation shows a slight downward trend. Almost all annual run-off anomalies as well as some seasonal ones show a downward trend due to decreasing precipitation, especially during the last decades.	The annual scenario (developed under SNC) projects a decrease in the annual value of up to 3.0 %, 6.1 % and 12.4 % for the 2025, 2050 and 2100 time horizons respectively. A drastic decrease in total precipitation is likely to occur in summer. This decrease is likely to reach up to 9.9 %, 20.5 % and 41.3 %, respectively. July is likely to contribute most to this decrease (–19.6, –23.5 and –49.7 %, by 2025, 2050 and 2100, respectively). The outputs of the SRES A2 scenario[13] project a decrease in annual precipitation of up to 40 % for the 2080s in the territory of Albania. Increases in the long-term mean annual and seasonal air temperatures and decreases in the mean annual and seasonal precipitation (combined with higher evaporative demand) would probably result in a lower river flow, up to 40 %.
Bosnia and Herzegovina	The precipitation in Bosnia and Herzegovina, especially in Herzegovina and the eastern part of B&H recorded a downward trend during the 20th century. During the period 1925–2000, in the Nevesinje-Trebinje area in Herzegovina, the precipitation decreased by 6 – 7 %, but not statistically significantly.	Under the IPCC AR4, A1B scenario, the simulated annual precipitation reduction from 1980 – 1999 to 2080 – 2099 for SEE varies from – 4 to –27 %, while decreases in the summer season will be up to –53 %.

13 The high-resolution regional climate projections SRES A2 scenarios were provided by the Hadley Centre, UK for the project **"Climate Change Projection for South Eastern Europe", WB.**

Macedonia	Based on the total annual precipitation, a linear downward trend at all meteorological stations was registered. During the last twenty years, compared to the period 1961 – 90, a decrease in precipitation was recorded at the annual level, especially in 1988 – 1990, 1992 – 1994, 2000 and 2001.	Climate change projections for Macedonia were performed using direct GCM output and empirical downscaling, both in combination with pattern scaling. The average sum of precipitation is expected to decrease from –8 % in 2075 to –13 % in 2100, in comparison with the reference period 1961 – 1990. Almost no change in precipitation is expected for the winter season in general in the territory of Macedonia, but quite a strong decrease in summer precipitation.
Montenegro	The results of a statistical analysis show that the annual sum of precipitation is unchanged. The mean annual precipitation decreased slightly during 1990 – 2005 with respect to the climatological mean, but without a significant difference compared to the 1961 – 1990 reference.	Under the IPCC AR4, A1B scenario, the simulated annual precipitation reduction from 1980 – 1999 to 2080 – 2099 varies from –4 % to –27 % and in the summer season decreases will be up to –53 % in the Mediterranean region and SEE.
Serbia	An analysis of the annual and seasonal precipitation sums for the period 1955 – 2005 in relation to the normal values for the period 1961 – 1990 mostly showed a negative trend, except in the autumn when it was positive at most stations in Serbia. The trend of the mean annual discharge calculated for the observed period (1950 – 2005) indicates decreasing discharges.	Using a coupled regional climate model (Eta limited area model and POM ocean model), projections of precipitations at the end of the 21st century (2070 – 2100), following the A1B SRES scenario, were performed. For the winter season, precipitation across Serbia will decrease almost everywhere in the range –10 % to –20 %. As for the summer season, in the Serbian territory, a substantial decrease in precipitation of about –10 % to –50 % is predicted
Sea-level rise and sea surface temperature		
Global, Europe and SEE country level:	Global: Sea levels rose by 0.17 m during the 20th century Europe: Sea levels around Europe increased by between 0.8 mm/year and 3.0 mm/year in the last century. Since the late nineteenth century, the global average sea surface temperature has increased by 0.6 ± 0.1 °C, consistent with the increase in global air temperature. The Baltic and North Seas and the western Mediterranean showed a slight warming of about 0.5 °C over the past 15 years.	Global: The sea level is projected to rise by 0.2 to 0.6 m during the 21st century. Projected rate of SLR in Europe in the 21st century is 2.2 to 4.4 times higher. It is very likely that the oceans will warm less than the land; by 2100, global sea surface temperature is projected to increase by 1.1 – 4.6 °C relative to the 1990 levels. Albania: a sea level increase of up to 30 – 45 cm by 2100 is predicted.
Changes in climate extremes (Extreme temperatures-heat waves; drought, forest fire; extreme rainfall, reveries floods; cyclones, wind storm surges)		
Global	Widespread changes in extreme temperatures have been observed over the past 50 years. Globally, more intense and longer dry periods. On a regional scale, there were increases in droughts during the second half of the 20th century. Upward trend in consecutive dry days.	Climate change will lead to an exacerbation of natural hazards associated with hydro-meteorological conditions, such as floods, droughts, heat waves and forest fires. Heat waves are expected to increase in frequency and severity in the warmer world.

Europe and SEE country level:	During the past 100 years, the number of cold and frost days decreased in most parts of Europe, whereas the number of days with temperatures above 25 °C (summer days) and of heat waves increased. During the 20th century drought and forest fire increased significantly in the Mediterranean and south-eastern Europe, (water scarcity and degradation). Significantly more wet days in central and northern Europe, fewer dry days in southern Europe; On a regional scale, the incidence of floods increased during the second half of the 20th century; More heavy rain events in most parts of Europe;	In Europe, cold winters are projected to disappear almost entirely by 2080 and hot summers are projected to become much more frequent; warm periods, including heat waves, are expected to be more intense, more frequent and longer-lasting. SEE region may experience one additional month per year of summer days and an increased number of hot days with the temperature exceeding 30 °C; Southern Europe: more frequent and intense droughts in all seasons, By the 2070s, today's 100-year droughts are projected to return every 10 (or fewer) years on average. More frequent extreme precipitation events in all Europe. An increasing risk of flooding in Europe is expected under climate change. A decrease in annual runoff in southern Europe by up to 23 % by the 2020s; by up to 20 – 30 % by the 2050s, and by up to 36 % by the 2070s. An increase in summer low flow by up to 80 % by the 2070s. Potential increases in the frequency and/or intensity of extreme weather events, such as storms and associated surges. Annual river discharge and the resulting water availability are projected to decrease, especially in the Mediterranean and south-eastern Europe.
Albania	During 1974 – 2006, floods accounted for the major share of disaster events (32 %), followed by extreme temperature (10 %), windstorm (10 %), drought (5 %), and landslides (5 %). The incidence of climate related disasters accounted for the major share of disaster events (62 %). The incidence of hazard events recorded a steady increase in the number of events (SEEDRMI, Final Report 2007, EM-DAT)	More hot days and heat waves are very likely in almost the entire territory of Albania. More frequent and severe droughts with greater fire risk are likely. An increase in the wind speed by up to 2 % relative to the period 1961 – 1990 is expected for the 2080s
Bosnia and Herzegovina	EM-DAT available for the period 1989 – 2006 shows that flood (31 %), drought (15 %), wind and hail storms (15 %), wild fires (8 %) and landslides (8 %) constitute 77 % of the total incidence of hazards in the country (SEEDRMI, Final Report 2007, EM-DAT)	Both the frequency of climate extremes and climate related disasters and economic damages caused by them could become even more pronounced.
Macedonia	The incidence of natural climate related hazards during the last seventeen years (1989 – 2006) showed a steady upward trend. Flood accounted for 44 % of the perils during the period 1989 – 2006 and, with extreme temperature (13 %), drought (6 %), wild fires (6 %) and windstorms (6 %), accounted for 75 % of the total number of natural disasters and technology related hazards in the country (SEEDRMI, Final Report, ISDR, WB, 2007, EM-DAT).	Extreme events such as flash floods, high temperatures, drought periods and forest fire are expected to increase;
Montenegro	Montenegro is vulnerable to floods, forest fires, heat waves, landslides and windstorms.	Both the frequency of climate extremes and climate related disasters and the resulting economic damage could become even more pronounced.
Serbia	The number of disasters occurring during the period 1989 – 2006 shows an upward trend. The data show that the occurrence of flood related hazards was the highest (34 %) among all perils and, with drought, wind and hail storms, landslides, forest fires and extreme temperatures, constituted a substantial share of the total number of disasters.	Both the frequency of climate extremes and climate related disasters and the resulting economic damage could become even more pronounced.

1.3.2 The current and changing socio-economic conditions in SEE

At present, the SEE countries have the total population of 19,574 thousand with almost half the population in rural areas. Demographic trends per country and for the SEE region are presented in Table 1.3.2. At the beginning of this century, approximately 24 % of the population in the SEE region (about 4,000,000) lived below the poverty line (National Strategy for Socio – Economic Development, Albania 2001; Mid-Term Development Strategy of Bosnia and Herzegovina -PRSP, 2004-2007, B&H, 2004; Poverty Reduction Strategy Paper, Macedonia, 2000; Poverty Reduction Strategy of Montenegro, 2005; Serbian Poverty Reduction Strategy, 2005).

Poverty is more widespread in the remote and rural areas and in larger households with more members unemployed or with low education. GDP per capita in the SEE countries ranges between 2200 and 4500 US dollars. On average, agriculture accounts from 20 to 40 % to GDP.

All SEE countries are in the process of preparation for full EU membership. The standard of living, unemployment rates, and relatively modest economic growth rates are the central economic problems. One of the key challenges is the implementation and acceleration of economic reforms and ensuring a balanced economic development; closely related are the challenges of improving the living standards and poverty reduction. Integration of climate change issues into development policies will represent a special challenge. Raising the awareness and capacity building for the inclusion of the concept of climate change in sustainable development strategies is of utmost importance.

Changes in the governance system (improved co-operation, co-ordination and consultations between various sectors within the government, as well as between the government and the private and civil sectors) represent another important challenge.

Many examples suggest that addressing poverty implies also preparing for climate variability and extremes. Some groups are particularly vulnerable to climate change: low-income groups in drought-prone areas with poor infrastructure and market distribution systems; low to medium-income groups in flood-prone areas due to the possible loss of stored food or assets; farmers who may have their land damaged or submerged by increased floods; and fishermen who may loose their catch due to decreased water levels in lakes. While climate change is only one of the many factors influencing poverty, immediate action should be taken to adapt to climate change impacts.

Table 1.3.2 Total population (thousands)/urban (%)

	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Albania	3 150 38.9	3 080 41.7	3 154 44.8	3 245 48.0	3 346 51.1	3 430 54.3	3 488 57.5	3 519 60.6	3 527 63.7	3 519 66.6	3 494 69.5	3 451 72.1
Bosnia and Herzegovina	3 421 41.1	3 787 43.2	3 915 45.7	3 942 48.6	3 899 51.8	3 833 55.2	3 751 58.5	3 653 61.7	3 544 64.8	3 423 67.8	3 294 70.6	3 160 73.3
FYR Macedonia	1 963 60.3	2 009 62.9	2 034 65.4	2 041 67.9	2 037 70.2	2 025 72.5	2 001 74.6	1 966 76.6	1 921 78.6	1 868 80.4	1 809 82.0	1 746 83.6

	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Monte-negro	623 53.4	670 58.5	608 61.2	600 59.5	604 58.7	611 58.9	613 60.0	613 62.0	612 64.4	610 66.6	607 68.8	603 71.0
Serbia	10196 50.9	10131 51.1	9 863 51.5	9 925 52.4	9 970 53.8	9 981 55.8	9 959 58.4	9 915 61.2	9 861 63.9	9 800 66.6	9 727 69.1	9 635 71.6
SEE Countries Total	19353 48.9	19677 51.2	19574 53.7	19753 55.3	19856 57.1	19880 59.3	19812 61.8	19666 64.4	19465 67.1	19220 69.6	18931 72.0	18595 74.3

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007 Revision, http://esa.un.org/unup, Monday, August 25, 2008;

1.3.3 The current vulnerability assessments and identification of the most vulnerable sectors in SEE

The SEE region is highly vulnerable to floods, landslides, droughts, forest fires, extreme temperatures, windstorms, earthquakes and technology related hazards. On average, climate related disasters account for the major share of total disaster events in SEE countries (about 70 %). Using data from the EM-DAT database and other available data (from the National Geophysical Data Centre website, peril/country specific research papers and national contribution to SEE/CCFAP-A), vulnerability assessment of the SEE countries was made on the basis of the incidence rate of hazards, annual average number of deaths and exposed population. The analysis revealed that the current vulnerability in the SEE region is mainly the consequence of climate extreme events. Table 1.3.3 shows that, on average, one flood event occurs every two years in the region. In most countries, a substantial number of the population is exposed to flood and drought. The exposed population data show the high vulnerability of the countries to flood and drought related hazards. The available economic loss data show the SEE countries' economic vulnerability, particularly to climate related hazards. It was found that the total annual economic losses from hydrometeorological hazards and unfavourable weather/climate conditions (floods, droughts, hail, frost, heavy rain, snow, strong winds, extreme low temperatures, etc.) in the SEE countries are about 200 million USD on average. These data show the intense losses in the region, which have an impact on the countries' sustainable development.

The current climate variability and climate related hazard affect many sectors, including water resources, agriculture and forestry, human health, ecosystems and biodiversity, energy, tourism, infrastructure and coastal zones (national contributions for SEE/CCFAP-A development).

The lack of land use planning codes and river basin management practices and deteriorating flood regulating infrastructure have increased vulnerability to floods and landslides in flood prone areas. The lack of capacity and training in disaster risk management and policy implementation at the governmental level in many countries, as well as the lack of early warning systems have also increased vulnerability to climate related hazards.

Table 1.3.3 The average annual incidence of major perils and vulnerability of SEE countries.

Country (period taken for the average)	Annual average incidence of major perils					Annual average number of deaths due to all perils	Annual average economic loss due to all perils (million USD)	Economic loss in comparison to GDP in SEE countries
	Drought	EQ	Flood related	Wind storm	Techology related			
Albania (1974 – 2006)	0.12	0.09	0.24	0.06	0.06	7.82	68.67	2.49
Bosnia and Herzegovina (1989 – 2006)	0.17	NA	0.28	0.11	0.17	3.72	22.94	0.96
Macedonia (1974 – 2006)	0.17	NA	0.22	NA	0.11	13.39	24.59	
Montenegro*								
Serbia and Montenegro (1989-2006)	0.17	0.06	0.50	0.06	0.56	10.00	82.0	1.66

**Available combined data for Serbia and Montenegro are presented here to understand the risk in the region.*

NA – data not available on the website

(Adopted from SEEDRMI 2007, p.69/70)

1.3.4 Future vulnerability assessments in SEE

Climate change poses a real and growing problem for south-eastern Europe. In this region, already vulnerable to climate variability and climate extremes, climate change is projected (IPCC AR4) to worsen the conditions. In particular, climate change may enhance the existing problems of desertification, water scarcity and food production, while at the same time introducing new threats to human health, ecosystems and national economies of the countries. The potential effects of climate change are very diverse and are likely to alter the basic necessities of life, such as food, water, health, land usage and the environment, and will be more damaging with increased warming and significantly decreased precipitation. As the United Nations Framework Convention on Climate Change (UNFCCC) indicated, "countries in arid and semi-arid areas or areas liable to floods, drought and desertification are particularly vulnerable to the adverse effects of climate change".

As the consequence of the projected regional climate change, the frequency and severity of droughts could increase across the region. The analysis showed that several months of summer drought every year is to be expected in most SEE countries. In some parts, droughts could occasionally persist throughout the year. Hotter and drier conditions would extend the areas prone to

desertification to encompass areas not currently at risk. In addition, the rate of desertification would increase due to increases in erosion, salinisation, fire hazard and reductions in soil quality. The IPCC project revealed that rainfall is expected to decline throughout the year in southern Europe, particularly in the summer but, paradoxically, intense events of rainfall are expected to increase in the region. River flood hazards, especially flash floods, across much of south-eastern Europe will increase even further, endangering settlements, infrastructures and waterways.

Climate change will affect many sectors, including water resources, agriculture and food security, forestry, ecosystems and biodiversity, human health, coastal zones, energy and tourism, infrastructure (Table 1.3.4). Many environmental and developmental problems in the SEE region will be exacerbated by climate change. This AP, based on the contributions of SEE countries, IPCC AR4, and already existing regional climate change studies, focuses on the already generally vulnerable systems/sectors.

Water resources

It is likely that the first impacts of climate change will be felt in the water resource systems of SEE. Reductions in water availability would hit SEE countries the hardest. The overall water availability in the SEE countries for the 2070s is expected to be reduced by –10 to –50 %[14].

The SEE region could suffer increasingly frequent regional water shortages due to the twin problems of reduced water resources in terms of their quantity and quality and rising demand. Economic activities depending on water availability, such as agriculture, tourism, industry and energy, will be particularly adversely affected, since increased climate variability will threaten, among other things, infrastructure, waterways, hydropower, crop yields and timber harvests as well as recreational areas.

Agriculture and food security

Agricultural production is very climate-sensitive. The increased intensity and frequency of storms, drought and flooding, altered hydrological cycles and precipitation variance have implications for future food availability due to their physiological effects on crops, pastures, forests and livestock (quantity, quality). A 2 °C global temperature rise could lead to a 20 % reduction in water availability for crop yields in southern Europe[15]. Extreme weather events, such as spells of high temperature, heavy storms or droughts, can severely disrupt crop production. As far as livestock is concerned, the impact of climate change is twofold: direct through alteration of the physiology of farm animals and indirect through changes in the food supply. Thus, the projected increases in temperature and precipitation variability across south-eastern Europe may have severe impacts on agricultural production in the region.

14 EEA Technical report , No 2/2007: Climate change and water adaptation issues; EuroWasser, Centre for Environmental Systems Research, University of Kassel, December 2001.

15 C. Giannakopoulos, M. Bindi, M. Moriondo, P. LeSager and T. Tin: Climate change impacts in the Mediterranean resulting from a 2 ^{O}C global temperature rise, Published in July 2005 by WWF, the global conservation organization, Gland, Switzerland.

Forestry

A temperature increase combined with a precipitation decrease during the summer boosts the risk of fires, which represents a major concern in the SEE region. In summer, high temperatures, low air humidity and fuel moisture represent favourable conditions for forest fires. The changing climate conditions could thus affect the frequency and magnitude of forest fires. In addition, extreme climate events, such as spring temperature backslashes and summer drought, are expected to increase in frequency and duration. These impacts might negatively precondition trees to other challenges, such as new pests and diseases. Insect and fungal attacks could also be enhanced by climate change.

Energy

In all SEE countries that are heavily dependent on hydropower for the supply of energy and electricity, a decrease in precipitation and hence in river flow and runoff will provide further challenges to already stressed national and regional energy security. In the SEE region, the hydropower potential is expected to decline by –34 to –40 % on average by the 2070s[16].

Coastal systems

In the coastal zones of the Adriatic coastline in Albania, Montenegro and Bosnia and Herzegovina, the risk of inundation or erosion, and land loss (due to storms and sea level rise) will increase substantially, with implications for industry, infrastructure and heritage sites and coastal natural habitats. In combination with increasing temperatures and heat waves, this could also become a major concern for tourism development in the region.

Health

The combination of heat and pollution in the SEE region would lead to an upsurge in respiratory illnesses, particularly among urban populations, while extreme weather events could increase death and injury rates. Water shortages and damaged infrastructure would increase the risk of cholera and dysentery. Water pollution, already a major health hazard in the region, would become even worse as pollutants become more concentrated with reduction in river flows. Higher temperatures would increase the incidence and extent of infectious diseases. On the other hand, snow melt, especially in the case of rapid warming accompanied by rain, could cause violent flood waves. These are characteristic and frequent phenomena of the Danube and Tisza River catchment areas. In the Mediterranean, intense precipitation falling on small catchment areas may cause rapid onset floods. Recent flood events in the SEE countries highlighted the need for population security, including the protection of homes. These events also demonstrated the diverse limits of protection[17]. For this reason, there is a need to change the current paradigm, with

16 EuroWasser: Europe's hydropower potential today and in the future; Centre for Environmental Systems Research, University of Kassel, December 2001.

17 WHO Regional Office for Europe, 2004:Heat-waves: risks and responses;
WHO, Regional Office for Europe, 2002: Floods: Climate Change and Adaptation Strategies for Human Health
Environmental Change and Infectious Disease Workshop Report, 2007; ecdc.europa.eu

a shift from defensive actions to a strengthening of regional cooperation in climate related disaster risk management, including early warning system development, as an adaptation method.

Ecosystems

Climate change exacerbates the problem of stressed ecosystems. A rapid change is very difficult for ecosystems to cope with. Many valuable ecosystems could be lost as species fail to keep up with the shift in climate boundaries and/or find their migration paths blocked by human activities. Up to 85 % of the wetland sites in southern Europe could disappear with a 3 to 4 °C rise in temperature. Mountain communities face an up to 60 % loss of their areas by 2080 under the high emission scenario. Collapsing ecosystems not only bring great hardship to people who depend on the products of these ecosystems for their livelihood, but are also ripe grounds for invasive species and the release of new pests. During the last 20 years, the WHO identified 30 diseases nearly all arising from distressed ecosystems (The Link Between Environment and Disease; http://www.un.org/Pubs/chronicle/2006/issue1/0106p68.htm).

National economies would be adversely affected not only by the direct impacts of climate change, but also by the cost of adaptive measures and the knock-on implications of changes elsewhere. It should be noted that in south-eastern Europe approximately 40 % of the population lives in rural areas and is strongly dependent on agriculture. Therefore, the impact on employment could be significant in this region. Quantitative estimates of financial costs are not available but, in general, SEE countries, as economies in transition, Non-Annex I Parties to UNFCCC, are expected to suffer larger economic damage than developed countries.

Future climate change poses a serious risk to poverty reduction and, through its impacts on the environment and social and economic well-being, could critically undermine the efforts at sustainable development in the SEE countries.

Table 1.3.4. Future regional impacts and vulnerability to climate change in South Eastern Europe (based on IPCC, AR4, 2007; INC and national contributions for SEE/CCFAP-A development, July 2008).

Impacts	Sectoral vulnerabilities
Temperature • Warming above the global mean in SEE. • Extreme high increase in temperature (more hot days and heat waves are very likely; increases in the heat index)	**Water:** Increasing water stress due to decrease of freshwater availability; Increase in the number and severity of flash floods and landslides; Increase in the number of people experiencing water stress; Reduction in water quality in some areas due to an increase in floods and droughts; Decrease in runoff is to be expected for all time horizons; for example, in Albania, an increase in air temperature and a decrease in annual and seasonal precipitation (combined with higher evaporative demand) would probably result in lower river flow by up to 40 %; Decreased patterns of snowfall and snow season duration; Groundwater recharge for river catchment will continuously decrease; The overall water availability in the SEE countries for year 2070s is expected to be reduced by –10 to –50 %. **Agriculture and food security:** Decreases in crop yield, such as wheat, maize, potatoes, vegetables, forages (alfalfa, etc.) fruit etc.; for example, in Macedonia, expected yield decrease by 2100 for vulnerable areas and crops as a result of climate change impact in the range from 21 % (winter wheat) to 84 % (tomatoes); Increased heat stress of domestic animals; Increased evapotranspiration and reduced soil moisture may increase land degradation and soil desertification processes, such as: a decline in the organic matter in soil, increase in soil erosion intensity and soil salinisation; Reduction in the extent of arable land due to soil erosion; In the coastal areas, increase in salinity, due to the likely sea level rise and intrusion of salt water into the soil; In general, an increase in temperature may shorten the reproductive cycle of many pests, hence, their risk to the respective host plants would be higher; Worsening of food insecurity in dry areas where agricultural land is subject to salinisation and erosion, reduction in crop yields and livestock productivity.

Precipitation and snow • Decrease in precipitation particularly in summer; • Increase in the frequency of intense precipitation events; • Increasing reduction in the amount of snow; **Sea levels increased around Europe** • sea level increase up to 30–45 cm by 2100 on the Adriatic coast (Albania)	**Health** Heat stress and changing patterns in the occurrence of disease vectors affecting health; Risks to life due to increases in the intensity and frequency of hydrometeorological hazards; Water pollution would become even worse as pollutants become more concentrated with reductions in river flow; **Tourism** Coastal tourism is expected to suffer vulnerabilities caused by sea level increase (in Albania, 30 – 45 cm up to 2100); The expected summer water shortages and higher risk of forest fires would have a negative impact on summer tourism; Positive impact on tourism in spring and autumn. Mountain tourism would suffer due to a shortening of the skiing season, unless artificial snow is made. **Energy** The likely runoff reduction is expected to have a significant influence on electricity generation. In the SEE region, the hydropower potential is expected to decline by –34 to –40 % on average by the 2070s; Changes in heating degree days and cooling degree days will change heating and cooling requirements and potentially shift the peak in energy demand to the summer season, with implications such as the need for additional energy capacity and increased stress on water resources. Likely decrease in total cloud cover and increase in wind intensity will lead to an increase in solar energy and wind energy potential.
Extreme Events Increasing frequency and intensity of extreme events, particularly: • droughts during the summer months; • increase in extreme rainfall associated with hail and winds; • intense rainfall events causing landslides and severe flash flooding; • heat waves/hot spells in summer of longer duration, more intense and more frequent;	**Terrestrial Ecosystems** Increased risk of the extinction of many species due to the synergistic effects of climate change and habitat fragmentation; Forested area is likely to decrease, redistribution and migration of tree species toward higher altitudes; great increase in forest fire risk; Significant habitat loss and extinction of species in many areas, including forests, due to higher temperatures and loss of groundwater. **Coastal Zones** People in low-lying Adriatic coastal areas will be affected by sea level rise and an increase in the intensity of weather extreme events; Coastal inundation is likely to seriously affect the aquaculture, industry and infrastructure; Up to 85 % of the wetland sites in southern Europe could disappear with a 3 to 4 °C rise in temperatures; Increased risk of availability of drinking water and tourism, due to sea level rise and extreme events.

1.3.5 Adaptation assessments, policies, and measures in SEE

Over the next decades, it is predicted that people in already vulnerable regions of SEE will face shortages of water and food and greater risks to health and life as a result of climate change. In addition to changes in the mean values of climate parameters, changes in the frequency and intensity of climate extremes (storms accompanied with floods and destructive effects of wind, drought, extremely high or low air temperatures, heat waves, snow storms, avalanches, landslides, forest fires, etc.) have been projected for south eastern Europe. As a consequence of such negative effects on food and energy production, water supply, biological diversification, hydropower potential, summer tourism, crop productivity and human health, the IPCC Fourth Assessment Report recognized the region of southern Europe as highly vulnerable to climate change.

There is now hard evidence that climate extremes, variability and change are significant impediments to successful economic development – i.e., they represent risks to regional, national and local economies. Climate change is anticipated to have far-reaching effects on the sustainable development of SEE countries, including their ability to attain the United Nations Millennium Development Goals by 2015. This highlights the need to mainstream both disaster risk management and adaptation to climate variability and change, in a mutually consistent and supportive manner, by ensuring disaster reduction management and adaptation are integral components of national development planning processes.

Climate change will have wide-ranging effects on the environment and socio-economic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity, and coastal zones. In their Second National Communications (SNC) to the UNFCCC (Albania and Macedonia) and country input for CCFAP development (Albania, Bosnia and Herzegovina, Macedonia, Montenegro and Serbia) provided information on their vulnerabilities to climate change for a wide range of sectors.

In Albania, under its SNC, a set of general adaptation policies and measures was identified (the policies address: *prevention of the negative effects*; *avoidance* or exploitation of changes in risk; *research* into new methods/ technologies of adaptation; *educating, informing, and encouraging behavioural change*. *The adaptation measures consist of* the integration of adaptation actions into development policy and planning at every level; an inventory of existing practices and decisions used to adapt to different climates; disaster relief to hazard-reduction programmes; improvement of monitoring /warning systems for flood and drought; promotion of awareness of climatic variability and change, as well as adaptation measures needed to address vulnerability to climate change for the following systems/sectors: water resources (modification of existing infrastructure; construction of new infrastructure), agriculture (short-term and long-term adaptations measures), forestry, energy and tourism.

In the Republic of Macedonia, within the Second National Communication on Climate Change, sectoral vulnerability analyses for the most vulnerable sectors (agriculture, biodiversity, forestry, health and water resources) were made and measures and actions on adaptation were identified. An Intersectorial Action Plan on Adaptation for the period 2008 – 2011 was developed.

Bosnia and Herzegovina highlighted priority to setting up a national strategy for adaptation to climate change and comprehensive implementation plans for adaptation. Within the B&H Initial National Communication (INC), which is in preparation, vulnerability and the identification of adaptation measures, as well as the development of a "Policy Framework for the implemention of adaptation measures" will be assessed.

So far, Montenegro has not carried out measures targeted at adaptation to climate change. Until the adoption of the relevant strategy that will address adaptation to climate change, the Initial Communication to the UNFCCC, which is in the preparation phase, is deemed to represent the government's starting point for the management of measures in this area. The planning and implementation of measures must first and foremost address the areas in which vulnerability caused by natural climate variability is already evident. In addition, priority must be given to segments that will require the longest period for adaptation and the current developmental trends of which show that future conditions may deteriorate

The country input from Serbia is highlighted by the "Development of a Framework Strategy and Action Plan to deal with the problem of Greenhouse Gas Emissions in Serbia and Montenegro" in 2005. Within this study, in the adaptation area, a series of general measures was proposed, both common measures for all vulnerable sectors and particular measures relevant for certain economic sectors, such as: agriculture, forestry, water management, health, environmental protection, power production, traffic, tourism, spatial planning, civil engineering and education. A Strategy for Sustainable Development, including a climate change chapter, has recently been approved by the Serbian Government. The elaboration of adaptation measures and the development of a National Adaptation Strategy will be the next step after a comprehensive vulnerability assessment under the project for the development of the First National Communication to the UNFCCC. Also highlighted is the construction of a forecasting and early warning system through Community Based Disaster Risk Management.

SEE countries are highly vulnerable to climate change. In recent years, the region has witnessed more frequent and severe floods, droughts and forest fires, which has resulted in considerable economic losses. For this reason, all SEE countries have recently taken their first steps in assessing impacts and vulnerabilities to climate change, as well as in considering possible adaptation options. However, SEE countries have limitations in capacity making planning and adaptation is difficult. Limitations include both human capacity and financial resources. Concerted regional action is required to enable SEE countries to adapt to the effects of climate change that are now occurring and will worsen in the future.

1.3.6 The major constraints identified in the V&A assessment in SEE

The study has found that natural and human systems in the SEE region are already under great stress, often beyond the intrinsic adaptive capacity of the system. Climate change adds to the existing stress and SEE countries are highly vulnerable and have inadequate capacities to respond. The problems and constraints identified are of institutional, technical, methodological and financial nature and remain of considerable concern, threatening the sustainability of the complex multidisciplinary activities relevant for vulnerability and adaptation assessment of managed and natural systems to climate change.

The institutional problems are related to the lack of an institutional and legal framework which might facilitate the process of preparation of national communications and other climate impact, vulnerability and adaptation studies. In addition, the limited awareness of stakeholders and the population of climate change adaptation is also identified as a common constraint.

The most persisting problem lies in data availability, consistency and transparency. The current monitoring of the climate and groundwater, climate forecasting and modelling conducted by national hydrometeorological services are faced with permanent problems in human resources and in operation, slow modernisation of equipment, reduction of the monitoring network, etc. Basic maps and databases are very old and/or hardly available (soil map, vegetation map, land use map, etc.). There is the necessity for increasing the technical capacities for monitoring and updating of basic data sets. Modern tools for vulnerability assessment are required in almost all vulnerable sectors (hardware, software and training of personnel). The training of experts in modern technologies for adaptation is also required to overcome the gap in personnel capacities.

The most important methodological problems are associated with: uncertainties linked with the climate change scenarios; lack of finer resolution regional climate models; lack of methods for simulation of extreme weather events; lack of a socio-economic scenario, which is also identified as a constraint in vulnerability assessment; lack of models for cost/benefit analysis (uncertainty about the future and the effectiveness and costs of adaptation options are common obstacles to action); lack of know-how for implementing new technologies.

All national case studies pointed to the lack of financial resources as a major obstacle to V&A assessment, adaptation planning and implementation.

1.4 TIMELINE OF CCFAP

1.4.1 Quick start phase

As reported in the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change – IPCC AR4, "In southern Europe, climate change (high temperature and drought) is projected to worsen the conditions in a region already vulnerable to climate variability and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity. It is also projected to increase health risks due to heat waves and the frequency of wildfires".

Therefore, reducing the risks associated with the impacts of extreme weather and climate variability is a fundamental developmental challenge faced by SEE countries. This must be urgently addressed in order to contribute to improving livelihoods, economic well-being and health, as well as maintaining biodiversity and culture.

This Climate Change Framework Action Plan with strategic focuses and defined actions, as a quick start phase in the implementation of the Belgrade Initiative, provides the basis for some of the project proposals under the relevant international funds and partnerships.

In other words, the Framework provides an identification of initial climate change actions that could be implemented quickly, cost-effectively and serve as a foundation for building widespread support for additional long-term actions.

The Framework is intended to promote (but in no way supersede) the links with more specific regional and national instruments and plans across specific sectors linked to weather and climate, including: water; agriculture; energy; forestry; health; coastal zone management; biodiversity and ecosystems; land use, buildings and transportation; and tourism. Addressing the issues of climate change requires an integrated, multi-stakeholder approach. Furthermore, a strategic programmatic approach is required, rather than an increase in stand-alone project initiatives.

The CCFAP runs from 2009 – 2015 and is consistent with the timeframes of the *Millennium Declaration, the Johannesburg Plan of Implementation* and subsequent work of the UN Commission on Sustainable Development, the "Hyogo Framework for Action 2005 – 2015: Building the Resilience of Nations and Communities to Disasters"; as well as the EU Green Paper on Adaptation, Water Initiative[18] (launched in the aftermath of the 2002 World Summit for Sustainable Development in Johannesburg-WSSD as a contribution to the achievement of the Millennium Development Goals-MDGs and WSSD targets for drinking water and sanitation) etc.

The Framework Action Plan will be subjected to a mid-term review in 2012 to determine the overall progress and identify the emerging gaps requiring priority action and adjustment of priorities in the future.

1.4.2 Development of a detailed action plan

However, the response to climate change will require a long-term co-operative action plan with detailed programmes well beyond such initial CCFAP activities. Targets and indicators for evaluating progress towards achieving the outcomes of this Framework will be established within the detailed Action Plan linked to the Framework and set at the appropriate levels. The project concept on "Development of a Regional Climate Change Action Plan for SEE (SEE/CCFAP) with prioritised adaptation measures" is presented in Annex 3.

18 www.euwi.net

2. OBJECTIVES AND EXPECTED RESULTS

Scientific information concerning the predicted impacts of climate change on south-eastern Europe demonstrates that SEE, already a vulnerable region, is in the front line of projected climate change. The reality that public health, property, economic development and biodiversity are at risk from direct climate change impacts adds urgency to the proposed actions to prepare for regional climate change impacts. As the information concerning climate change impacts is relatively certain and impacts are anticipated to be great, the SEE countries should act with a degree of urgency. The officials of these countries will respond to the range of known risks according to the best available science, probability and likely magnitude in order to minimize the risks of climate change. Resilience to climate change impacts will require a high degree of coordination among states and local authorities, business leaders and residents.

The SEE countries are in the process of developing a Southeast European Climate Change Framework Action Plan for Adaptation, which aims at clearly setting the direction on adaptation priorities for the region. The plan is being facilitated by the Regional Environmental Centre for Central and Eastern Europe and the SEE Sub-Regional Virtual Climate Change Centre hosted by the Republic Hydrometeorological Service of Serbia, with support from the Royal Norwegian Ministry of Foreign Affairs, for the implementation of the project: "Preparation of a Climate Change Framework Action Plan for the SEE Region (SEE/CCFAP)".

The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as: ". . . adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions or activities to climatic change and variability." Floods, droughts, fires, wind surges, land slides, record temperatures are occurring more frequently, often at more extreme levels, than earlier. Therefore, the SEE/CCFAP-A is now offering the background for cooperation to support regional preparation for both extreme events and long-term trends reflecting global and regional climate change.

The purpose of the SEE/CCFAP-A is to ensure that the SEE population build their resilience capacity to the risks and impacts of climate change through implementing adaptation actions; improving understanding of climate change and its effects; education and awareness raising; improving decision making and good governance; developing and strengthening partnership and cooperation; and to support the SEE Countries in the implementation of Article 5 and Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) and its Framework for Capacity Building and the Nairobi Programme of Work on Impacts, Vulnerability and Adaptation.

The SEE-CCFAP-A and its different programmes for adaptation will assure faster and better cooperation and exchange of information between the experts and countries in the region. In addition, SEE cooperation in adaptation will contribute to capacity building and public awareness in all countries of SEE. At the same time, cooperation will accelerate the development and implementation of cost-effective adaptation measures in the participating countries, as well as in the region as a whole.

The objectives are: to understand the main characteristics of climate variability and hazards in the SEE region; to understand existing programmes/projects and institutional arrangements for addressing climate change; to identify adaptation activities to climate hazards and climate change. The SEE/CCFAP-A will establish a framework for current and future regional project initiatives in terms of adaptation to the impacts of climate change. It will be revised and updated to reflect changes in climate sciences and in economic conditions in the SEE countries and emerging technologies. By taking action to address climate change, the SEE Governments will be taking action towards the development of a more sustainable society and economy.

The outcomes of the Framework Action Plan will be:

Human capacity to monitor and assess environmental, social and economic risks and effects of climate change strengthened; Existing hydrometeorological and oceanographic institutional capacity, including observations and data collection systems, sustained and upgraded; Development and strengthening of technical data sets and tools for projections of regional climate variability and change, including analytical and application systems for forecasting and early warning, undertaken; Climate data sets integrated with relevant social and economic information, and traditional knowledge for risk management; Human capacity to identify, analyze and implement cost effective adaptation response measures and the creation of a pool of informed resource persons conversant with the development of practical steps in adaptation tools and methods strengthened; Human capacity to identify and integrate scientific and traditional knowledge into adaptation practices strengthened; Negotiation and advocacy skills of government and NGOs to more effectively engage in the international negotiations process strengthened; Existing and emerging regional cooperation and international partnerships for the SEE region on climate change strengthened; Increased access by the SEE Region to resources from funding mechanisms related to climate change;

Some adaptation activities are already in progress in the SEE countries; both these ongoing and new efforts are described here. They are grouped in several general strategic focus areas: Climate Observations and Climate Science; Climate Change and Public Health, Safety and Emergency Preparedness; Climate Change and Water Resources Management, Freshwater Quantity and Quality, and Water Supply; Climate Change and Agriculture and Forestry; Climate Change and Land Use; Buildings and Transportation; Climate Change and Tourism; Climate Change and Coastal Zones; Climate Change and Biodiversity and Ecosystems; Climate Change and Energy; Cross Cutting Issues.

The following sections provide a series of actions for SEE region to undertake in each of these strategic focus areas.

3. CLIMATE CHANGE POLICY FRAMEWORK IN ADAPTATION – SEE STATUS

3.1 INTERNATIONAL

The main mechanism to address climate change on the international stage is the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC entered into force on 21 March 1994 and there are now 191 Parties (member countries) to the Convention. "The UNFCCC provides the basis for concerted international action to mitigate climate change and to adapt to its impacts"[19] . All Parties are committed to "formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing the measures to "facilitate adequate adaptation to climate change", Article 4.1(b). "The developed country Parties … shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects", Article 4.4. By the Convention's Subsidiary Body for Scientific and Technological Advice, attention has also been given to the scientific and technical aspects of adaptation and technology transfer. This includes the Nairobi Work Programme on impacts, vulnerability and adaptation to climate change (Nairobi Work Programme-NWP), which was adopted by the COP in 2006[20]. The NWP comprises the following thematic areas: Data and observations; Climate modelling, scenarios and downscaling; Climate related risks and extreme events; Socio-economic information; Adaptation planning and practices; Research; Technologies for adaptation; and Economic diversification. All thematic areas are divided into several action-oriented sub-themes. The NWP, officially recognising the role of the WMO and NMHSs in programme implementation, urged the Parties to take a proactive role in planning national and regional programmes on adaptation to climate variability and change.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007) gives detailed projections for the 21st century and these show that global warming will continue and accelerate. Even if countries reduce their greenhouse gas emissions, the Earth will continue to warm. Predictions for 2100 range from a minimum of 1.8 °C to as much as a 4 °C rise in global average temperatures. In its 2007 report on impacts, adaptation and vulnerability to climate change, the Intergovernmental Panel on Climate Change (IPCC) concluded that there was a high confidence that the recent regional changes in temperature have had discernible impacts on physical and biological ecosystems. The projected changes in climate could have major consequences on hydrology and water resources, agriculture and food security, terrestrial and freshwater ecosystems, coastal zones and marine ecosystems, and human health in South Europe. Adverse impacts include increased flood and drought magnitude and damages, reductions in crop yields, decreased water availability, and increased number of people exposed to vector- and water-borne diseases. The effects of climate change imply that the local climate variability that

19 United Nations Framework Convention on Climate Change: Handbook. UNFCCC Secretariat, Bonn, Germany. http://unfccc.int/resource/docs/publications/handbook.pdf>effects_and_response_measures_art_48/application/pdf/200702_sids_adaptation_bg.pdf

20 FCCC/CP/2006/5 Section V, E. Implementation of Article 4, paragraphs 8 and 9 of the Convention; UNFCCC, 2/CP.11 Five-year programme of work of the Subsidiary Body for Scientific and Technological Advice on impacts, vulnerability and adaptation to climate change.

people have previously experienced and have adapted to is continuously changing. The SEE countries have no resources and capacity to adapt and are, therefore, the most vulnerable. Future climate change is a serious risk to poverty reduction and, through its impacts on the environment and social and economic well-being, could critically undermine efforts for sustainable development in the SEE countries

3.2 EUROPEAN

The European Union must take on the challenge of adaptation under the Green Paper[21] with its Member States and globally with partner countries.

"This Green Paper examines climate change impacts in Europe, the case for action and policy responses in the EU. It focuses on the role of the EU, but takes account of the prominent role of Member States, regional and local authorities in any efficient adaptation strategy".

3.3 NATIONAL CLIMATE CHANGE POLICY FRAMEWORK IN SEE

All SEE countries participating in the SEE/CCFAP-A development belong to the non-Annex I Parties (the Republic of Albania, Bosnia and Herzegovina, Montenegro, the Former Yugoslav Republic of Macedonia and the Republic of Serbia) and have certain commitments to the UNFCCC, as well as the possibility of receiving support from mechanisms established under the UNFCCC in order to meet their commitments.

The major national activities in the field of climate change taken in the previous period are the following:

Albania joined the UNFCCC in 1995 and the Kyoto Protocol in 2005 and has the status of a Non-Annex I country. The Government of Albania has taken considerable steps for the implementation the obligations deriving from its status as a non-Annex 1 Party to the UNFCCC governed by Articles 4 and 12 of the Convention, including the preparation of National Communications (NC).

With the technical and financial assistance of the United Nations Development Programme (UNDP), Albania was able to compile and launch in 2002 the first national report for the Conference of the Parties of the UNFCCC on Climate Change, known as the First National Communication (FCN) to the UNFCCC of Albania. The UNDP in close collaboration with the MEFWA, its main partner on the issue of climate change, is currently developing the Second National Report (SNC) for Climate Change and implementing a portfolio of many climate change relevant projects under an umbrella programme for climate change, aimed at mitigating climate change in Albania and developing the country's national institutional and technical capacities to address climate change issues in national planning and development.

The studies performed under the process of compilation of the Albania FNC to the UNFCCC have shown that Albania is a relatively low net emitter of greenhouse gases (GHG) that cause global warming. Climate change is a global issue as all countries of the world contribute at certain rates to the overall GHG emissions and all countries are affected in varying degrees by it. As such, climate change will affect Albania with increased temperatures, less precipitation and a sea level

21 Brussels, 29.6.2007 COM(2007) 354 final.

rise. The Albanian coast has been found to be one of the most vulnerable parts of the country to the current and expected impacts of Climate Change.

Although Albania does not have any commitments for GHG emission reduction, a set of measures identified as technological needs have been recognized and assessed through the Technology Needs Assessment (TNA) of Albania, another exercise performed with the assistance of the UNDP, which was finalized and launched in 2004. The NC process has not only been considered as a tool for reporting to the UNFCCC, but also for integration of the climate change issues into national planning and the programming process. Due to such efforts, the National Energy Strategy (NES) has already integrated many findings and outputs from the studies performed within the NC and TNA processes. A couple of legal acts exists on energy efficiency and the renewable sector, i.e., the Law on Energy Efficiency and renewable sources and the Law on Forests, which address climate change related issues, specifically those related to CDM forestation/reforestation activities.

With the ratification of the Kyoto Protocol, Albania became eligible to host Clean Development Mechanism (CDM) Projects. The UNDP is assisting the country in capacity building and establishing the legal and institutional framework to host CDM projects.

Bosnia and Herzegovina is a party to a number of international environmental agreements and conventions, and is fully committed to meeting the requirements stipulated by these agreements. The most important ratified international agreements are the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, the United Nations Convention on Biological Diversity, the United Nations Convention to Combat Desertification, the Convention on Long-range Trans-boundary Air Pollution and the Protocol to the Convention Financing of the Co-operative Programme for Monitoring and Evaluation of Long-range Transmission of Air Pollutants in Europe (the EMEP Protocol), the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, etc.

After UNFCCC ratification in 2000, a serious effort was made to set up an appropriate policy and an institutional and legal framework to meet the Convention commitments. In December 2000, a B&H National Focal Point to the UNFCCC was appointed and in 2001, the Climate Change Committee of B&H was established as a governmental body facilitating Bosnia and Herzegovina's climate change activities, and it has the leading role in major decision-making on possible policies and measures in the field of climate change. At the present time, on the institutional side, the Ministries of Physical Planning, Civil Engineering and Ecology in the Republic of Srpska, as the B&H Focal Point to the UNFCCC, the State Steering Climate Change Committee and Subcommittee and the GEF operational B&H Focal Point for climate change issues are responsible for the coordination of all climate change activities at the level of Bosnia and Herzegovina and at the international level.

In February 2001, a Round Table on the subject "Framework UN Convention on Climate Change and Kyoto Protocol – Rights and Obligations of Bosnia and Herzegovina as a Member of the Convention" was organized upon invitation by the B&H Focal Point to the UNFCCC. The Medium-Term B&H Programme of Activities on the implementation of the UNFCCC for the period 2002 – 2006 was prepared on the basis of conclusions, recommendations and suggestions of the above-mentioned Round Table and adopted by the State Steering Committee for Climate Change of Bosnia and Herzegovina in 2002.

Climate change has been integrated into a number of important strategic frameworks in B&H. For example, the Development Strategy of B&H (DSPRSP) for the realization of national sustainable development and poverty reduction for the period 2003 – 2007, based on the Millennium Development Goal, underlines climate change consequences and sets up several priority actions with respect to climate protection issues. The recently adopted National Environmental Action Plan for B&H based on national sustainable development priorities, the Rio Agenda 21 and the objectives and priorities of the Sixth European Community Environment Action Programme 2001 – 2010 also consider addressing the climate change (NEAP B&H, 2003). Bosnia and Herzegovina, successfully finalised a two-year ratification process and the Kyoto Protocol to the UNFCCC was ratified in 2007.

Although a Non-Annex I Party (developing country) to the UNFCCC and the Kyoto Protocol, Bosnia and Herzegovina needs to do substantial work in the area of climate change. The country is fully committed to meeting the requirements stipulated in Article 4 (Commitments) and Article 12 (Communication and Information Related to Implementation) of the Convention and B&H National Focal Point to the UNFCCC in cooperation with other responsible institutions made all necessary action for the preparation of the Initial National Communication. In 2008, the UNDP Office in Bosnia and Herzegovina, as the implementing agency, commenced all necessary activities related to the preparation of the Initial National Communication. It is expected that the INC for Bosnia and Herzegovina will be submitted to the UNFCCC Secretariat during 2009.

The Former Yugoslav Republic of Macedonia ratified the UN Framework Convention on Climate Change (UNFCCC) on 4 December, 1997, and the Kyoto Protocol in July 2004. The MOEPP coordinated all activities related to the ratification of the Convention and the Protocol, including activities related to raising public awareness.

The MOEPP has been designated as the National Focal Point to the UNFCCC and as the Designated National Authority (DNA) for the implementation of the Kyoto Protocol. It is a key governmental body responsible for policy making and coordination of the implementation of the provisions of the UNFCCC and the Kyoto Protocol. In January 2000, a Climate Change Project Office was set up within the Ministry. Furthermore, a National Climate Change Committee (NCCC) was established as an advisory body for policy-making related to climate change issues. It is composed of thirteen representatives of key governmental agencies, non-governmental organizations, private entities and the academia. The Committee is chaired by a presentative of the Macedonian Academy of Science and Arts.

The First National Communication on Climate Change (FNC) was adopted by the Government of Macedonia and submitted to the UNFCCC Secretariat in March 2003. The adoption of the Second National Communication on Climate Change is in the final stages.

Although RM does not have any commitments for GHG emission reduction, a set of measures identified as technology needs have been identified and assessed through Macedonia's Technology Needs Assessment (TNA) – another exercise carried out with the assistance of the UNDP, which was finalized and launched in 2004. The proposed technology measures and options include the introduction and implementation of measures focused on energy saving through the implementation of energy efficiency measures and promotion of renewable energy sources.

In addition to the institutional set-up, the Republic of Macedonia is focusing its activities at several levels in addressing climate change: strategic, legislative, regional, bilateral and multilateral.

The Climate Change issues are recognized in national strategic documents, such as: the National Strategy on Sustainable Development, in the final stage of adoption by the Government; the Second National Environmental Action Plan (adopted by Parliament in 2006); the National Strategy for the First Commitment Period 2008 – 2012 according to the Kyoto Protocol (Adopted by the Government in February 2007); the National Strategy on Environmental Investments (2007 – ongoing), in which carbon financing is treated as an additional source of financing.

At the legislative level, climate change issues are incorporated into the Law on Environment, including details on the preparation of inventories of GHG emissions and removals by sinks, as well as an action plan on measures and activities to abate the increase of GHG emissions and mitigate the adverse impacts of climate change. The Law on Environment stipulates that this is done with the purpose of stabilizing the GHG concentrations at levels that would prevent dangerous anthropogenic impact on the climate system within a time frame sufficient to allow ecosystems to naturally adapt to climate change. In accordance with the principle of international cooperation and the goals of national social and economic development, a National Plan for climate change should be adopted. In addition, the provisions on the Clean Development Mechanism were incorporated into the amended Law on Environment.

Montenegro. Montenegro ratified the UNFCCC on 23 October 2006, following the country's independence in May 2006, and has the status of a non-Annex I country. The law on the ratification of the Kyoto Protocol to the UNFCCC was adopted by the Montenegrin Parliament in March 2007 (Official Gazette of MN, No.17/2007).

The Government of Montenegro is making a considerable effort to formulate an appropriate policy, and establish the legal and institutional framework so as to effectively implement its commitments under the UNFCCC and KP. Important steps have especially been taken in the implementation of the Kyoto Protocol, starting with the creation of a suitable environment to host CDM projects. Thus, the DNA of Montenegro, which is the national authority approving CDM projects at the national level, was established as a CDM Committee and Technical Operational Body (TOB), pursuant to Ministerial Decision No. 01-330/15 of February 2008. Other important initiatives undertaken within the CDM framework include the selection of the Sustainable Development Criteria and Indicators, and the elaboration and approval of the internal procedure, criteria and timeframe under which submitted CDM projects will be evaluated and approved by the DNA of Montenegro and the establishment of the Montenegrin DNA website within the Ministry of Tourism and Environment website.

Within the framework of the Memorandum of Understanding (MoU) on Cooperation for Environmental Protection signed by the Ministry of Tourism and Environment (MTE) and the Italian Ministry of Environment, Land and Sea (IMELS), a portfolio of potential CDM projects was prepared, with the main purpose of assessing the CDM opportunities in the energy, waste and forestry sectors.

Montenegro does not have a special national climate change policy at the moment. However, the climate change issue has been explicitly addressed in national sectoral legislation. In particular, the Law on Ambient Air Quality (OJ MN, No. 47/07) stipulates the obligation to monitor GHG emissions and the new Law on Environment (Official Gazette of MN, No. 48/08) stipulates the

obligation of the Government to develop and adopt a National Plan for the Mitigation of Climate Change, a National GHG inventory, an Action Plan of measures and activities for the prevention of the causes and mitigation of the negative effects of climate change and a National Plan and Action Programme for Combating Desertification and Mitigation of Drought Effects.

Other national policies, programmes and strategies addressing climate change include: the Development Directions of Montenegro as an Ecological State (2001); the Economic Reforms Agenda (2003); the Development and Poverty Reduction Strategy (2003); the National Waste Management Policy (2004); the Energy Policy (2004); the Energy Efficiency Strategy of the Republic of Montenegro (2006); the Action Plan for the Implementation of Recommendations from European Partnership (2005); the Strategy for the Development of Small Hydro Power Plants (2006); the Food Production and Rural Areas Development Strategy (2006); National Strategy for Sustainable Development (2007); the National Capacity Self-Assessment Report (NCSA), (2007); the Spatial Plan of Montenegro until 2020, including its sectoral studies (2008); the National Energy Development Strategy until 2025 (2007); the National Forestry Management Policy (2008); Integrated-Coastal Zone Management (2008); the National Plan for the Integration of Montenegro into the EU for the period 2008 – 2012 (2008); The Framework Strategy of Serbia and Montenegro on Climate Change, (The Framework Strategy, 2005); Finally, the National Strategy for Sustainable Development pays particular attention to climate change issues and addresses both the mitigation and adaptation to climate change in the Montenegrin context and specifies a number of measures that need to be implemented by 2012.

The Republic of Serbia became a Party to the UNFCCC as a successor of the Serbia and Montenegro/Federal Republic of Yugoslavia (FRY). The Convention was ratified on 12 March, 2001 and the Kyoto Protocol on 17 January, 2008.

The key responsibility in the area of environmental protection rests with the Ministry of Environment and Spatial Planning, which is the Focal Point of the UNFCCC and the Kyoto Protocol. Regarding climate change, other governmental institutions having certain competences are: the Ministries of Mining and Energy, Economy and Regional Development, Agriculture, Forestry and Water Management, Health and Infrastructure, as well as the Environmental Protection Agency (SEPA). The SEPA was established in 2004 as an institution within the Ministry. One of the functions of this Agency is the development of a GHG inventory. The Republic Hydrometeorological Service of Serbia (RHMSS), as an independent governmental organization, is responsible for the monitoring of weather, climate and waters, research and forecasting, early warnings and alarms against the occurrence of climate extremes and hydrometeorological hazards, and international cooperation in these fields. The scope of its work includes a large number of tasks related to the implementation of the UNFCCC, including overall coordination of multidisciplinary work in climate change impact vulnerability and adaptation. Under the Belgrade Initiative on regional SEE co-operation in the field of climate change, the RHMSS hosts the Sub-regional Climate Change related Centre in Belgrade for Research and Systematic Observation, Education, Training, Public Awareness and Capacity Building. All the mentioned Governmental institutions, in cooperation with other stakeholders, have been working on adaptation related issues. According to the preliminary data, it was identified that further activities related to adaptation to climate change are required in the fields of agriculture, biodiversity, forestry, water and health as priorities.

A regulatory framework needs to be in place to support and implement adaptation policies and programmes developed in different areas. Thus, the national climate change policy framework includes a large number of strategies, laws and other legal documents, such as: the Law on the

Ratification of the UNFCCC; the Law on the Ratification of the Kyoto Protocol; the Law on the Ratification of the Convention of the World Meteorological Organization; the Law on the Ratification of the UN Convention to Combat Desertification; the Law on the Ratification of the UN Convention on Biological Diversity; the Law on Environmental Protection; The Law on the Ministries, The Law on Hydrometeorological Activities; the Law on Waters; the Law on Metrology; the Strategy for Sustainable Development; the Forest Development Strategy of the Republic of Serbia; the Energy Development Strategy of the Republic of Serbia by 2015; the Millennium Development Goals in Serbia, 2003. Some of the national priorities in the development of climate change policies include the following: continuous process of harmonization of national legislation with EU regulations; adoption of a National Strategy for the incorporation of the Republic of Serbia into the clean development mechanism under the Kyoto Protocol as well as the Framework Climate Change Strategy and Action Plan; capacity building of all stakeholders involved in the development and implementation of climate change policies, including field of science, research and development; campaigns to raise public awareness with regard to climate change issues; support to multidisciplinary and intersectoral projects for the assessment of the effects, vulnerability and adaptation options; improvement of intersectoral communication; support to the implementation of the Belgrade Initiative and support to the capacity building of the Sub-regional Centre for Climate Change in Belgrade, created within RHMS, through the national budget, the Eco Fund of Serbia, IPA, bilateral and multilateral programmes of technical assistance, etc.

3.4 REGIONAL

3.4.1 Belgrade Climate Change Initiative

Recognizing the importance of climate change for sustainable development and poverty eradication in the SEE region and the importance of integrating climate change considerations into the development of key economic sectors in the SEE countries in order to protect the environment and facilitate partnership and cooperation between the SEE countries and other countries in the UNECE region, the Belgrade SEE Climate Change Initiative was adopted at the Sixth Ministerial Conference on "Environment For Europe" Belgrade, Serbia 10 – 12 October 2007.

Under the Belgrade Initiative, the Ministers agreed: (i) that the interested countries of the SEE should strengthen their political support for the implementation of the SEE/CCFAP-A (ii) that the interested countries shall support the SEE pilot project aimed at setting up the functions of a Sub-regional Virtual Climate Change Centre hosted by the Republic Hydrometeorological Service of Serbia, which will contribute to the coordination of the implementation of the SEE/CCFAP-A; (iii) that in order to develop and implement the SEE/CCFAP-A programmes, the SEE countries will establish partnerships with relevant international organizations; (iv) to invite SEE countries, international organizations, financing institutions, donors and other stakeholders to join this open-ended initiative and to be fully involved, sharing their experience and providing much needed support for sub-regional climate change activities.

The Ministers of SEE Europe took full advantage of the Environment for Europe process in order to establish the Sub-regional, SEE Virtual Climate Change Related Centre for Research and Systematic Observation, Education, Training, Public Awareness, and Capacity Building (SEE/VCCC), hosted by the Republic Hydrometeorological Service of Serbia. The SEE/VCCC is a

network of national institutions of participating countries (ministries, hydrometeorological services, scientific institutions, NGOs, and other stakeholders).

3.4.2 Other relevant regional initiatives and/or ongoing regional projects in SEE

Within the context of the Global Facility for Disaster Reduction and Recovery (GFDRR), the World Bank and the UN/ISDR Secretariat have initiated a South-Eastern Europe Disaster Risk Mitigation and Adaptation Programme (SEEDRMAP), in line with the Hyogo Framework, which aims at reducing the vulnerability of the countries of south-eastern Europe to the risks of disasters.

Under the Barcelona Convention adopted in 1976, the UNEP Mediterranean Action Plan (MAP) was adopted so as to protect the environment and foster sustainable development in the Mediterranean Basin. The following are the programmes within the framework of the MAP: Partnership for the Adriatic, which focuses on coastal water management, the ecosystem and tourist development (the participating countries are Croatia, Bosnia, Montenegro and Albania); the Adriatic-Ionian Initiative (AII) was formally established as a political initiative at a conference held in Italy in 2000. Seven Countries cooperate within the framework of AII: Albania, Bosnia & Herzegovina, Croatia, Greece, Italy, Slovenia, Serbia and Montenegro. The aim of AII is to link the coastal countries of the two seas in order to cooperate in the development and safety of the whole area.

The Global Climate Observing System (GCOS) was developed as a Regional Action Plan for eastern and central Europe in 2005 and a Regional Action Plan for the Mediterranean Basin in 2006. These Action Plans highlight the urgent need to reverse the degradation of the observation networks, particularly in developing countries, and stress the requirement for immediate action to be taken to address critical deficiencies in climate observation and research programmes, since adaptation to climate and the management its impacts are critical factors in the pursuit for sustainable development, poverty reduction, and the protection of human lives and health in the European region.

The major national activities under regional initiatives and regional projects in the field of climate change taken in the previous period are the following:

Albania. Besides the National Communications, TNA, a study case entitled "Impacts of climate change to the power sector and identification of adaptation response measures in the Mati River Catchment area (MRCA)", jointly funded by the Regional Environmental Centre (REC) within regional SEE cooperation in the field of climate policy and the UNDP-GEF within the Second National Communication. Relevant national projects for adaptation are: Identification and Implementation of Adaptation Response Measures in the Drini-Mati River Deltas, UNDP-GEF (May 2008 – May 2012); Disaster Risk Mitigation and Adaptation (AL-DRMAP). This WB project, as part of the Disaster Risk Mitigation and Adaptation Program for the SEE countries, was developed by the World Bank together with the United Nations International Strategy for Disaster Reduction (UN ISDR). This programme is supported by the Global Facility for Disaster Reduction and Recovery (GFDRR), established with multiple donors and partners, notably UN ISDR, to reduce vulnerability to disasters in accordance with the Hyogo Framework for Action.

Macedonia. The Research Centre for Energy, Informatics and Materials of the Macedonian Academy of Sciences and Arts (ICEIM-MANU) has been acting in the field of climate change for more than a decade. The main activities include: the preparation of a National Inventory of GHG Emissions and Mitigation Analyses for the purpose of the National Communications under the UNFCCC. The Centre especially deals with climate change and energy issues, including environmental and economic evaluation of energy technologies, as well as developing mitigation scenarios for the development of the national energy systems.

As the national focal point of the Intergovernmental Panel of Climate Change (IPCC), the ICEIM-MANU is also involved in international climate change-related research activities, contributing to the work on mitigation analyses from the perspective of developing countries and countries in transition. Also, one of the ICEIM-MANU members was involved in the study group of the World Energy Council (WEC) that prepared the publication "Energy and Climate Change (WEC, 2007)".

The Centre for Climate Change and Energy Technologies, within the Faculty of Mechanical Engineering of Ss. Cyril and Methodius University, was established in order to carry out research, apply and transfer of new energy technologies in the fields related to the United Nation Framework Convention for Climate Change (UNFCCC) and the Kyoto Protocol. Also, the Faculty of Mechanical Engineering is the host institution of the Centre for Cleaner Production, created recently with the support of UNIDO.

The Faculty of Technology and Metallurgy, together with MOEPP, participated in a EU FP6 project related to eco-houses and innovative eco-efficient materials.

The Faculty of Forestry is part of a regional project within the INTERREG III B Programme entitled "Risck management, disaster management and prevention against natural hazards in mountain/forest regions". Among other things, this project addresses soil erosion caused by water and torrential flows in mountainous regions. The expected increase of rainfall intensity due to climate change is closely related to the above.

The Faculty of Civil Engineering participated in the bilateral research project entitled "Meeting the Increased Irrigation Demand as a Result of Climate Change". The project was funded by the Ministry of Science and Education of the Republic of Macedonia and the Slovenian Research Agency. The aim of the project is to define water management practices and measures for the modernization of irrigation systems in order to meet the increasing irrigation demand as a result of climate change.

The Skopje Institute of Agriculture is part of another ongoing regional project related to the water resources sector "Interdisciplinary assessment of water resource management in two transboundary lakes in south-eastern Europe (DRIMON)". The project is financed by the Norwegian Research Council. The project is intended, by a comparison – or twinning – exercise, in which data and experiences within both natural and social sciences from three lake basins (Lake Prespa and Lake Skadar in the Balkans, and Lake Vansjø in Norway), to increase the knowledge base and promote a dialogue between stakeholders for improved transboundary management of water resources in the Balkans.

The Faculty of Agricultural Sciences and Food of Ss Cyril and Methodius University is conducting several projects, such as:

- The regional project "Education, Research and Training for Global Environmental Change and Sustainable Management of Natural Resources in the Western Balkans", financed by SIU, the Norwegian Cooperation Program on the Research and Higher Education with Countries of the Western Balkans (2006 – 2010).
- The regional project related to global changes, an INTERREG III B – CADSES Project, partially funded by the EU: "Remotely Accessed Decision Support System for Transnational Environmental Risk Management – STRiM".

The Faculty of Agricultural Sciences and Food completed several international projects related to increase irrigation water use efficiency and environmental protection financed by IAEA, UNESCO, SCOPES, etc. It is expected that these projects will contribute to an increased level of know-how and a better level of expertise for adaptation to climate change.

Macedonia is one of twelve countries participating in the regional project "Capacity Building for Improving the Quality of Greenhouse Gas Inventories" (Europe/CIS region). The project will initiate a regional programmatic approach to build capacity for improving the quality of data inputs to national greenhouse gas inventories, using the good practice guidance of the Intergovernmental Panel for Climate Change for cost-effectiveness.

The Project River Monitoring System in Macedonia (RIMSYS), funded by the Swiss Agency for Development and Cooperation with a Macedonian contribution, is a co-operation project between Switzerland and Macedonia. The aim of the project is to support the Macedonian authorities in strengthening their capacity to document long-term changes in water pollution and the hydrological regimes of the most important rivers of the country. The Project RIMSYS commenced the first phase in 2000, with the objective of improving the monitoring system on the rivers by installing 18 river monitoring stations and an environmental laboratory at the HMS.

In addition, the Republic of Macedonia participated in the regional UNDP project: Regional Project on Building Capacities to Access Carbon Financing in Eastern Europe and CIS. As a result, the National Strategy for CDM for the First Commitment Period 2008 – 2012 was prepared. The country is currently participating in the REC sub-regional project "Enhance Regional South East European (SEE) Cooperation in the Field of Climate Policy".

Montenegro. Montenegro is part of a number of initiatives adopted at the regional and transnational levels in the fields of both mitigation of and adaptation to the adverse effects of climate change. With special emphasis on adaptation and preparedness, Montenegro is also part of the initiatives undertaken within the Southern Eastern Europe Disaster Risk Mitigation and Adaptation Programme (SEEDRMAP).

With the financial support of international organisations and institutions, the Montenegrin Government is developing a number of programmes and projects which will contribute to the strengthening of the country's adaptation capacity and its preparedness to climate change induced disasters. Among the numerous activities developed under the international cooperation programme between the Montenegro and the Italian Ministry of the Environment, Land and Sea, in addition to those concerning the implementation of CDM project-activities (see Sub-section 3.3), it is possible to highlight those having a positive impact on Montenegro's capacity for adaptation:

- legal assistance for the harmonization of legislation with the "acquis communautaire" in the field of environment and energy;

- technical support in the assessment of renewable energy sources: the relevant document was presented in 2007 and is now used in the implementation of the Strategy for the Energy Sector of Montenegro;
- moreover, an Environmental Montenegrin-Italian Facility (EMIF) has been established in order to finance the priority projects to be jointly identified in the sectors including, inter alia, the preparation of a National Strategy for the realization of CDM projects; support to the development of eco-efficient buildings in the public sector and the tourism area; designing and implementation of pilot projects within the Montenegro National Strategy for Sustainable Development.

At a more regional level, it is possible to highlight the following initiatives currently in process:

- The introduction and implementation of the Strategy for Integrated Coastal Zone Management. Considering the fact that coastal areas are particularly vulnerable to the effects of climate change, this strategy provides an overall basis for setting up a coherent policy for the management and protection of coastal areas. Although closely articulated within the National Strategy for Sustainable Development, the strategy can also become an integral part of the actions taken at the regional level, as it attempts to support the Montenegrin Government in discharging its obligations as a contracting party to the Barcelona Convention. The ratification of the Protocol for Integrated Coastal Zone Management of the Mediterranean will later improve the national institutional and legal framework in order to harmonise it with the relevant ICZM requirements. This will be the first step in enabling the realization of the Coastal Area Management Programme of Montenegro (CAMP Montenegro), created to ensure the sustainable development of the Montenegrin coast in accordance with the NSSD objectives and goals.
- Also worth mentioning is the project initiated within the "Adricosm-Star" Initiative (ADRIatic Sea Integrated COastal AreaS and River Basin Management System – Montenegro Coastal Area and Bojana River Catchment), aimed at developing and implementing an integrated coastal area and river water management and modelling system, which covers the area of the Bojana River Delta, managed by both Montenegro and Albania, and the whole Montenegrin Adriatic coast.
- In view of the fact that improvements in energy efficiency in the public and residential building code have also been identified as an important element of the national adaptation strategy, the Montenegrin Ministry of Tourism and Environment, with the financial support of and in cooperation with the Italian Ministry of Environment Land and Sea and UNEP, has agreed to implement the "Solar Water Heating Programme for Montenegro", adopted within "The Mediterranean Renewable Energy Programme". The project will support the establishment of financing mechanisms for the development of water heating systems, with the potential to support the market and capacity building and training for local solar water heating suppliers. Moreover, with the financial assistance of the World Bank, Montenegro is currently developing specific projects aimed at increasing energy efficiency and ameliorating the heating system in the public and residential building code.
- Under the Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean Region (SAP BIO), the Mediterranean Action Plan

UNEP and the Regional Activity Centre for Specially Protected Areas, Tunisia, a National Overview on vulnerability and impacts of climate change on marine and coastal biodiversity in Montenegro is in the final stage of preparation. This document studies the link between climate change and coastal marine biodiversity and makes some recommendations for future activities regarding climate change and coastal marine biodiversity.

As for the regional programmes and initiatives of the SEE countries, it is worth mentioning the proposal by the Norwegian Company Statkraft to support the start-up of the project "Climate Change in SEE – Effects on Hydropower Production". The project, which will be jointly implemented by the SEE countries, is expected to positively contribute to the renewable energy potential in the SEE region.

Finally, , in cooperation with Egypt and Syria, Montenegro will participate in a sub-regional plan specifically addressing the adaptation issue. The purpose of this plan is to conduct a study on adaptation to climate change in these three countries. Under the supervision of the relevant Ministry, a national consultant will: (i) make a review of available information on vulnerabilities to climate variability and extreme events, (ii) assess how the relevant policies, legal framework, economic instruments and institutional setup integrate climate change concerns, (iii) review the current and projected measures and actions towards adaptation, and (iv) explore how adaptation to climate change could be addressed through policy measures, an improved legal and institutional framework, using appropriate economic instruments, (v) identify key adaptation measures (priority criteria and short list of activities) as well as concrete activities, such as capacity building. This stocktaking exercise will be complemented by consultation with different stakeholders and government representatives

The Republic of Serbia participated in the following regional projects:

- In the context of the Global Facility for Disaster Reduction and Recovery (GFDRR), the World Bank and the UN/ISDR Secretariat initiated the South-Eastern Europe Disaster Risk Mitigation and Adaptation Program (SEEDRMAP), which is in line with the Hyogo Framework, and aims at reducing the vulnerability of the SEE countries to the risk of disasters;
- Adaptation to climate change in agriculture, forestry and fisheries: the FAO's multidisciplinary expertise in agriculture, forestry and fisheries and involvement with farmers, scientists and policy-makers could facilitate an integrated approach to climate change adaptation, 2007;
- FAO/World Bank "Serbia Water Resources Management Project";
- Project in bilateral technical cooperation with Italy concerning the programme "SINTA: Simulations of Climate Change in the Mediterranean Area";
- COST Action ES0601: Advances in homogenization methods of climate series: an integrated approach: The aim of the action COST ESO601 is to examine all known and available methods of finding and removing inhomogeneity in series, not only in meteorology, but also in other sciences. From the available methods, the best should be used and one typical or, probably, universal approach to homogeneity should be made.

- FP6 project ADAGIO (Adaptation of Agriculture in European Regions at Environmental Risk under Climate Change): research "Climate change, vulnerability and adaptation in agriculture – the situation in Serbia";
- Project relating to the establishment of a Drought Management Centre for South East Europe (DMCSEE): The DMCSEE will coordinate and facilitate the development, assessment and application of drought risk management tools and policies in south-eastern Europe with the goal of improving drought preparedness and reducing drought impacts;
- The regional project "Low Level Water and Hydrological Drought in the Danube Basin" has been initiated and should be coordinated by the National Committee for the International Hydrological Programme of Bulgaria. All Danube countries would participate in the project by setting up national teams of experts in the fields of hydrology, meteorology and climatology.

4. SEE/CCFAP: CONTINUOUS UPDATE ON SEE CLIMATE CHANGE PERSPECTIVE – URGENT ACTIONS

4.1 BACKGROUND, NEED FOR URGENT ACTIONS

The UNFCCC has recognized the importance of research and a systematic observation to reduce uncertainties regarding the effects of, and impacts and responses to climate change, and in particular, adaptation to climate change (Article 5). As part of this recognition, the COP invited the Global Climate Observing System (GCOS) to identify the priority capacity-building needs and identify gaps in regional systematic observation (see FCCC/SBSTA/2006/). The Regional GCOS Action Plan for Eastern and Central Europe (2005) and Regional GCOS Action Plan for the Mediterranean Basin (2006) were developed, highlighting the need for a better knowledge base and forecasting and climate services, and the need to improve observations at all levels and establish denser networks in order to enhance the ability of countries to adapt. In addition, early warning and risk management systems are recognized as efficient contributors that can facilitate adaptation to climate variability and change.

The WMO, as a specialized UN Agency concerned with weather, climate and water, together with the National Meteorological and Hydrological Services (NMHSs) of WMO member states, has a major role in the implementation of the UNFCCC Nairobi Programme of Work on Impacts, Vulnerability and Adaptation to Climate Change. In the light of such challenges, in its Strategic Plans, the WMO has stressed the urgent need for governments to provide adequate support for modernisation of the National Meteorological and Hydrological Services in developing and transition countries, including the SEE countries (see WMO Regional Association VI -Europe: Strategic Plan for the Enhancement of Meteorological and Hydrological Services in the Region, 2008-2011, WMO, 2007).

The World Bank and UN/ISDR, in collaboration with other international partners, initiated the work on the South-Eastern Europe Disaster Risk Mitigation Initiative (SEEDRMI), which is in line with the Hyogo Framework and aims at reducing the vulnerability of the SEE countries to the risk of disasters. The SEEDRMI incorporates three focus areas, the first of which recommends urgent actions in capacity building and development of the national hydrometeorological forecasting, data sharing and early warning systems.

4.2 CLIMATE OBSERVATIONS, MONITORING AND FORECASTING IN SEE

Meteorological and hydrological activities in the SEE region have a long tradition. All SEE countries are members of the World Meteorological Organization (WMO) and participate in the Global Climate Observing System (GCOS).

The monitoring of meteorological elements in Albania, which is very important for evidencing climate changes and variability, has been carried out since the late 19th century. The National

Network, as of recently within the Institute for Energy, Water and Environment (IEWE), the University of Polytechnics of Tirana, consists of 128 meteorological (4-automatic), 102 hydrological (1 - 2 observations/day), 11 air quality stations (located by meteorological stations) and 43 water quality sampling points in rivers, lakes and the coastal area. No radar is installed in the IEWE network. Satellite data are very important in fire fighting and coastal zone management, but the IEWE receives analogue not digital images, which cannot be efficiently used. There is no radiosonding station in the Albanian network, not even in support of aviation. In the field of meteorology, weather forecasts and analysis are produced (short, up to 72 hours, and medium term forecasting, up to ten days), including 12 - 24-hour warnings of hydrometeorological hazards. During the last years, the IEWE began to make seasonal forecasts, but this is still in an experimental phase. In the field of hydrology, studies and reports on the regime of surface waters, ground waters and marine waters, periodic bulletins, etc. are produced. In the field of environment, the service has been extended to air and water quality measurements, collection, processing and dissemination.

In Bosnia and Herzegovina, meteorological and hydrological observations and research are currently carried out by Hydro-Meteorological Institutes in the Republic of Srpska and the Federation of Bosnia and Herzegovina. The existing capacities of the network of observing stations for systematic monitoring and reporting, both in terms of equipment and human resources, are inadequate and insufficient. Apart from the need to optimize and modernize the current hydro-meteorological network, it is also necessary to improve the national scientific and technological research facilities, as well as to increase the investment in these facilities. Research activities and capacity building efforts could comprise climate studies on possible impacts on different sensitive sectors.

Monitoring and research activities concerning the climate-meteorological and hydrological parameters in Macedonia are performed by the Hydro Meteorological Service (HMS) within the Ministry of Agriculture, Forestry and Water Economy. Initial sporadic measurements and observation of meteorological elements in the country commenced in 1891 in Skopje. A network of meteorological and hydrological stations was established in the 1920's. The meteorological observation system in the country consists of 14 main meteorological stations (of which two are airport meteorological stations), 19 regular climatological stations, 26 phenological stations, one aerological station, 6 hail suppression centres and about 200 precipitation stations. There are also two automatic stations. The series of data are very often inhomogeneous, with many gaps due to the problems with measuring equipment, data processing, etc. Specific data needed for research or projects is not always readily available, which is the main barrier to conducting more complex analyses.

The HMS monitors surface and groundwater quantities. Surface water resources are monitored at 110 gauging stations (of which 68 are active) and 115 measuring points (of which only 38 are active) are used to monitor the groundwater. At 54 gauging stations on rivers, discharge and water level are monitored. On each of the three natural lakes, there is one gauging station for monitoring the water level. Due to budget reduction, monitoring of the groundwater was stopped and presently there is no systematic quantity and quality monitoring of groundwater in the country. This is the weakest point of the Macedonian monitoring system. The quality of surface water is also monitored by the HMS. Regional institutes for health protection monitor surface waters within their competences. The monitoring network consists of 20 measuring points located on rivers, lakes and reservoirs. Detailed monitoring of physicochemical and microbiologi-

cal parameters of the lakes is performed by the Hydrobiological Institute from Ohrid. Industrial and domestic waste water are controlled periodically. Also, monitoring of chemical and toxicological water pollution and radiological and biological analyses are carried out periodically.

There are 19 stations within the air-monitoring network established by the HMS. The Republic Health Institute also has an air monitoring network with 10 measuring sites in Macedonia. A monitoring station for traffic air pollution has been installed at locations with heavy traffic in the centre of the city of Skopje. The results of monitoring are transmitted via a telecommunications network to the central station in the Environmental Information Centre within the Ministry of Environment and Physical Planning. The values of particular polluters are presented on the web page of the MoEPP and in reports. The Republic Health Institute also has an air monitoring network with 10 measuring sites in Macedonia.

Climate observation and monitoring in Montenegro are carried out by the Hydrometeorological Service of Montenegro (HI-M), the main tasks of which are meteorological and hydrological measurements and observation, as well as data acquisition and processing. Measurement and observation are performed at 8 main stations, 20 climatological stations and more than 50 precipitation stations, in accordance with the criteria set by the World Meteorological Organization (WMO). The current system of numerical weather prediction (NWP) can perform high resolution NWP with the capability of running several versions of state-of-the-art NWP models, using high quality, large-scale data from ECMWF to downscale to the regional domain. However, significant gaps in the network station of the National Hydrometeorological Service still remain. Considering the importance of an adequate and effective system of climate monitoring and forecasting within the adaptation strategy, there is a strong need for improvement. There is a lack of a network of automatic stations for measuring, monitoring, recording and processing hydrological and meteorological parameters; ground-based stations receiving data from a meteorological satellite and radar data are also lacking. The NMHS still has no remote stations except one in the hydrological sector. Therefore, none of the urban areas are covered by meteorological radar. The main shortcoming of the current regional system is its limited capability for regional data analysis. This consists of a relatively simple interpolation from the ECMWF analysis and does not employ local observations. None of the hydrological models are in use. Help is also needed in the implementation of a specific model for hydrology forecast based on the operative forecast of maximum precipitation. Storm forecasting data, that is, information about dangerous weather is not shared with the NMHSs of neighbouring countries. Finally, one of the most important priorities for the HI-M is to increase the number of experts dealing with climate modelling in Montenegro. Training from which HI-M would especially benefit includes the numerical modelling of the atmosphere, operative climatology and agrometeorology, as well as operative hydrology.

In Serbia, meteorological activity commenced on 1 January 1848 in Belgrade. The Belgrade Meteorological Observatory was established in 1887. The Republic Hydrometeorological Service of Serbia (RHMSS) was established in 1947. At present, the national meteorological and hydrological observation system of the Republic of Serbia consists of 28 surface synoptic stations, main climatological and main agrometeorological stations running hourly observation and reporting programmes; 1 upper-air (radiosounding) meteorological station; 13 meteorological radar centres; 90 regular climatological stations; 35 regular agrometeorological stations; 650 precipitation stations; 52 phenological stations; 26 stations for monitoring air pollution; 188 basic surface water stations, 398 basic ground water stations, 159 stations for surface water quality. The

network of real time reporting hydrological stations consists of 62 stations. Weather forecasts are made for various geographic areas for time intervals of 0 - 3 hours to 240 hours, detailed forecast, monthly and seasonal forecast. In 2007, to be included in the EU early warning and alarm system, electronic forms ("Meteo Alarm" and "Hydro Alarm") were developed and are operatively used for publishing warnings and alarms against weather and hydrological disasters in the territory of the Republic of Serbia. This system represents the basic component of the national protection plan and mitigation of the effects of natural disasters and catastrophes. In accordance with the WMO, the GCOS Regional Action Plan and UNFCCC recommendations, the Medium-Term Programme for Modernization of the RHMSS highlights the need for action in the following priority areas: Production of routine and special climate analyses and monitoring products focused on severe weather and climate events; Creation of systematic archives of climate extremes; Interpretation and assessment of seasonal forecasting (three-month and six-month) products from global prediction models focusing on the SEE region; Development of a climate alert system with the objective to support the introduction of climate information and predictions into early warning and disaster prevention systems; Promoting integration into the national preparedness systems; Development of the capacity to produce climate forecasts and use the data, especially for impact assessments and vulnerability assessment, and exchange of information about the observed impacts of regional climate change, including outreach activities; Improvement of the capability of database service on (meta) data managing and provide the public with climate monitoring analysis and prediction products through an Internet web site.

There is an urgent need for increasing the technical capacities for climate observations, monitoring, forecasting and updating of basic climate data sets. Modern tools for climate data management, processing, climate forecasting and climate extreme alert are required in almost all countries (equipment, hardware, software and training of personnel). In this context, the Framework AP identifies broad priorities with the aim to improve observations, monitoring of climate variability and climate change, climate prediction, climate data base management, exchange of current and historical data.

CCFAP Urgent Actions:

1) Promotion of the implementation of systematic observation, focusing on the issues relating to impacts, vulnerability and improvement of SEE sub-regional data exchange:

- Facilitate the implementation of a Regional project for modernization of National Meteorological and Hydrological Services of all western Balkan countries (WMO/WB/ISDR SE European NMHS);
- Facilitate the implementation of the projects listed in the GCOS Regional Action Plans for central and eastern Europe and for the Mediterranean Basin;
- Facilitate assistance in maintaing meteorological equipment to ensure ongoing reliable data at the national level;
- Provide a routine climate analysis and monitoring products of temperature and precipitation for the SEE region; production of special sub-regional climate analysis and monitoring products focused on snow cover, drought, severe weather and climate events in SEE;

- Create systematic archives of climate extremes in the SEE region (extreme air temperature, heat waves, intense rainfall and floods, persistent drought conditions, intense snowstorms, extreme seasonal snow accumulations and rapid melt events, severe thunderstorm conditions and associated lightning, hail, intense short duration rainfall, damaging winds, freezing rain, forest fires, etc.);
- Compile historical hydrological data on water levels, sediment transport and flow regime, including extremes for all international water bodies (rivers and lakes) in the region.

2) Improvement of the quality and database management of climate data and climate prediction products and promotion of data exchange between the SEE countries:

- Provide interpretation and assessment of seasonal forecasting (three-month and six-month) products from global prediction models focusing on the SEE region;
- Routinely generate and distribute user-tailored products to meet NMHSs needs (one-month forecast, etc., statistically downscaled point-wise probabilistic prediction products, for both precipitation and temperature, at some major points in SEE); publishing of a regular sub-regional climate outlook;
- Undertake product verification (in accordance with the WMO guidelines) and the necessary exchange of basic data, including both hind cast and observation data for verification;
- Develop a sub-regional SEE climate alert system with the objective to support the introduction of climate information and predictions into early warning and disaster prevention systems (various climate indices forecast: UV index, heat index and heat wave early warning system, forest fire index, drought and flood indices, etc.); encourage greater exchange, harmonisation and integration of early warnings for weather and water hazards, climate extremes and disasters; Promote integration into the national preparedness systems;
- Develop the capacity to produce climate forecasts through human resource development, training activities, education and training fellowships organized by the Sub-regional Climate Change Centre in cooperation with the WMO and partner national and international institutions (group training courses for staff of SEE NMHSs; special assistance programme relating to cooperation and exchange of seasonal-interannual forecast methods between NMHSs, international conferences and seminars);
- Improve the capability of database service on (meta) data management and provide the public with climate monitoring analysis and prediction products through Internet Web sites;
- Promote free and unrestricted use and access to data for agreed purposes in the context of the WMO Resolutions 25 and 40; Develop a regional climate data policy for access and distribution of climate data.

3) Enhance the capacity to supply and use the data, especially for impact assessments at regional and national levels, and the exchange of information about observed impacts of regional climate change, including outreach activities:

- Provide capacity building workshops on the use of data and scenarios for climate impact and other related research in cooperation with the IPCC;

- Assist end users in specifying their needs and requirements for climate data and products, including organization of workshops and other forums on the needs of users in cooperation with the WMO, the IPCC, etc. (SEE Regional Climate Outlook Forum);
- Improve climate information explanation during sub-regional workshops concerning product dissemination and strengthen coordination and cooperation with the NMHSs in the SEE region.

4.2 CLIMATE MODELLING AND SCENARIOS IN SEE

The development/application of higher resolution regional models for the SEE countries is important just as an analysis of the differences between the outcomes of the model. This would help enhance the capacity for building informed decision making. In this connection, some efforts are being taken in most SEE countries, as indicated below.

As for the analysis required for climate modelling and scenario development, in **Albania**, climate change scenarios are prepared using MAGICC/SCENGEN (version 4.1). The global model MAGICC is run using the scenarios A1BAIM, A2ASF, B1IMA, B2MES, which are markers of the respective SRES families (SRES A1, SRES A2, SRES B1, SRES B2) (IPCC, TAR 2001). A study entitled CLIMATE CHANGE PROJECTION FOR SOUTH-EASTERN EUROPE was performed for the World Bank. It analyzed high-resolution regional data (with a horizontal resolution of 50 km) for actual climate and climate change projections, provided by the Hadley Centre, UK. The Hadley Centre's version of the RCM (HadRM3P) is based on HadAM3H, an improved version of the atmospheric component of the latest Hadley Centre, coupled with AOGCM, HadCM3 (run under the SRES A2 emission scenario). Under this study, projected changes for the 2080s in the territory of Albania were determined.

In **Bosnia and Herzegovina**, the regional climate change projections developed under the IPCC AR4 (A1B scenario) were used for characterization of local temperature and precipitation change. The country input highlighted the need for improvements and larger investments in national scientific and technical research facilities in the country, including specifically capacity building for the development and implementation of methods for local climate change scenarios.

For climate change projections for **Macedonia**, direct GCM output and empirical downscaling, both in combination with pattern scaling, are used. For information about current and future large-scale climate variability, the results of four GCMs are used, together with NCEP/NCAR re-analysis to describe the relationship between large-scale climate variability across south-eastern Europe and local-climate variability in Macedonia. The four GCMs which are used in the analysis are: the Australian coupled GCM CSIRO/Mk2, the UK coupled GCM UKMO/HadCM3, the USA coupled GCM DOE-NCAR/PCM and the German coupled GCM MPI-DMI/ECHAM4-OPYC3. Since the future climate simulations with GCMs are based on a limited number of emission scenarios, usually SRES A2 and B2, the local climate change projections were additionally scaled to other marker SRES emission scenarios (A1T, A1B, A1Fl, B1), using the pattern scaling method (Mitchell, 2003). Empirical models were developed separately for four seasons: winter, spring, summer and autumn. The projected values correspond to the re-

sults obtained by MAGICC/SCENGEN5 software using the same models and all six marker scenarios. The results of direct GCM output also correspond to the results of the PRUDENCE project for Macedonia.

The Hydrometeorological Institute of **Montenegro** participates in the project AdriCosm STAR, which aims at the development and partial implementation of an integrated coastal area and river urban waters management system that consider both observational and modelling components. One of the project objectives is to produce IPCC climate change scenario impact for the next decades (2020 – 2030). The NMM and HMRB coupler will be nested in IPCC climate scenario simulations in order to produce meteorological data sets for the Montenegro region at a 10 km resolution. The most important priority action in HI-M is to increase the number of experts who will deal with climate modelling in Montenegro. The most important are trainings in numerical modelling of the atmosphere, operative climatology and agrometeorology and operative hydrology.

In the Republic Hydrometeorological Service of **Serbia** (RHMSS), two climate regional models are employed for climate studying and prediction using: (a) the regional climate model PRECIS of the UK Met Office Hadley Centre, high resolution climate projections (25 km) were performed for the 21st century using the scenarios A1, A2, B1 and B2 (IPCC); (b) the regional climate model ClimNMM-B; which is a system based on the ETA regional numerical model developed in Serbia (National Meteorological Service and Meteorological Institute of the University of Belgrade). Today, the Eta model is successfully used in weather forecasting and climate change simulations. To date, high resolution climate projections (25 km) have been performed for the 21st century using scenarios A1, A2, B1 and B2 (IPCC). Priority actions are the following: enhance capacity and experience in the employment of these different models, statistical approaches and outputs through human resource development, planned training activities, education and training fellowships; encourage and enhance participation of experts in scientific assessment under the IPCC and research under the WMO, EU/FP7 programmes; improve the availability and applicability of climate change modelling and downscaling data for use by policy makers at all levels; strengthen capacity for integrated assessment and GIS-based computer algorithms for supporting policy assessments at regional levels.

As can be seen, climate change projections in SEE countries are not uniform and regionally comparable due to the use of different methodologies, time horizons and SRES scenarios. Further detailed investigations and high resolution regionalized predictions are thus critically important for adaptation policies. The countries emphasised the need to develop regional climate models providing fine-scale climate information for long-term impact studies and forecasting, as well as to facilitate capacity building and information exchange between SEE institutions.

CCFAP Urgent Actions:

1) Identify gaps in the development of regional and sub-regional climate scenarios, including the necessity for, and availability and applicability of climate models:

- Develop climate change scenarios using climate models, especially those which provide sub-regional and regional specificities, such as the regional climate models PRECIS, ClimNMM-B, etc., including data downscaled from general circulation models.

2) Identify practical opportunities to improve access to, and use of outputs of different models, including training opportunities:

- Enhance capacity and experience in the use of these different models, statistical approaches and outputs through the development of human resources, planned training activities, education and training fellowships (one of the planned projects is the GCOS Project No.10. Capacity Building in Regional Downscaling and Modelling – A Proposal for an International Workshop – fundraising negotiations are in the final phase);
- Encourage and enhance participation of experts from the SEE region in scientific assessment under the IPCC and research under the WMO, EU/FP7 programmes.

3) Improve the availability and applicability of climate change modelling and downscaling data for use by policy makers at all levels.

- Provide data archiving and improved accessibility to information about climate model output and climate change scenarios for the SEE region considering the user needs at all levels;
- Promote the use of climate model outputs in simulating the response of water resources(ground and surface water regime) in the SEE region to possible climate change scenarios;
- Promote the use of GIS technology (Geographic Information System).

4.3 REDUCTION OF CLIMATE RELATED RISKS IN SEE

Disaster risk management has become a vital and urgent component of adaptation and coping with climatic changes. Within the South-Eastern Europe Disaster Risk Mitigation and Adaptation Program (SEEDRMAP), which aims at reducing the vulnerability of the countries of south-eastern Europe to the risks of disasters, the World Bank Study "Assessment of Economic Benefits of Hydrometeorological Services in the SEE Countries" was performed.

This Natural Disaster Risk Assessment for the SEE countries is the first effort at a systematic collection of data on selected hazards in the SEE region, such as earthquakes, landslides, flooding, drought, forest fires, and epidemics, and an estimation of losses on specific sector levels. Priority actions in this area, emphasized by the SEE countries' reports, are the following: enhance capacity to understand, assess and predict, current and future climate variability, trends in long-term climate change, occurrence and scale of extreme events and their impacts through human resource development, planned training activities, education and training fellowships; assist in adoption, calibration and validation of impact models for agriculture, water resources, biodiversity and coastal zones, which can be employed to assess the impacts of climate change; provide investigation of weather and water hazards, climate extremes and disasters, including economic evaluations of damage; enhance the capacity to assess climate related risks through vulnerability-based and natural hazards-based assessments; promote the use of tools and systems for these purposes.

CCFAP Urgent Actions:

1) Improvement of knowledge of biophysical and socio-economic changes in human systems that would affect the ability to cope with the future climate:

- Enhance the capacity to understand, assess and predict, current and future climate variability, trends in long-term climate change, occurrence and scale of extreme events, and their impacts through development of human resources, planned training activities, education and training fellowships;
- Assist in the adoption, calibration and validation of impact models for agriculture, water resources, biodiversity and coastal zones, which can be used to assess the impacts of climate change;
- Investigate weather and water hazards, climate extremes and disasters in the SEE region, including economic evaluations of damage.

2) Enhancement of the capacity to assess climate related risks through vulnerability-based and natural hazards-based assessments:

- Enhance of the capacity to assess climate related risks through vulnerability-based assessments, development of human resources, planned training activities, education and training fellowships;
- Enhance the capacity to assess climate related risks through natural hazard-based assessments, through development of human resources, planned training activities, education and training fellowships.

3) Exchange and use of information about analyses and experience in climate risk assessment and management:

- Enhance the capacity in climate risk assessment and management through planned training activities, international seminars and conferences;
- Production of climate change risk maps.

4) Promotion of the use of tools and systems for these purposes.

- Enhance the capacity to use tools and systems for climate risk assessment and management through planned training activities.

4.4 SOCIO ECONOMIC INFORMATION ON CLIMATE IMPACTS IN SEE

The lack of a socio-economic scenario was identified as a constraint in vulnerability assessment. In vulnerability assessment it is important to make an assessment of how populations and economy will develop during the 21st century and how that will affect the impacts of and adaptation to climate change. This is commonly realized using scenarios in three steps. In the first step, the crucial elements of the sectors that are likely to change should be identified. Then a scenario of how these crucial elements might change over the next decades needs to be developed or, preferably, obtained. In the third step, the impact and adaptation analysis must be combined with the socio-economic scenario. At present, all SEE countries usually use expert judgment information for these issues.

CCFAP Urgent Actions:

1) Identification of the existing approaches and available data, needs, gaps, barriers and constraints, ways and means of improving the availability of, and access to relevant socio-economic information and its integration into impact and vulnerability assessments:

- Enhance the capacity to use tools and systems for the development of socio-economic scenarios and their integration into impact and vulnerability assessments through planned training activities;
- Provide data archiving and improved accessibility to information about socio-economic scenarios and other relevant information.

2) Enhancement of the capacity to understand the importance of socio-economic aspects of climate change, and integration of this information into impacts and vulnerability studies:

- Enhance the capacity to understand the importance of socio-economic aspects of climate change, through the development of human resources, planned training activities, education and training fellowships.

5. SEE/CCFAP: DEVELOPMENT AND IMPLEMENTATION OF PROGRAMMES FOR ADAPTATION – PROVISIONAL SHORT TO MEDIUM TERM PRIORITIES IN RELEVANT SUB-REGIONAL PROGRAMMES

The cooperative Sub-regional SEE Programmes for Adaptation focused on integrated impact and vulnerability assessments, adaptation planning and implementation in a variety of sectors of importance to the region, and regional and international collaboration. This part of the CCFAP also includes short to medium-term actions relating to specific regional adaptation needs and concerns the address of climate change adaptation issues along both regional and sectoral lines. It should galvanize regional and international support for adaptation priorities in a range of sectors, and promote climate resilient development in a manner that is practical, informed by the best science, environmentally sound and economically efficient, and that promotes on-the-ground results.

5.1 SUB-REGIONAL PROGRAMME 1/ STRATEGIC FOCUS: CLIMATE CHANGE AND PUBLIC HEALTH, SAFETY AND EMERGENCY PREPAREDNESS

This programme component will support a range of collaborative research and information exchange activities which would increase the capacity in the SEE countries to respond to a range of climate change impacts on health, including: thermal stress early warning; physical effects of extreme weather and climate events; synergies and interactions with environmental quality, e.g., air, water, and soil quality and air-borne allergens; infectious diseases; changes in food quality, food supply, water supply and nutrition; economic and social aspects of climate change impacts and the resulting implications for human health.

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Improve current information about the health impacts of weather and climate extremes;
- Perform regular health monitoring; establish emergency alert systems and data sharing. There should be health surveillance monitoring in extreme cases of weather, e.g., to observe the possible effects of hot dry summers or flooding on human health;
- Facilitate the sharing of data and lessons learnt, e.g., awareness raising with examples of the best and good practice;
- Help addressing climate change issues in health adaptation into health and non-health policy areas (water, building, etc.);

- Incorporate climate change adaptation measures into National Environmental Health Action Plans;
- Incorporate climate change adaptation measures into National Action plans on environment and children's health;
- Improve access to information for stakeholders and the public.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Impact assessment (effects on health of temperature increase, air pollution, probabilities of future risks from flooding, infectious deceases, etc.);
- Adaptation assessment (surveillance and monitoring of pathogens, epidemiological studies on exposure and relative risks, risk and (cost-) benefit modelling, etc.);
- Mapping of vector-borne diseases at the sub-regional level, produce risk maps to aid directing activities into potential risk areas.

Specific needs:

SEE/CCFAP priorities for actions:

- Establishing National Early Warning Systems due to the harmful effects of weather variables on human health;
- Strengthening of the capacities at the national and local levels (education, awareness raising and the creation of legal frameworks, institutions and an environment that enables people to make well-informed decisions for the long-term benefit of their society).

5.2 SUB-REGIONAL PROGRAMME 2/ STRATEGIC FOCUS: CLIMATE CHANGE AND WATER RESOURCES MANAGEMENT, FRESHWATER QUANTITY AND QUALITY AND WATER SUPPLY

This programme component will improve the understanding and assessment of key drivers having a significant impact on water resources and their interactions with other human activities and the combined consequences. The knowledge produced is required to manage and mitigate risks and uncertainties in managing water resources in the region and to develop appropriate measures for adaptation strategies in water policies.

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Share information and research outputs within sub-regional countries (current climate trends and extremes and their impacts on water resources management,

freshwater quantity and quality, and water supply, cost benefit analyses and cross-sector studies – if any);

- Share the lesson learnt for the connections between the water issues and land-use planning, in particular in relation to flood risk management.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Establish a high-quality climate and hydrological database, archival and reference data sets;
- Employ unified methods of data quality control, analyses of historical data for climate change detection studies, trend analyses, model development/validation;
- Research on the assessment of anthropogenic influence on hydrological changes;
- Assessment of climate-induced changes in the hydrological cycle and cost-benefit analyses of adaptation options (this requires major research advances in the fields of climatology, hydrology, land use planning, socio-economy and multi-objective decision-making under uncertainty;
- Development of the methodology for ground water vulnerability assessment;
- Employment of high resolution models for climate change projections;
- Simulation of water balance under climate change conditions;
- Development of methodologies to evaluate the efficiency of measures for flood and drought management;
- Research on improved design standards for each domain of intervention (irrigation, water supply, flood and droughts, erosion and sedimentation, water resources management, monitoring and water quality);
- Flooding and erosion risk mapping.

Specific needs:

SEE/CCFAP priorities for actions:

- Development of a database of extremes (droughts and floods) and establishment of an early warning system for floods and droughts;
- Incorporate climate change adaptation measures into relevant national strategic and planning documents;
- Training and equipment for national/local water management organizations and operators;
- Modernization/construction of irrigation systems in drought prone areas;
- Refurbishment of existing flood protection and drainage systems and construction of new ones;

- Enlargement and modernization of the existing network of meteorological and hydrological stations, including ground water monitoring systems (quality and quantity);
- Improvement of national insurance schemes against flood and drought damage;
- Strengthening of the capacities of the National Hydrometeorological Services and particularly their observation networks, telecommunications, processing, forecasting and early warning systems.

(See Annex 1, Project concept proposal)

5.3 SUB-REGIONAL PROGRAMME 3/ STRATEGIC FOCUS: CLIMATE CHANGE AND AGRICULTURE AND FORESTRY

This programme component will improve the understanding and assessment of key drivers having a significant impact on agriculture and forestry. Priority collaborative research and information-sharing are the following: drought impacts and improvement of the resilience of irrigation systems with regards to drought; consideration of crop choices (e.g., low-water varieties) and farming practices (e.g., dry farming) with regard to water requirements; agro-environmental risk assessment; vulnerability of forest resources to climate change; development of managerial practices to reduce the risk of forest fires and insect disturbance; development of climate-impact data sets and products on the emerging forest practices.

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Dissemination of the available information about the coping of agriculture and forestry with current climatic variability;
- Dissemination of the available information about vulnerability to extreme events and their cost evaluation, and "no regret" measures;
- Organization of awareness and information campaigns, and training programmes for decision-makers and potential users, farmers and foresters, devoted to the environmental and socio-economic implications of climate change, etc.;
- Training of institutions and farmers for adopting the best available practices for climate change adaptation.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Research on the impact of climate change on planting dates and cultivars;
- Research on the impact of climate change on crop and forest yields, pests and diseases;

- Research on the impact of climate change on the effects of extreme events, such as forest fires, on agriculture and forestry directly and on the market for agricultural and forestry products, etc.;
- Development of a database of droughts and forest fires and risk mapping;
- Identification and development of adaptation measures and techniques to combat the negative effects of climate change on agricultural production and forestry.

Specific needs:

SEE/CCFAP priorities for actions:

- Construction/upgrade the monitoring/warning systems for surveying fires, insects, diseases and other disturbances in forestry/agriculture;
- Development of monitoring tools for drought sensitivity and other indicators of vulnerability to climate change impacts;
- Incorporation of climate change adaptation measures into national agricultural and forestry strategic development documents;
- Development of adaptation programmes relating to climate change in the forestry sector;
- Enlargement and modernization of the existing network of meteorological/agro meteorological stations and the establishment of drought and forest fire early warning system;
- Preparation of basic regional maps of in GIS format (soil, vegetation, erosion, drought and forest fire risk map, etc).

5.4 SUB-REGIONAL PROGRAMME 4/ STRATEGIC FOCUS: CLIMATE CHANGE AND LAND USE, BUILDINGS AND TRANSPORTATION

This Programme will support building preparedness for climate change impacts into all major investments in land and infrastructure and help the region to understand and reduce the risks of possible climate change impacts. Priority actions under this Programme include the following: revision of standards and green building guidelines to better support and encourage historic preservation activities; cooperative activities to incorporate climate change impact information into construction, operations and maintenance of infrastructure projects (these documents include, but are not limited to: Road Strategic Plans and Standards, Project Management Manual, Design Procedure Manual, Transportation System Strategic Plan, Surface Water Design Manual, etc.).

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Dissemination of the available information about the coping of land use, buildings and transportation with current climatic variability;

- Organization of awareness and information campaigns, and training programmes for support of policy-makers in the spatial development sphere and for planners relating to the environmental and socio-economic implications of climate change, need for new building codes, etc.;
- Raising awareness of the need for protection of cultural resources, such as historic buildings, cultural properties and archaeological sites, from the damage caused by climate change impacts, such as flooding, erosion and storm events.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Evaluation and planning relating to the potential impacts of coastal flooding associated with sea level rise;
- Evaluation of land-use changes under climate changes conditions;
- Cost calculation of potential adaptation measures and assessment of no-action costs;
- Improved design standards for buildings;
- Incorporation of climate change impacts information into construction, operations and maintenance of infrastructure projects (Road Strategic Plans and Standards, Project Management Manual, Design Procedure Manual, Transportation System Strategic Plan, Surface Water Design Manual, etc.).

Specific needs:

SEE/CCFAP priorities for actions:

- Development and update of high resolution regional climate scenarios and projections;
- Regularly updated risk maps as a planning tool for regional planning work;
- Risk and vulnerability assessments for regions;
- Incorporation of climate change adaptation measures into spatial plans;
- Incorporation of climate change adaptation measures into physical and urban plans;
- Incorporation of climate change adaptation measures into strategic impact assessment.

5.5 SUB-REGIONAL PROGRAMME 5/ STRATEGIC FOCUS: CLIMATE CHANGE AND TOURISM

This programme component will improve the understanding and assessment of the impact of climate change on tourism in the SEE region. Priority actions under this Programme include the following: a quantitative assessment of the potential impacts of climate change on tourist flows

to SEE countries; the suitability of the SEE climate for tourism in 2020, 2050, 2080, based on existing models and scenarios; and the potential changes in the number of tourists visiting SEE countries due to climate change.

Needs for information exchange and technology transfer on:

SEE/CCFAP priorities for actions:

- Dissemination of the available information about the coping of tourism with current climatic variability;
- Organization of awareness and information campaigns, training programmes for support of both policy-makers and tourism practitioners, relating to the environmental and socio-economic implications of climate change;
- Introduction of education and awareness programmes for all tourism stakeholders – in the public and private sectors – as well as consumers;
- Raising awareness of the need for the protection of cultural resources, such as historic buildings, cultural properties and archaeological sites, from damage caused by climate change impacts, such as flooding, erosion and storm events.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Evaluation and planning for the potential impacts of coastal flooding associated with sea level rise;
- Efficiency standards development in new tourist accommodations, as well as mechanisms for energy conservation;
- Development of regional and local climate information services tailored to the tourism sector and promotion of their use among tourism stakeholders. Capacity building for interpretation and application of this information;
- Assessment of the suitability of the SEE climate for tourism in 2020, 2050, 2080, based on existing models and scenarios.

5.6 SUB-REGIONAL PROGRAMME 6/ STRATEGIC FOCUS: CLIMATE CHANGE AND COASTAL ZONES

This Programme will collaborate with other regional initiatives, regional climate scientists and experts in order to increase knowledge about the impacts of current and projected climate change on coastal zones.

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Sharing of information, knowledge, experience and best practices on adaptation measures in coastal zones;

- Dissemination of the available information about the coping of the development of coastal zones with current climatic variability;
- Organization of awareness and information campaigns, training programmes for support of both policy-makers and the public relating to the environmental and socio-economic implications of climate change to coastal areas;
- Raising awareness of the need for the protection of coastal areas from the damage caused by climate change impacts, such as flooding, erosion and storm events.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Evaluation and planning relating to the potential impacts of coastal flooding associated with sea level rise;
- Evaluation of the impacts of sea level rise on ground water and water availability;
- Evaluation of the impacts of climate change on fisheries, as well as other marine species;
- Development and transfer of adaptation technologies.

Specific needs:

SEE/CCFAP priorities for actions:

- Construction/upgrading of the monitoring/warning systems to survey vulnerabilities in coastal areas;
- Development and update of high resolution regional climate scenarios and projections;
- Integrated impact scenarios for coastal areas;
- Improvement of early warning and response systems.

5.7 SUB-REGIONAL PROGRAMME 7/ STRATEGIC FOCUS: CLIMATE CHANGE AND BIODIVERSITY AND ECOSYSTEMS

This Programme will collaborate with other regional initiatives, particularly with the SEE Initiative on Biodiversity, regional climate scientists and experts, in order to increase knowledge about current and projected climate change impacts on wildlife and biodiversity (fish, wildlife, habitat conditions and biodiversity) in the SEE region.

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Sharing experience in addressing the impacts of climate change on biodiversity and for the development of strategies for adaptation to increase resilience and build accommodation for biodiversity under climate change;

- Dissemination of the available information about the coping of biodiversity with current climatic variability;
- Organization of awareness and information campaigns, training programmes for support of both policy-makers and local communities relating to the impact of human-induced activities and climate change on biodiversity and ecosystems;
- Awareness raising of the need to protect biodiversity and ecosystems from the damage caused by climate change impacts, such as flooding, erosion and storm events;
- Distribution map of the major ecosystem types, map of biomes and mapping of habitats and vegetation types for precise inventarisation of the biodiversity.

Needs for additional research work:

SEE/CCFAP priorities for actions:

- Research on the impact of climate change and extreme weather events on species survival;
- Research on the impact of climate change on changes in habitat, composition and structure, including the expected increase in invasive species and diseases;
- Research on the impact of climate change on changes in seasonal timings that will affect the dependencies and reproductive success of species;
- Research on the impact of climate change on land use, such as agriculture, water, and forestry, on biodiversity;
- Development of scientific tools to evaluate the effects of climate change on local fish and wildlife populations and habitats;
- Assessment of the impacts of climate change on SEE Wetland Ecosystems;
- Assessment of the impacts of climate change on SEE Mountain Ecosystems.

Specific needs:

SEE/CCFAP priorities for actions:

- Development and update of high resolution regional climate scenarios and projections;
- Enhancement of the capacity to use tools and impact assessment models for biodiversity;
- Risk and vulnerability assessments for protected areas in the SEE region;
- Enlargement and modernization of the existing network for monitoring the status of biodiversity components through monitoring of the phenology of bioindicator species;
- Enlargement and modernization of the existing network of mountain meteorological stations with vertical and slope distribution for biodiversity vulnerability assessment.

5.8 SUB-REGIONAL PROGRAMME 8/ STRATEGIC FOCUS: CLIMATE CHANGE AND ENERGY

This Programme will collaborate with other regional initiatives, regional climate scientists and experts, in order to increase knowledge about the impacts of current and projected climate change on water. Action proposal: collaborative research and analysis of the vulnerability of the water resources regime and hydropower to climate change, drought impact on the biofuel industry, etc.

Needs for information exchange and technology transfer:

SEE/CCFAP priorities for actions:

- Dissemination of the available information about the impact of current climatic variability on energy production and consumption (supply and demand side);
- Organization of awareness and information campaigns, training programmes for support to policy and energy decision makers and other users, relating to the socio-economic implications of climate change;
- Raising awareness of the need for using alternative sources for energy production;

Needs for additional research work on the impact of climate change:

SEE/CCFAP priorities for actions:

- Integrated research on climate impact on water resources (precipitation, runoff) and energy production/consumption;
- Research on climate change impact on the potential of renewable energy sources (wind, solar energy maps, hydro, geothermal, biofuel, etc);
- Development of a methodology for evaluating climate impact on energy production and consumption.

Specific needs:

SEE/CCFAP priorities for actions:

- Development and update of high resolution regional climate scenarios and projections;
- Unified methodology for the evaluation of climate impact on the energy sector, cost benefit analysis and assessment of the no-action costs;
- Establishment of the capacities to monitor and respond to the anticipated impacts of climate change at the institutional and community levels;
- Incorporation of climate change adaptation measures into national energy strategic and planning documents.

6. SEE/CCFAP: CROSS CUTTING ISSUES

6.1 SEE COOPERATION IN ADAPTATION

Increasing vulnerability to climate change and other natural disasters in the countries of south-eastern Europe necessitated the further strengthening of regional and international technical and scientific cooperation in providing more successful climate change monitoring and forecasting, as well as the assessment of climate change impacts on human health, economic activities, availability of water and other natural resources, and the need for timely problem identification and the adoption of measures and strategies to adapt to the changed climate conditions.

In line with the decisions of the Convention in connection to regional cooperation in adaptation, the SEE countries strongly supported the implementation of the Belgrade Initiative through: support of governmental bodies in active participation in the creation and implementation of the SEE/CCFAP-A in cooperation with the Regional Environmental Centre for Central and Eastern Europe (REC) and the Sub-regional, SEE Virtual Climate Change Related Centre for Research and Systematic Observation, Education, Training, Public Awareness and Capacity Building (SEE/VCCC).

Development of the Southeast European Climate Change Framework Action Plan for Adaptation (SEE/CCFAP-A) and its different programmes for adaptation, as indicated in Chapter 5, will ensure faster and better cooperation and exchange of information between the experts and countries in the region. Also, SEE cooperation in adaptation will contribute to capacity building and public awareness in all SEE countries. Simultaneously, cooperation will accelerate the development and implementation of cost/effective adaptation measures in the participating countries, as well as in the region as a whole. This cooperation will contribute to socio-economic development and poverty eradication in the SEE region, as well as support the implementation of the United Nations Framework Convention on Climate Change (UNFCCC), especially its Articles 5 and 6, Framework for Capacity Building, and the Nairobi Programme of Work on Impacts, Vulnerability and Adaptation.

General priorities for actions to support the implementation of the SEE/CCFAP-A:

- Joint activities to support the revision of the national development strategies, taking into consideration climate changes, vulnerabilities and adaptation; appropriate integration of climate change impacts should be made an obligatory standard requirement in regional development;
- Joint activities in capacity building and strengthening of meteorological and hydrological monitoring and forecasting systems both at the country and sub-regional levels;
- Joint activities in increasing data-gathering capacity and data quality, and enhancement of data-sharing between the countries of the SEE sub-region;

- Joint activities in the development, installation and maintenance of weather/climate/hydro early warning systems in the SEE region, as part of the EU early warning systems ;
- Sub-regional workshops to allow for knowledge dissemination and sharing and to encourage further sub-regional cooperation.

6.2 CAPACITY BUILDING IN SEE

Due to their difficult socio-economic situation, most SEE countries are faced with an insufficient institutional framework, limited human capacities and scarce financial resources. In such an unfavourable situation, coupled with the need for transformation and modernization of their economic systems, it is difficult to give national priority to climate change protection and is much harder to achieve sustainable capacities.

Sustaining the activities in climate change issues continues to be a challenge for most SEE countries with the above-mentioned obstacles and competing priorities, such as poverty eradication. Therefore, the implementation of this interdisciplinary and multi-tier structured SEE/CCFAP-A will serve as the regional mechanism for capacity building and enhancing the capability to conduct climate observations, monitoring and forecasting; describe baseline climates; examine current climate variability and extremes; assess risks, both present and future; investigate adaptation, both present and future; create/apply climate change scenarios; conduct sensitivity analyses; examine sectoral impacts; examine risks and uncertainties; facilitate integrated impact analyses; evaluate the economic viability of adaptation measures; simulate economic impacts over time, allowing for the separation of benefits and costs of adaptation under climate change from those occurring under natural climate variability.

The UNFCCC framework for capacity building in developing countries[22] and countries with economies in transition[23] sets out the scope of, and provides the basis for, action in capacity building related to the implementation of the Convention that will, in a coordinated manner, assist them in promoting sustainable development, while at the same time meeting the objective of the Convention.

An important, non-exhaustive list of common capacity needs, covering all three dimensions of capacity building (systemic, institutional and human), considering the diverse aspects of climate change issues (observations and measurements, vulnerability and adaptation, understanding of the climate change issue – education, training and awareness, mitigations, transfer of technology, climate change strategy and action plans, negotiating capacity, cross-cutting issues and cross-convention synergies), is as follows:

SEE/CCFAP priorities for actions:

- Raising climate change to a higher level on the SEE sub-regional agenda;

22 FCCC/CP/1999/6/ Add.1, Capacity building in developing countries (non-Annex I Parties), Decision 10/CP.5, <http://unfccc.int/>.

23 FCCC/CP/2001/13/ Add.1, Capacity building in countries with economies in transition, Decision 3/CP.7, <http://unfccc.int/>.

- Enhancing SEE cooperation in climate change research, development and transfer of technologies, know-how and practices;
- Building capacities in the SEE region for the UNFCCC negotiation process and specifically for the ongoing AWG process. The SEE region has a very delicate and specific status and needs assistance in understanding the process and addressing relevant issues; setting indicators for measuring the capacity building among countries, which is an issue under discussion within the AWG LCA process;
- Providing the bases for sustainable capacities to deal with climate change in the SSE countries;
- Modernization of National Hydrometeorological services in the SEE countries;
- Improvement of collection, management, exchange, access to and use of the observational data and other relevant information on current and historical climate and its impacts on SEE;
- Development/application of climate models, access to and use of information and data on projected climate change for SEE;
- Provide capacity building workshops and training programmes relating to the use of tools and systems for the development of socio-economic scenarios and their integration into impact and vulnerability assessment;
- Promotion of the understanding of the impacts of and vulnerability to climate change;
- Enhancement of the capacity to supply and use the data, especially at regional and national levels and exchange information about the impact of observed climate change;
- Provision of capacity building workshops on adoption, calibration and validation of impact models for agriculture, water resources and biodiversity, which can be used to assess the impacts of climate change;
- Training of experts in modern technologies for adaptation is also requested to overcome the gap in personnel capacities; promotion of the understanding, development and dissemination of information about practical measures, methodologies and tools aimed at increasing economic resilience and reducing reliance on the vulnerable economic sectors;
- Facilitating communication and cooperation among the SEE countries and relevant organizations, business, civil society, decision makers, and other stakeholders;
- Training and equipment for water management organizations and operators;
- Training of institutions and farmers for adopting the best available practices for adaptation.

6.3 EDUCATION, TRAINING AND PUBLIC AWARENESS IN SEE

Education, training and public awareness are important foundations for the development and implementation of policies and programmes addressing climate change. The UN Convention on

Climate Change, under Article 6 on Education, Training and Public Awareness, calls on governments to promote and cooperate in the development and implementation of educational and public awareness programmes, to promote public access to information and public participation, and to promote training of scientific, technical and managerial personnel. The Conference of the Parties, by its decision 9/CP.13[24], decided to adopt the amended New Delhi Work Programme related to Article 6 of the Convention and extend it by five years.

The Decision underlines that regional, sub-regional and international cooperation can enhance the collective ability of the Parties to implement the Convention, improve synergies, avoid duplication of effort between the different conventions, and ultimately both improve the effectiveness of programming and facilitate its support.

In order to advance the implementation of Article 6 of the Convention, it is proposed to cooperate in the following:

SEE/CCFAP priorities for actions:

- Encourage the integration of climate change into national educational systems;
- Apply new sub-regional and bilateral programmes for education and training and other forms of capacity building for the young staff of SEE countries, within the existing international framework and the development of regional partnership proposed in this Initiative (SEE/CCFAP-A);
- Facilitate, develop and implement regional education and training programmes focused on climate change, in particular, targeting the young population, and including personnel exchange to train experts;
- Facilitate, develop and implement regional public awareness programmes on climate change and its effects at the SEE regional and national levels by encouraging contributions and personal action in addressing climate change, supporting climate-friendly policies and fostering behavioural changes, including the involvement of popular media;
- Facilitate public access to data and information, by providing the information on climate change initiatives, policies and results of SEE/CCFAP-A actions needed by the public and other stakeholders to understand, address and respond to climate change;
- Promote public participation in addressing climate change and its effects and in developing adequate responses, by facilitating feedback, debate and partnership in climate change activities and in governance;
- Organize training for local authorities and communities;
- Raise awareness among national decision makers and local authorities to integrate adaptation measures to current climate vulnerabilities (caused by extremes) into national development plans;
- Enhance sub-regional, regional and international cooperation in undertaking activities within the work programme related to Article 6 of the UNFCCC, and

24 Decision 9/CP.13: Amended New Delhi work programme on Article 6 of the Convention; FCCC/CP/2007/6/Add.1

further enhance synergies between the Rio Conventions and improve the effectiveness of all sustainable development efforts;

- Develop institutional and technical capacity to identify gaps and needs for the implementation of Article 6, assess the effectiveness of SEE activities related to Article 6 and consider the links between Article 6 activities, implementation of policies and measures to mitigate and adapt to climate change, and other commitments under the Convention, such as technology transfer and capacity-building;
- Under the SEE roster of experts, develop a directory of organizations and individuals, indicating their experience and expertise relevant to Article 6 activities, with the view of building active networks involved in the implementation of these activities.

6.4 ROSTER OF EXPERTS IN SEE

The establishment of the sub-regional **roster of SEE experts** is important for enhancing the capacity to successfully deal with climate change issues in the SEE region (see Annex 2 of the SEE/CCFAP-A). The roster of experts will serve as the main source of knowledge for the development and implementation of programmes and projects under the SEE/CCFAP-A and its monitoring. The proposed list of experts from Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro and Serbia is presented in the open list of experts from SEE region in Annex 2 to the SEE/CCFAP-A. Under the SEE roster of experts, the preparation of a directory of organizations and individuals is envisaged (with an indication of their experience and expertise, relevant to Articles 5 and 6, Framework for Capacity Building and the Nairobi Work Programme on Impacts, Vulnerability and Adaptation, with the view of building active networks involved in the implementation of CCFAP activities). In addition, the list of countries' institutions and experts contributing to the development of the SEE/CCFAP-A is presented in Annex 4.

6.5 CLIMATE CHANGE PARTNERSHIPS

The Belgrade initiative for the enhancement of SEE sub-regional cooperation in the field of climate change[25], launched by the Republic of Serbia, was adopted at the Sixth Ministerial UNECE Conference "Environment for Europe", held in Belgrade, Serbia, in October 2007. The background documents were prepared by the Ministry of Environmental Protection of the Republic of Serbia, the Republic Hydrometeorological Service of Serbia and the Regional Environmental Centre for Central and Eastern Europe (REC), with the support of the Italian Ministry of Environment, Land and Sea and the Swedish International Development Cooperation Agency. The key component of this Initiative is related to the development of the SEE/CCFAP Programmes; the establishment of a Sub-regional, Virtual Climate Change Related Centre in Belgrade for Research and Systematic Observation, Education, Training, Public Awareness, and Capacity Building, and the development of partnerships. The recommendation of the Belgrade SEE Climate

25 Belgrade Initiative: Enhancing the Regional SEE Cooperation in the Field of Climate Change, Sixth Ministerial UNECE Conference "Environment for Europe", October 2007, Belgrade, Serbia (ECE/BELGRADE.CONF/2007/20; ECE/BELGRADE.CONF/2007/20/Add.1)

Change Initiative related to partnerships stated that in "developing and implementing the SEE/CCFAP programmes, the SEE countries shall establish partnerships with relevant international organizations. A close relationship should be promoted with the Secretariats of the UNFCCC, WMO and the GEF, as well as with the UNDP, UNEP and EU and capacity building initiatives under relevant environmental agreements". As climate change is a complex issue, the Belgrade Initiative stressed the need for partners to move forward in this field.

According to this recommendation of the Belgrade Climate Change Initiative, the SEE/CCFAP-A addresses the need to increase the capacity to deal with climate change, particularly in the field of adaptation, through several policies, including building partnerships. Recognizing the importance of partnerships in climate change, the SEE/CCFAP-A encourages all participating countries to facilitate partnership and cooperation among various stakeholders at the national, regional and international level.

Partnership and cooperation at the SEE country level are coordinated through the governmental institutions responsible for climate change issues and consist of a range of key decision makers from academia and other sectors such as finance, housing, development, utilities, transport, environment, energy, regulators and policy makers, as indicated below.

Albania. A partnership has been built between the Ministry of Environment, Forests and Water Administration (MOEFWA) and UNDP, as well as other key stakeholders, to develop the very first project relating to adaptation to current and future climate change impacts in Albania. In June 2008, the project entitled: "**Identification and Implementation of Adaptation Response Measures in the Drini-Mati River Deltas**" was launched. This project, which is funded by the GEF, focuses on adaptation actions required **for the area of the Drini-Mati River Deltas** (DMRD), which harbour **biodiversity values of global and national significance,** identified as being highly vulnerable to current and expected climate change impacts, associated with significant potential ecological and socio-economic consequences. The high vulnerability of the DMRD, combined with the likelihood of significant adverse impacts on the preservation of globally significant biodiversity, indicate an urgent need for the Albanian government, non-government, private sector, community, and international donor representatives to take climate change impacts into account in all future actions aimed at promoting sustainable development of this area. The overall development goal of this project is to assist Albania in establishing a mechanism by which strategies to moderate, cope with, and take advantage of the consequences of climate change are enhanced, developed and implemented.

Bosnia and Herzegovina. The key governmental institutions and academia participating in climate change issues include the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina, the Ministry of Physical Planning, Civil Engineering and Ecology of the Republic of Srpska, the Federal Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina, the Regional Environmental Centre of B&H, the Ministry of Science and Tehnology of the Republic of Srpska, the Ministry of Agriculture of the Republic of Srpska, the Republic Hydro-Meteorological Institute of the Republika Srpska, the Federal Hydrometeorological Institute of the Federation of Bosnia and Herzegovina, the University of Banja Luka, the Faculties of Natural Science, Forestry, Agronomy, etc. of the Republic of Srpska, the Faculties of Natural Science, Agronomy, etc. of the University of Sarajevo, the Federation of Bosnia and Herzegovina.

Macedonia. As it can be concluded from the above Chapters (reference to Chapter 3.4.2) partnerships exist mainly in the scientific community. Official partnerships at the governmental level are lacking. There is a need for timely information about upcoming possibilities from bilateral donors (Germany, etc.) in adaptation and the use of existing funding instruments.

Montenegro. Key governmental and other institutions participating in climate change activities include: the Ministry of Tourism and Environment, the Hydrometeorological Institute of Montenegro, the Ministry of Agriculture, Forestry and Water Management, the Ministry for Economic Development, the Environmental Protection Agency, the Centre for Ecotoxicological Research, the Electricity Distribution of Montenegro, UNDP CO, and REC CO.

Serbia. Cooperation at the national level in dealing with climate change related issues includes more than 10 key organizations represented by the government, climate scientists, domestic and international organizations, the most important being the following: the Ministry of Environment and Spatial Planning, the Ministry of Agriculture, Forestry and Water Management, the Republic Directorate for Water, the Ministry of Infrastructure, the Ministry of Mining and Energy, the Ministry of Economy and Regional Development, the Republic Hydrometeorological Service of Serbia (RHMSS), the Environmental Protection Agency, the University of Belgrade: the Faculty of Civil Engineering, the Faculty of Medicine, the Faculty of Agriculture, the Faculty of Forestry, the Institute of Meteorology – the Faculty of Physics, the Faculty of Traffic and Transport Engineering, the University of Novi Sad: the Faculty of Agriculture, the University of Niš: the Faculty of Science and Mathematics, the Institute of Soil Science, Belgrade, the Institute of Public Health of Serbia "Dr Milan Jovanovic Batut", the Institute of Public Health of Belgrade, the Institute for Nature Conservation of Serbia, the Eco Fund of Serbia, UNDP CO, REC CO, UNEP CO, EU CO, etc. The Regional Environmental Centre for Central and Eastern Europe (REC) and the Republic Hydrometeorological Service of Serbia, as the host of the Sub-Regional Virtual Climate Change Centre for South Eastern Europe (SEE/VCCC), signed a contract on technical cooperation. According to its provisions, the two parties will establish a joint office to strengthen the establishment of the basic functions of the Sub-Regional Virtual Climate Change Centre for South-Eastern Europe (SEE/VCCC) through partnership relations. Under its 2007 Strategic Plan for the Enhancement of Meteorological and Hydrological Services in Europe, the WMO supports the establishment of the SEE/VCCC in Belgrade. The RHMSS is working with potential partners on laying down the appropriate roles for the parties involved in SEE/VCCC activities.

Cooperation with the UNDP has a long tradition and, at present, cooperation is focused on the preparation of INC. A technical cooperation programme between the CIMA Research Foundation (Italy) and the RHMSS is in preparation. Also, the MoESP and the RHMSS are cooperating with the Italian Ministry for the Environment, Land and Sea, the Earth Simulator, Japan, JICA, the Italian Trust Fund (hosted by the REC, Hungary), Norway, the Netherlands, Sweden, Slovakia, the UNFCCC Secretariat, GEF, UNDP, UNEP, WB and other potential donors.

7. SEE/CCFAP: IMPLEMENTATION MODALITIES

7.1 POSSIBLE SOURCES OF FUNDING

Funding is of vital importance for the planning and implementation of adaptation plans and projects. The basic conclusion of the Stern Review was that the costs of strong and urgent action on climate change would be lower than the thereby avoided costs of the impacts of climate change under business as usual (Stern 2006). All countries, rich and poor, need to adapt to climate change, and this will be costly. Developing countries, already the hardest hit by climate change, have little capacity (both in human and financial terms) to adapt. The hitherto research indicates that climate change may have a major effect on water resources, agriculture, forestry, coastal management, tourism, energy, land use, buildings, transportation, natural ecosystems and human health of the SEE countries.

The possible sources of funding for the implementation of the Climate Change Framework Action Plan for Adaptation in the SEE region (SEE/CCFAP-A) are, but not limited to: UNFCCC/GEF, including Strategic Priorities for Adaptation (SPA) to which the region is eligible and the Adaptation Fund under the Kyoto Protocol, once it becomes operational. There are also other funds set up recently by the UNDP, UNEP, WB, FAO, UNESCO and the EU (Instrument for Pre-Accession Assistance – IPA, Seventh EU Framework Programme – FP7), the WMO Programme for Technical Cooperation, the SEE Initiative for Disaster Reduction and Adaptation through the World Bank, and bilateral financial and technical assistance (ODA) funds (UK, Spain, Japan, Switzerland, etc.). Other opportunities, such as Multilateral Environmental Agreements (MEAs), the areas of work of which could be synergetic with adaptation, may also provide further funding for adaptation. These MEAs include the Convention on Biological Diversity, the UN Convention to Combat Desertification and the Ramsar Convention on Wetlands. Other Specific Assistance of cooperative projects include Project-type Technical Cooperation, Climate Technology Initiative (CTI), the Japanese International Cooperation Agency (JICA) Training Courses, SEE countries' national funds and private foundations, as well as in-kind contributions from participating SEE countries. The Republic of Serbia, through the Republic Hydrometeorological Service of Serbia, as a government authority hosting the Sub-regional Virtual Climate Change Centre in Belgrade for Research and Systematic Observation, Education, Training, Public Awareness, and Capacity Building, contributes in-kind to the virtual Centre with its personnel, communications, computer and technical infrastructure resources, including premises with the necessary office equipment.

7.2 COORDINATION OF IMPLEMENTATION

The Southeast European Climate Change Framework Action Plan for Adaptation (SEE/CCFAP-A) seeks to provide both an overview of the existing actions and activities to adapt to climate change in the SEE region and to propose new key actions and activities to address

gaps in the current response. Local, national and regional actions and activities are included where they are relevant to SEE.

Climate change is a gradual process that occurs over decades. Therefore, the work to adapt to climate change needs to commence now, but it will be a long-term process that needs to be tackled in a staged, prioritized way.

Failing to take action in the key areas and sectors and plan for the future could increase the risk and incur higher costs than the climate changes themselves, and remedial maintenance and renewal are required. Therefore, it is important to take a precautionary approach and adopt "no regret" solutions, which will deliver benefits whatever the extent of climate change and which will thrive under current and future climate conditions.

The SEE/CCFAP-A summarizes the overeaching aims for local, national and regional decision makers and stakeholders with regard to climate change which, in SEE, should be to work with a changing climate, through adaptation to its impacts (both risks and opportunities) within the region and to manage these for the benefit of present and future generations.

Resilience to climate change impacts will require a high degree of coordination among states, national and local authorities, business leaders and residents. In some areas of regional vulnerability, such as water management, agriculture, forestry, coastal zones, biodiversity, energy, infrastructure, tourism and health, the need for coordination is especially high. Thus, the goals and actions in this plan simply represent SEE actions in the context of this necessary cooperation and partnership. The proposed adaptation activities are grouped in the following chapters:

Chapter 4 of the SEE/CCFAP-A reflects the conclusions and actions identified within the SEE Disaster Reduction Management Initiative (SEE DRMI) under the UN International Strategy for Disaster Reduction (UN/ISDR) and the World Meteorological Organization Region VI (Europe) Strategic Plan. In this Chapter, the continuous update of the SEE climate change perspective is given together with identified actions and needs taken from other initiatives (SEEDRMI, WMO RA-VI Strategic Plan). It comprises (i) Climate Observations, Monitoring and Forecasting in SEE; (ii) Climate Modelling and Scenarios in SEE; (iii) Reduction of Climate Related Risks in SEE; and (iv) Socio Economic Information on Climate Impacts in SEE. The UNFCCC has recognized the importance of research and systematic observation to reduce uncertainties regarding the effects of climate change and impacts and responses to it. As part of this recognition, the Conference of the Parties to the UNFCCC invited the Global Climate Observing System (GCOS) to identify the priority capacity-building needs and identify gaps in regional systematic observation (FCCC/SBSTA/2006). Regional GCOS action plans for eastern and central Europe and for the Mediterranean Basin were developed, pointing to the need for a better knowledge base, better forecasting and climate services, and the need to improve observations at all levels in order to enhance the ability of the countries to adapt. In addition, early warning and risk management systems are recognized as efficient contributors that can facilitate adaptation to climate variability and change.

The list of identified actions and needs taken from other initiatives (SEEDRMI, WMO RA-VI Action Plan) has to be continuously updated. It is presented in Table 1, Action Plan Part A.

Chapter 5 of the SEE/CCFAP-A consists of the programmes for adaptation and defines proposed actions and needs in different sub-regional programmes. These focus on the following sectors: (i) public health, safety and emergency preparedness; (ii) water resource management;

(iii) agriculture and forestry; (iv) land use, building and transportation; (v) tourism; (vi) coastal zones; (vii) biodiversity and ecosystems; and (viii) energy.

The proposed actions and needs in the eight sub-regional programmes corresponding to different strategic foci are given in Table 2, Action Plan Part B. They are public health, water management, agriculture and forestry, land use, building and transportation, tourism, coastal zones, biodiversity and ecosystems and energy.

Chapter 6 of the SEE/CCFAP-A contains the important cross-cutting issues which are relevant to actions related to continuous climate change update in SEE and for all sub-regional programmes given in Chapter 5. These common cross-cutting activities comprise: SEE cooperation in adaptation; capacity building in SEE; education, training and public awareness in SEE; creating a roster of experts in SEE; and building partnerships in climate change. Priority actions are presented in Table 3, Action Plan Part C.

The **overall coordination** of the SEE/CCFAP-A will be realised by an ad-hoc working group, comprising representatives and appointed experts from the interested SEE countries. The REC and SEE/VCCC will provide the secretariat and technical support to this group. The SEE/VCCC expressed interest to perform a variety of other tasks related to maintaining the web site, fundraising, drafting correspondence, preparation of reports, news releases, brochures, fact sheets, expert opinions, etc.

The coordination of the specific work under Chapter 4 "Continuous Update of SEE Climate Change Perspective" will be realised by the SEE/VCCC. The projects and activities under Chapter 5 "Development and Implementation of Programmes for Adaptation" will be directed by different interested countries. During the SEE/CCFAP-A preparatory process, the countries expressed preliminary views on the leadership. The Republic of Albania expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in the hydropower sector, which also has a mitigation potential. Albanian Vulnerability and Adaptation experts conducted relevant in-depth studies. Bosnia and Herzegovina expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in the energy and agricultural sectors. The Former Yugoslav Republic of Macedonia expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in water management and agricultural sectors. Montenegro expressed its intention to coordinate sub-regional projects and activities in the field of adaptation in tourism and coastal zones. The Republic of Serbia expressed its intention to coordinate the sub-regional projects and activities in the field of adaptation in water management, forestry, agriculture, public health, land use, biodiversity and building. The REC, in cooperation with the SEE/VCCC, expressed its interest to coordinate projects and activities under SEE/CCFAP-A Chapter 6 "Cross-cutting Issues".

Montenegro is also interested to support the establishment of a Balkan Regional Climate Change Forum (BR CCF) for political and policy dialogue in order to facilitate the coordination of the activities on adaptation and mitigation in the region. This Forum should be used by the UNFCCC focal points and the informal Open Balkan Group to obtain endorsement from the Ministers for joint regional action in the global climate change process, as well as for the better understanding of the policies they need to develop and implement with the involvement of other Ministries (in charge of energy, economy, agriculture, etc.).

The expression of interest in the coordination of implementation by different countries should be based on national priorities set in national strategic and planning documents and existing le-

gal, institutional and technical capacities. The official letter of interest by the Minister of Environment should follow the proposed programmes, projects and/or activities, based on previous support by the relevant beneficiary/ies. In the case of research programmes, links with the governmental institutions can be achieved through the inclusion of the relevant ministries or other governmental institutions as a programme/project partner. Keeping the Ministry responsible for climate change informed is of crucial importance for maintaining the proper national project base on climate change adaptation activities in the country.

List of Acronyms

AP – Action Plan

AWG-LCA – Ad hoc Working Group on Long-term Cooperative Action (under UNFCCC)

CDM – Clean Development Mechanism of the Kyoto Protocol

COP – Conference of the Parties to the UNFCCC

CTI – Climate Technology Initiative

ECCP – European Climate Change Programme

ECMWF – European Centre for Medium-Range Weather Forecasts

EU – European Union

FAO – Food and Agriculture Organization of the United Nations

FP7 – Seventh EU Framework Programme

GCOS – Global Climate Observing System

GEF – Global Environment Facility

GFDRR – Global Facility for Disaster Reduction and Recovery

ICZM – Integrated Coastal Zone Management

IEWE – Institute for Energy, Water and Environment

IPA – Instrument for Pre-Accession Assistance

IPCC – Intergovernmental Panel on Climate Change

JICA – Japan International Cooperation Agency

KP – Kyoto Protocol

MDG – Millennium Development Goals

MEAs – Multilateral Environmental Agreements

NMHSs – National Meteorological and Hydrological Services

NWP – UNFCCC Nairobi Programme of Work on Impacts, Vulnerability and Adaptation

ODA – Official Development Assistance

RCC – Regional Cooperation Council

REC – Regional Environmental Centre for Central and Eastern Europe

RHMSS – Republic Hydrometeorological Service of Serbia

SEE – South-East Europe

SEE/CCFAP-A – South-East European Climate Change Framework Action Plan for Adaptation

SEE/VCCC – South-East European Virtual Climate Change Centre

SEEDRMAP – South Eastern Europe Disaster Risk Mitigation and Adaptation Program

SNC – Second National Communications (to UNFCCC)

UN – United Nations

UNCBD – United Nations Convention on Biological Diversity

UNCCD – United Nations Convention to Combat Desertification and Drought

UNDP – United Nations Development Programme

UNECE – United Nations Economic Commission for Europe

UNEP – United Nations Environment Programme

UNESCO – United Nations Educational, Scientific and Cultural Organisation

UNFCCC – United Nations Framework Convention on Climate Change

UN/ISDR – United Nations International Strategy for Disaster Reduction

WB – World Bank

WCP – World Climate Programme

WHO – World Health Organization

WMO – World Meteorological Organisation

WSSD – World Summit on Sustainable Development

8. ANNEXES

ANNEX I: IDENTIFIED NATIONAL ADAPTATION ACTIONS AND MEASURES

ALBANIA

Adaptation Policies and Measures

Referring to *the National Strategy for Development and Integration* (NSDI, 2007-2013), NSDE MDGs for Albania, etc., the V&A team has identified the following types of adaptation policies for coping with the negative effects of climate change:

– Prevent the negative effects – anticipatory actions to reduce the susceptibility of an exposure unit to the impacts of climate:
    - legislative, regulatory and institutional
    - structural and technological (technological/engineering solutions)
– Avoid or exploit changes in risk;
– Research into new adaptation methods/technologies;
– Educate, inform, and encourage behavioural change – dissemination of knowledge through education and public information.

Given the potential rate of climate change, both the short-term impacts (that already exist and that need to be immediately addressed) and the medium and longer-term impacts are considered to compile to the adaptation measures, which should be taken both at an individual level and by society as a whole. The short-to-medium term measures are presented in Table 1.

The policy makers are strongly recommended to consider the proposed adaptation measures for sustainable development and vulnerability reduction in Albania.

Table 1. Albania. Proposed adaptation policies/measures (S – short term up to 2025, M&L – medium and longer term)

Adaptation policy	Adaptation measures	Responsible party
Prevent the effects: legislative, regulatory, and institutional	Include in the New National Strategy for Tourism, the Development of the necessary adaptation measures for the protection of the beaches threatened with disappearance.	MEFWA[26], MCST[27], LG[28]
	Integrate adaptation actions to climate into development policy and planning at every level/sector.	All Ministries
	Prepare disaster relief to hazard-reduction programmes	DE[29], MEFWA, IEWE[30]
	Establish new legislation for water use	MEFWA, MA[31]
	Increase the forest area through reforestation, especially on eroded lands and refused agricultural lands (about 40.000 ha).	MEFWA, MA, MF[32], LG
	Energy sector: Increase generation from new, very efficient, combined cycle thermal power plants in order to support the reduction of all HPPs in general and the Drin River Cascade in particular from climate change.	MEE[33], MF
	Planning of the rehabilitation of the Fierza, Komani and Vau and Dejes HPPs (Drin River Cascade) shall take into consideration the climate effect, which will reduce their production and their availability.	
	Planning of the construction of a small hydro power plant shall take into consideration the climate effect.	
	Integration of regional development programmes, plans and policies and climate change concerns in the Drin River Cascade.	
	Planning of the construction of new medium and large hydro power plants should take into consideration climate effect, which will reduce their production and their availability.	

26 Ministry of Environment, Forestry and Water Administration

27 Ministry of Culture, Sports and Tourism

28 Local Government

29 Directorate of Emergency, Ministry of Interior

30 Institute for Energy, Water and Environment, University of Polytechnics

31 Ministry of Agriculture

32 Ministry of Finance

33 Ministry of Economy, Energy

	Establishment of capacities to monitor and respond to the anticipated climate change impacts on the Drin River Cascade at institutional and community levels	
Prevent the effects: structural and technological/engineering solutions	**Modification of existing infrastructure**	
	Modification of the existing reservoirs.	MCTT[34], MA, LG
	Removal of sediments from reservoirs to increase water storage capacity.	MCTT, MA, LG,
	Modification of existing irrigation systems, including pumping stations, water canals, etc.	MA, LG, MCTT
	Controlling and eventually stopping the collection of solid materials from the river beds. (downstream of "Drini i Bashkuar" , below the "Vau i Dejës" dam , riverbed of Gjadri, Drin of Lezha and especially the river bed of the Mati River).	MI[35], MCTT,LG
	Construction of new infrastructure	
	Construction of new irrigation infrastructure.	MA, LG
	Construction of costal infrastructure.	
	• Maintenance or restoration of wetlands, marshlands and dune systems ("Building with nature"). (along the low coast from the Buna Delta to the Mati Delta.	MEFWA[36], MCST, REO[37], LG[38]
	• **Protection of sand dunes and dune management**. (beaches of Shëngjin, Tale and Velipoja).	MEFWA[39], MCST, REO[40], LG[41]
	• Refilling of beaches to hinder further erosion (Shëngjin).	MCTT, LG, MCST
	Additional capital investment for flood protection.	MF, MI, MEFWA
Avoidance or exploitation of changes in risk	**Monitoring of the coastal area** (including monitoring of meteorological, maritime and shoreline indicators, geological surveys, beach profiling, emergency response systems).	IEWE, MEFWA, DE
	Improve monitoring /warning systems for flood and drought.	IEWE,
	Forestry	

34 Ministry of Construction, Transport and Telecommunication

35 Ministry of Interior

36 Ministry of Environment, Forestry and Water Administration

37 Regional Environmental Office

38 Local Government

39 Ministry of Environment, Forestry and Water Administration

40 Regional Environmental Office

41 Local Government

	Establishment of monitoring/warning systems to survey fires, insects, diseases and other disturbances in forests.	IEWE, MEFWA, MA
	Permanent monitoring of the forest health situation, including more important pests and diseases and fertilizer use, implementation of Good Plant Protection Practices and Integrated Pest Management approaches for pests and disease control.	MEFWA, MA
	Agriculture	
	Implementation of practices to conserve moisture (agro-technique measures such as conservation tillage to protect the soil from wind and water erosion; retain moisture by reducing evaporation and increasing infiltration of precipitation into the soil.	MEFWA, MA, LG, individual farmers
	Active participation of farmers through the Water User Associations.	LG, individual farmers,
Research	Inventory of existing practices and decisions used to adapt to different climates	CCUP, different Ministries, LG
	Improvement of weather and seasonal climate forecasts.	IEWE
	Forestry - studies on:	
	An optimum land use plan considering climate change impacts.	EA[42], IEWE
	Extent of erosion and how to combat it.	EA, IEWE, research institutions
	Increasing the erosion protection forest area until it covers 75 % of the total forest area.	
	Projections of the extent of forests and their likely composition changes, to prioritize species and their races to be used in reforestation.	
	Increasing of the protected forest zone areas so as to protect biodiversity.	MEFWA, LG, MA,
	Preparation of management plans to conserve biodiversity, taking into account the likely impacts of climate changes on forestry.	MEFWA, LG, EA, research institutions
	Classification of forests according to a scale of their danger to fire.	EA,MEFWA, LG,
	Identifying the different forest species and provenances, or actual geographical races of the main forest species in different actual climate conditions and their adaptation capacity to the expected climate changes.	EA,MEFWA, LG,
Education, behaviour	**Promotion of stakeholder awareness of the environmental and socio-economic implications** of climate variability and change.	CCUP, MEFWA, REC,

42 Environmental Agency, MEFWA

Education, behaviour	**Increasing public awareness of the need to take individual actions to deal with climate change** *(e.g.,* on health, home protection, landscape protection, biodiversity conservation).	CCUP, MEFWA, REC, NGOs, LG
	Information, communication and training related to the consolidation of extension organizations for irrigated crops, promotion and consolidation of research and extension organizations.	CCUP, MEFWA, REC, LG

MACEDONIA

Table 2. Macedonia. Proposed adaptation policies/measures (Short term- medium and longer term up to 2015)

	Problem identified	Measures	Actions	Responsible party	Time frame	Budget EUR
1	No coverage of climate change issues in strategic development documents	Approximation of strategic development documents from the aspect of climate change	Incorporation of climate change adaptation measures into: • Spatial plan • Agricultural strategic development documents • Strategic and planning documents based on the draft law on waters (development of the national water strategy, finalization of a water master plan and river basin management plans, including a change in the available and necessary water resources due to climate change impact, priority by-laws) • Physical and urban plans • NEHAP[43] • Strategic impact assessment • Action plan on environment and children's health	MOEPP[44], MAFWE[45], MTC[46], MH[47]	2008/09	III

43 National Environmental Health Action Plan

44 Ministry of Environment and Physical Planning

45 Ministry of Agriculture, Forestry and Water Economy

46 Ministry of Transport and Communication

47 Ministry of Health

Measures for identification, assessment and mitigation of climate change negative impact						
2	Data unavailability for all sectors	Continuous data collection, development of databases and their management	Development of a database on extremes (droughts and floods).	HMS[48], MOEPP, MH	2008 – 2010	II
			Preparation of basic maps of RM in GIS format at 1:50 000 scale (soil, vegetation, erosion, eol, etc.).	MAFWE, MOEPP, HMS	2008 – 2010	III
3	Climate change vulnerability	Adaptation measures	Development of an adaptation programme relating to climate change in the forestry sector.	MAFWE	2008 – 2010	
			Production of native species plants and refforestation of 700 ha of bare land/year.	MAFWE, MF[49], MOEPP	2008 – 2010	I
			Identification and introduction of species resistant to climate change, implementation of measures for agricultural support.	MAFWE	2009 – 2015	II
			Introduction of adaptation measures and techniques concerning climate change (organic matter turnover/water protection and agro-techiques) in central Povardarie.	MAFWE, Public water management enterprises	2008 – 2010	II
			Modernization of the irrigation systems in the Tikves and Strumica regions.	MAFWE, Public water management enterprises, scientific community	2008 – 2011	II

48 State Hydrometeorological Service

49 Ministry of Finance

Monitoring

	Problem identified	Measures	Actions	Responsible party	Time frame	Budget EUR
4	Lack of a quality monitoring system for climate change impact in different sectors	Imrovement of the monitoring system	Establishment of a ground water monitoring system (quality and quantity).	HMS, MAFWE, RIHP[50]	2008 – 2011	I
			Establishment of an early warning system in Skopje, due to the harmful effects of weather variables on human health, housed in the RIHP.	RIHP, HMS, MEPP, MAFWE, MH	2008 – 2010	II
			Establishment of an early warning system for floods and droughts.	MOEPP, MAFWE, HMS	2008 – 2010	II
			Enlargement and modernization of the existing network of hydrometeorological stations and introduction of the monitoring of basic soil indicators.	HMS, MAFWE, MOEPP	2008 – 2011	I
			Establishment of a pilot network of mountain meteorological stations in Jakupica with a vertical and slope distribution for biodiversity vulnerability assessment.	HMS, MOEPP	2008/09	II
			Establishment of 5 monitoring stations in forest regions throughout Macedonia for monitoring climate change in forestry.	MAFWE, HMS, MOEPP	2008 – 2009	I
			Monitoring of the status of the upper forest border (vertical and horizontal spreading of the forest species ranges and migration of animals).	MOEPP, MAFWE	2008 –	II

50 Republic Institute for Health Protection

Measures for strengthening capacities at institutional, systemic and individual level

	Problem identified	Measures	Actions	Responsible party	Time frame	Budget EUR
5	Lack of capacities at institutional, systemic and individual levels	Strengthening of capacities at the institutional, systemic and individual levels	Raising climate change to a higher level in the relevant ministries.	HMS, MAFWE, MOEPP	2008	III
			Establishment/strengthening of the relevant structure within the MEPP and other relevant ministries.	MEPP	2008	III
			Providing additional equipment and staff in institutions responsible for environmental monitoring.	All Ministries	2008-	II
			Training and equipment for water management organizations and operators.	Public water management enterprises	2008–2010	II
			Training of institutions and farmers to enable the adoption of the best available practices for climate change adaptation.	MAFWE	2009	III
			Training of national experts for the development of socio-economic scenarios regarding climate change.	MOEPP	2008–2009	III
			Introduction of syllabus programmes on climate change and adaptation within the educational system in RM.	MOEPP, MON	2009	III
			Acceptance of the evidence based best laboratory practice and techniques and strengthening of the existing ones in order to improve the diagnostics and treatment as secondary adaptation measures.	MH, HIF[51]	2008–2015	III
			Establishment of a system for monitoring the status of biodiversity components through the monitoring of the phenology of bioindicator species; defining climate change sensitive species.	MOEPP, NGOs	2008–2009	III

51 Health Insurance Fund

ANNEX 2: ROSTER OF EXPERTS

ALBANIA:

Ermira Fida, MBA, Programme Manager, Climate Change Unit/Program (CCU/P), MoEFWA, Albania

Eglantina Bruci, Prof. Dr., V&A Team Leader, Head of the Climate Research Group, Institute for Energy, Water and Environment (IEWE), Albania

Mirela Kamberi, MSc., Team Leader, GHG mitigation; CCU/P, MoEFWA, Albania

Besim Islami, Dr., Team Leader, GHG inventory, CCU/P, MoEFWA, Albania

Liri Muçaj, Prof. Assoc. Dr., Climatology expert, IEWE; Albania

Vangjel Mustaqi, Prof. Assoc. Dr., Head of Meteorological Department, IEWE, Albania

Spiro Karadumi, Prof. Dr., Forestry expert, Environmental Agency, Albania

Miriam Bogdani, Dr., Hydrology expert, IEWE, Albania

Sabri Laçi, Prof. Dr., Head of the Department of Geography, Faculty of History and Philology, Tirana University, Albania

Thimaq Lako, Dr, Forestry Expert, Albania

BOSNIA AND HERZEGOVINA:

Goran Trbić, Prof. Dr., University of Banja Luka, Faculty of Natural Science; Republic Hydro-Meteorological Institute of the Republic of Srpska, Bosnia and Herzegovina

Martin Tais, Hydrometeorological Institute of the Federation of Bosnia and Herzegovina, Bosnia and Herzegovina

Nada Rudan, Republic Hydro-Meteorological Institute of the Republic of Srpska; Bosnia and Herzegovina

Esena Kupusović, Hydrometeorological Institute of the Federation of Bosnia and Herzegovina, Bosnia and Herzegovina

Hamid Ćustović, Prof. Dr., University of Sarajevo, Faculty of Agriculture, Federation of Bosnia and Herzegovina, Bosnia and Herzegovina

Aleksandar Knežević, Prof. Dr., Faculty of Mechanical Engineering, Federation of Bosnia and Herzegovina, Bosnia and Herzegovina

Petar Gvero, Prof. Dr., University of Banja Luka, Republic of Srpska; Bosnia and Herzegovina

Djordje Vojinović, University of Banja Luka, Republic of Srpska; Bosnia and Herzegovina

MACEDONIA:

Climate and Climate Scenarios

Klemen Bergant Dr., (international expert), Macedonia

Pece Ristevski, M.Sc. Hydro Met Administration, Macedonia

Suzana Alcinova Monevska, M.Sc. Hydro Met Administration, Macedonia

Agriculture

Ordan Cukaliev, Prof. Dr., Faculty of Agricultural Sciences and Food, Macedonia

Dusko Mukaetov, Dr., Institute of Agriculture, Macedonia

Sreten Andonov, Prof., Dr., Faculty of Agricultural Sciences and Food, Macedonia

Pece Ristevski, M.Sc. Hydro Met Administration, Macedonia

Ivan Micev, Dipl. Ing. Faculty of Agricultural Sciences and Food, Macedonia

Biodiversity

Vlado Matevski, Dr. Faculty on Natural Sciences, Institute on Biology, Macedonia

Forestry

Nikola Nikolov, Dr., Faculty of Forestry, Macedonia

Health

Vladimir Kendrovski, Dr. Public Health Institute, Macedonia

Water Resources

Katerina Donevska, Dr. Faculty of Civil Engineering, Macedonia

MONTENEGRO:

Nebojša Jablan, Stock Company "Electricity Distribution of Montenegro", Montenegro

Marina Marković, BA in Economics and MSc in Environmental Sciences, Montenegro

Vasilije Busković, MSc. in Biology, Montenegro

Tatjana Djurčević, Ministry of Tourism and Environment, Montenegro

Biljana Djurović, Ministry of Tourism and Environment, Montenegro

Mirjana Ivanov, Hydrometeorological Institute of Montenegro, Montenegro

Slavica Micev, Hydrometeorological Institute of Montenegro, Montenegro

Nataša Pazin, Hydrometeorological Institute of Montenegro, Montenegro

Sanja Pavićević, Ministry of Tourism and Environment, Montenegro

Zorica Djuranović, Ministry of Agriculture, Forestry and Water Management, Montenegro

Ana Misurović, Center for Ecotoxicological Research, Montenegro

Predrag Novosel, Center for Ecotoxicological Research, Montenegro

Iva Kolinović, Environmental Protection Agency, Montenegro

Milena Bataković, Environmental Protection Agency, Montenegro

Ivana Bulatović, Environmental Protection Agency, Montenegro

Radmila Damjanović, Ministry for Economic Development, Montenegro

Borko Raičević, Ministry for Economic Development, Montenegro

SERBIA:

Zaviša Janjić, NCEP/Serbian Academy of Sciences & Arts/SEEVCCC

Slobodan Ničković, World Meteorological Organization

Borivoj Rajković, Institute for Meteorology, Faculty of Physics, University of Belgrade/SEEVCCC

Milan Dacić, Republic Hydrometeorological Service of Serbia/SEEVCCC

Danica Spasova, South-East European Virtual Climate Change Center/RHMSS

Jelena Cvetković, Ministry of Environment and Spatial Planning

Dragan Jovanović, Republic Hydrometeorological Service of Serbia

Dusan Jović, South-East European Virtual Climate Change Centre

Jelena Popović, South-East European Virtual Climate Change Centre

Boško Telenta, South-East European Virtual Climate Change Centre

Vladimir Djurdjević, Institute for Meteorology, Faculty of Physics, University of Belgrade/SEEVCCC

Goran Pejanović, SEWA Company, Belgrade/SEEVCCC

Miroslava Unkašević, Institute for Meteorology, Faculty of Physics, University of Belgrade

Ivana Tošić, Institute for Meteorology, Faculty of Physics, University of Belgrade

Danijela Božanić, Ministry of Environment and Spatial Planning

Tatjana Savić, South-East European Virtual Climate Change Centre/RHMSS

Vladimir Dimitrijević, Republic Hydrometeorological Service of Serbia

Dragan Mihić, South-East European Virtual Climate Change Centre/RHMSS

Ljiljana Dekić, Republic Hydrometeorological Service of Serbia

Tatjana Komlen, South-East European Virtual Climate Change Centre/RHMSS

Branko Bijelić, Republic Hydrometeorological Service of Serbia

Petar Spasov, Republic Hydrometeorological Service of Serbia

Zoran Krajinović, Republic Hydrometeorological Service of Serbia

Zorica Radičević, Republic Hydrometeorological Service of Serbia

Branko Zivlak, Republic Hydrometeorological Service of Serbia

Aleksandar Prodanović, Water Directorate, Ministry of Agriculture, Forestry and Water Management

Jovan Despotović, Faculty of Civil Engineering, University of Belgrade

Jasna Plavšić, Faculty of Civil Engineering, University of Belgrade

Mihailo Andjelić, Republic Hydrometeorological Service of Serbia

Jasminka Smailagić, South-East European Virtual Climate Change Centre/RHMSS

Miroslava Mihajlović, South-East European Virtual Climate Change Centre/RHMSS

Marija Miladinović, South-East European Virtual Climate Change Centre/RHMSS

Tihomir Popović, Environmental Protection Agency of Serbia

Nikola Marjanović, Public Water Management Company "Srbijavode"

Stevan Prohaska, Institute Jaroslav Cerny, Belgrade

Saša Orlović, Directorate of Forests, Ministry of Agriculture, Forestry and Water Management

Ratko Kadović, Faculty of Forestry, University of Belgrade

Stanko Konstadinov, Faculty of Forestry, University of Belgrade

Mirjana Ocokoljić, Faculty of Forestry, University of Belgrade

Radmilo Pešić, Faculty of Agriculture, University of Belgrade

Dragutin T. Mihailović, Faculty for Agriculture, University of Novi Sad

Branislava Lalić, Faculty for Agriculture, University of Novi Sad/SEEVCCC

Ilija Arsenić, Faculty for Agriculture, University of Novi Sad/SEEVCCC

Dragana Milovanović, Ministry of Agriculture, Forestry and Water Management, Republic Directorate for Water

Miroslav Malešević, Ministry of Agriculture, Forestry and Water Management, Republic Directorate for Water

Elizabet Paunović, Ministry of Health

Ana Šijački, Faculty for Medical Sciences and Urgent Center, University of Belgrade

Nada Macura, Institute of Public Health of Belgrade

Dragan Katanić, Faculty for Medical Sciences, University of Novi Sad, Institute for Health of Children and Young People

Rade Babović, Institute for Urgent Medical Help, Sombor

Orena Dželetović Milošević, Institute of Public Health of Belgrade

Tioslav Petković, Republic Hydrometeorological Service of Serbia

Branislava Kapor, Republic Hydrometeorological Service of Serbia

Nena Kovačević, Republic Hydrometeorological Service of Serbia

Dragan Malošević, Republic Hydrometeorological Service of Serbia

Slavimir Stevanović, Republic Hydrometeorological Service of Serbia

Samir Ćatović, Republic Hydrometeorological Service of Serbia

Borjanka Palmar, Republic Hydrometeorological Service of Serbia

Srdjan Marjanović, Republic Hydrometeorological Service of Serbia

Bojan Palmar, Republic Hydrometeorological Service of Serbia

Ivica Nikolić, Republic Hydrometeorological Service of Serbia

Vladan Kocić, Republic Hydrometeorological Service of Serbia

Katica Canić, Republic Hydrometeorological Service of Serbia

Nada Pavlović Berdon, South-East European Virtual Climate Change Centre/RHMSS

Jasna Kolaček, Republic Hydrometeorological Service of Serbia

Dragan Djukić, Republic Hydrometeorological Service of Serbia

Ivica Radović, Ministry of Environment and Spatial Planning

Vladimir Stevanović, Faculty of Biology, University of Belgrade

Dmitar Lakušić, Faculty of Biology, University of Novi Sad

Milutin Pantović, Ministry of Environment and Spatial Planning

Aleksandar Vasiljević, Public Company "Srbijašume" (forestry)

Saša Stamatović, Ministry of Agriculture, Forestry and Water Management

Aleksandar Bogunović, Ministry of Agriculture, Forestry and Water Management

ANNEX 3. IDENTIFIED PROJECT IDEAS

1. Project Concept	
Project title	**Development of a Regional Climate Change Action Plan for SEE (CCFAP) with prioritised adaptation measures**
Location	South-Eastern Europe
Project goals	• The primary goal of this project is to assist the SEE countries in the Development of a Detailed Regional Climate Change Action Plan for SEE (CCFAP) with prioritised adaptation measures, which could be helpful to the countries and communities in addressing adaptation to climate change; this Action Plan will include a proposal of priority adaptation measures and projects, and will provide a sustainable path forward for the beneficiary SEE countries. • To assist the Ministries of Environment in setting up priorities in adaptation to climate change through a regional cross-border project endorsed by the countries in the REReP and its implementation within the REReP; • To maintain the coordination of donors in the implementation of REReP regional projects in the field of climate change.
Project activities	• Identification of the key stakeholders; establishment of regional technical teams for scoping and designing a V&A study and assessments and strategy development. • Assessment of weaknesses, needs and proposed measures in observation, research and modelling to gain an in-depth understanding of the impacts and characteristics of vulnerabilities within the priority sector/system under current and future climate conditions. • Assessment of weaknesses, needs and proposed measures in the characterization of the nature and scale of future climate risks in priority sector(s)/system(s), including evaluation of actual adaptive measures. • Preliminary assessment of the opportunities and barriers in priority sectors/systems to adapt to projected changes and the implications for sustainable development and other national priorities in the SEE regions. • Priority list of cross-border adaptation policy actions and measures which will serve as the primary basis for the formulation of adaptation projects to be supported by various donors and adaptation funds. • Adaptation of the SEE Climate Change Action Plan as the portfolio of sub-regional cooperation in the field of climate change and cross-border policies, programmes, and projects generating knowledge/output data to inform national/ sectoral adaptation planning.
Beneficiaries:	Countries: Albania, Bosnia-Herzegovina, FYR Macedonia, Montenegro, Serbia
Duration:	15 months
Preliminary budget	975,000 EUR

2. Project Concept proposed by Serbia	
Project title	SEE/CCFAP-A: SUB-REGIONAL PROGRAMME 2/ STRATEGIC FOCUS: Climate Change and Water Resources Management: **Development of tools and skills for assessing adverse impacts of climate change on water resources, and the formulation of adaptation strategies for water resources management in the SEE countries**
Location	South-Eastern Europe
Project goals	The primary goal of the proposed project is to assist the SEE countries in developing/using adequate tools and strengthening the existing capacities/know-how for: • Assessment of climate change impact on the water resources regime in the region, including ground and surface water quantity and quality; • Identification of uncertainties and risk factors in managing water resources in the basins likely to be altered in significant ways by climate change; • Formulation of adaptation strategies and measures for an integrated water resources management in vulnerable river basins of the region in line with the EU WFD.
Project activities	Key project activities will focus on: • Identification of vulnerable areas and river basins in the SEE region likely to be adversely affected by climate change; • Collection of water resources/hydrological, meteorological, water use, and other data from the selected areas/river basins and the creation of a database; • Selection of climate and hydrological models to be used for (a) downscaled simulation of plausible future climate change scenarios and (b) defining hydrological response of the selected areas/river basins to the simulated climate change scenarios; • Running selected climate and hydrological models in all the selected river basins; • Assessment of impacts on water resources in the SEE region; • Establishment of the degree to which various areas/river basins in the SEE region are susceptible to, and unable to cope with, the adverse effects of climate change; (by, for example, assigning an adequate 'vulnerability index' to each analyzed area/river basin); • Presentation of the results of the analysis to key stakeholders in the water sector and the general public and raising awareness of the looming water stress; • Assisting stakeholders in the water sector and the SEE governments in formulating adaptation strategies for an integrated water resources management in the vulnerable river basins; • Assisting in the planning of the measures/focused actions in the SEE region aimed at improving water resources management in the vulnerable river basins, in line with the formulated adaptation strategies; • Intensive training – on-the-job and through specialized courses and workshops - of hydrologists, climate specialists and water specialists/managers of SEE in the following specialized fields: data management, use of advanced downscaled climate models, hydrological modelling and use of hydrological models in simulating river basin response to climate forcing, water uses, the principles of integrated water resources management in river basins under water stress, techniques for improving dialogue with stakeholders and raising public awareness, and the related areas of expertise.
Beneficiaries:	The Governments of the SEE countries, especially policy makers and managers in the water sector as well as the general public in these countries.
Duration:	24 months
Preliminary budget	2,000,000 €

3. Project Concept proposed by Montenegro and Serbia	
Project title	SEE/CCFAP-A: SUB-REGIONAL PROGRAMME 3/ STRATEGIC FOCUS: Climate Change and Agriculture and Forestry **Forest-Fire Limited Area Modelling System: Development of a Pilot Pre-operational System**
Project acronym	**FLAMES**
Geographic region of interest	South-Eastern Europe
Name of the lead partner institution	The Ministry of Interior Affairs and Public Administration of Montenegro (Sector for Emergency Situations and Civil Protection)
Project partners (development of a model and its implementation)	– Hydrometeorological Institute of Montenegro – Republic Hydrometeorological Service of Serbia – Research Group for Geophysical Modelling (RGGM)
Rationale and proposed approach	Forest fires are the one of the disasters causing enormous economic and ecological damage. It is estimated that in the year 2000 alone, 350 million hectares of forests and woodlands were destroyed by fire. The occurrence of forest fires is increasing as a result of climate change. Forest fires are affecting larger areas and becoming more severe in several regions of the world, including southern Europe. The key component of fire management and of providing early warnings is the establishment of systems for the prediction of the behaviour of a fire. In order to predict the time evaluation of the fire perimeter and thus to assist operators to suppress fire spread, operational modelling prediction systems should be used. Modelling of wildfires is a multi-scale multi-physics problem. Due to the highly complex non-linear character of the fire process, most of the currently employed numerical fire-spread models still implement rather crude empirical approximations instead of using full physically-based parameterizations.
Major project objective	The major objective of the proposed project is to develop and implement a pilot dynamically-based modelling system with the atmospheric and fire components fully coupled and integrated. A key driver for the simulated process is the near-surface wind conditions, provided by the atmospheric forecasting model. This coupled atmosphere-fire model will be based on the numerical solution of the energy (heat) balance and fuel combustion components, the effects of the land cover and the influence of topography.

Specific project objectives	Technological part • To adapt a high-resolution atmospheric model (the NCEP/NMM model, which is used for operational forecasts in the United States) for the geographical domain relevant for the project; • To extend the surface temperature equation in NMM with the following process components relevant for wildfire forecasting: horizontal advection and diffusion and topography forcing; • To introduce a new equation into the NMM for the surface biomass fuel consumption; • To integrate the atmospheric and fire components into a unified Limited Area Modelling System (FLAMES); • To select 2 – 3 major wildfire events in the region of interest; to collect detailed observation evidence on the fire time evolution in these events; • To perform numerical model experiments for the selected fire events; • To install the model software and implement it in the met offices in Serbia and Montenegro for further pilot testing; • To prepare software support capable of activating and executing FLAMES within a short time for future operational exploitation. Coordination part • To coordinate activities of the participating partners; • To care about the timely release of the project deliverables; • To be responsible for producing progress and final reports; • To provide general administrative support to partners; • To represent the project consortium in communication with donor and other organizations relevant for the project.
Beneficiaries	Users of this system would be the services for fire protection of forest resources, the fire extinguishing services, warning and alarm agencies, national parks, the general public through official information *via* the mass media.
Duration	36 months
Proposed budget	400.000 EUR, to cover the costs for manpower, travel, administration and equipment

4. Project Concept proposed by Macedonia	
Project title	SEE/CCFAP-A: SUB-REGIONAL PROGRAMME 2/ STRATEGIC FOCUS: Climate Change and Water Resources Management: **Development of the methodology for ground water vulnerability assessment under climate change conditions at the regional level**
Location	South-Eastern Europe
Project goals	The primary goal of the proposed project is to improve capacity and increase the understanding and knowledge about the vulnerability and adaptability of ground water system, and to enhance preparedness for climate change.

Project activities	• Development of methodology and quantitative / quantitative criteria for the assessment of ground water vulnerability to climate change • Execution of pilot measurements in the most vulnerable areas in the region; • Definition of long term country-specific and regional monitoring programmes with cost estimates.
Beneficiaries	The governments of the SEE countries, especially policy makers and managers in the water sector, as well as the general public.
Duration	1.5 year
Preliminary budget	800.000 EUR

5. Project Concept proposed by Macedonia	
Project title	SEE/CCFAP-A: SUB-REGIONAL PROGRAMME 2/ STRATEGIC FOCUS: Climate Change and Water Resources Management: **Water Framework Directive – the main driver to address climate change impact**
Location	South-Eastern Europe
Project goals	Successful adaptation measures to climate change will depend on the extent to which the issue is integrated into the implementation of national and European water regulations and other sectoral policies. The main goal of this project is to create a consistent adaptation framework mainstreamed through existing instruments dealing with water policy (WFD, Groundwater Directive, Flood Directive) and to incorporate the measures to cope with climate change in the first planning cycle (first River Basin Management Plans) through a common and integrated approach.
Project activities	1. Early policy activities • Assessment of the strengths and weaknesses of current policies and regulations, identifying information gaps, uncertainties and where future challenges and priorities might lie; • Mainstreaming climate change impacts into existing strategy and policies for water availability, flooding, water quality and other water related issues; • Reorentante water policies to integrate water demand management into all sectoral policies; • Introduction of policy-aimed cross-border cooperation as an opportunity for a common solution to water management, flood control and the prevention of natural hazards; • Identification of cross-cutting conclusions which are applicable across all sectors; • Identification of potential conflicts between sector policies and adaptation needs, and making the different policies consistent with each other; • Creation of a common reporting mechanism to communicate all results achieved within national impact assessments.

	2. Capacity building, awareness raising and training activities • Improvement of general awareness of all players on climate change trends and impacts, for a better targeting of measures and achieving "win - win" solutions; • Open dialogue on climate change impact and emerging best practices; • Awareness raising in changing unsustainable production and consumption patterns and the introduction of water demand management in all sectors; • Shared understanding of climate change impact and adaptation through the dissemination of information, training and discussion process; • Work on a Science/Policy link
Beneficiaries	All SEE counties
Duration	1.5 years
Preliminary budget	1,500,000 EUR

6. Project Concept proposed by Macedonia	
Project title	SEE/CCFAP-A: SUB-REGIONAL PROGRAMME 3/ STRATEGIC FOCUS: Climate Change and Agriculture and Forestry **Agriculture as a Victim of Climate Change and as a Contributory Factor to Climate Change**
Location	South Eastern Europe
Project goals	Identification of known and future possible effects of long-term climate change on agriculture and adaptation of new agricultural practices in response to the changed conditions, as well as increasing farmers' ability to cope with variability.
Project activities	• Encouragement of a "no-regret" approach to agricultural development-options that increase agricultural efficiency and flexibility under the current and future conditions and build up farmers' capacity to adapt to long-term change; • Promotion of farming practices that withstand climate variability – the use of drought resistant crop varieties or more efficient use of water resources; • Encouragement of farmers to reduce excessive use of nitrogenous fertilizers (introducing a nitrate legislation -Directive 91/676/EEC) • Introduction of good farming practices – soil and water conservation, soil cultivation, pest and manure management); • Encompassing environmental requirements related to climate change and incentives.
Beneficiaries	All SEE counties
Duration	1 year
Preliminary budget	800,000 EUR

7. Project Concept proposed in accordance with the WMO recommendation (The WMO document "Strengthening the Hydrometeorological Services in South Eastern Europe" undertaken in the context of SEEDRMAP's first focus area)	
Project title	SEE/CCFAP-A STRATEGIC FOCUS: CONTINUOUS CONTINUOUS UPDATE ON SEE CLIMATE CHANGE PERSPECTIVE – URGENT ACTIONS **Modernization of Hydrometeorological Services in the South-Eastern Europe countries**
Geographic region of interest	South-Eastern Europe
Name of the lead partner institutions	NMHSs of Albania, Bosnia and Herzegovina, FYR Macedonia and Serbia
Project partners (development of a model and its implementation)	Hydrometeorological Services of: – Albania – Bosnia and Herzegovina – FYR Macedonia – Montenegro – Serbia
Rationale and proposed approach	The UNFCCC has recognized the importance of research and systematic observation to reduce uncertainties regarding the effects of climate change and vulnerability assessment and responses to it, i.e., adaptation to climate change. As part of this recognition, the World Meteorological Organization undertook the activities (Regional Project on the Strengthening of the Hydrometeorological Services in South-Eastern Europe) to identify the NMHSs priority capacity-building needs and identify gaps in the observation systems of SEE, regional, forecasting and warning systems for natural hazards and climate extremes, data exchange and management systems. The WMO Project Report highlighted the urgent need for modernization of the SEE NMHSs, as well as its strengthening of human resources.
Major project objective	The major Project objective focuses on strengthening the whole process of each NMHS, as part of the regional network, to a level where each NMHS can produce both adequate data and information for civil protection, disaster risk and emergency management efforts nationally and regionally, and provide adequate data for the global climate change scienctific community, in order to improve global, regional and local weather and climate forecasts, climate change projections, impact, vulnerability and adaptation assessment and climate related disasters risk management. Through this modernization, the capability of the NMHSs to produce better climate services for their communities, in order to promote socio-economic development and adaptation to climate change, will also be significantly improved. In addition, the improvements will give NMHSs the basis for sustainable development and harmonization with EU meteorological and hydrological infrastructures.

<table>
<tr><td>Specific project objectives</td><td colspan="2">The Project will provide for the modernization of the main components and infrastructure of the NMHSs in the SEE countries, particularly in:
• Observation systems (meteorological, hydrological, maritime and environmental observation networks, remote sensing networks, equipment and instruments calibration and maintenance);
• Communication system (data collection and distribution/sharing systems);
• Data management systems;
• Data processing and forecasting systems, including seasonal forecast;
• Climate monitoring, forecasting and projection systems;
• Weather and Climate Watch and Warning Systems;
• Training the SEE NMHSs managers, scientists and other technical staff in good management and specialized fields of the activities of the NMHSs.</td></tr>
<tr><td>Beneficiaries</td><td colspan="2">National Meteorological and Hydrological Services of SEE Countries:

– Albania
– Bosnia and Herzegovina
– FYR Macedonia
– Montenegro and
– Serbia</td></tr>
<tr><td>Duration</td><td colspan="2">5 years</td></tr>
<tr><td rowspan="7">Proposed budget</td><td colspan="2">Investment Plan (in euros) according to WMO recommended investments</td></tr>
<tr><td>Serbia</td><td>8,208,000</td></tr>
<tr><td>Montenegro</td><td>7,882,000</td></tr>
<tr><td>Bosnia and Herzegovina</td><td>8,849,000</td></tr>
<tr><td>FYR Macedonia</td><td>10,613,000</td></tr>
<tr><td>Albania</td><td>8,239,000</td></tr>
<tr><td>Total</td><td>43,791,000</td></tr>
</table>

<table>
<tr><td colspan="2">8. Project Concept proposed in accordance with the WMO MEDARE Initiative and UN/ISDR SEEDRMAP</td></tr>
<tr><td>Project title</td><td>SEE/CCFAP-A STRATEGIC FOCUS: CONTINUOUS UPDATE ON SEE CLIMATE CHANGE PERSPECTIVE – URGENT ACTIONS
Data Rescue in the Western Balkan Region</td></tr>
<tr><td>Location</td><td>South-Eastern Europe</td></tr>
</table>

Project goals	The overall objective of this project is: • Presevation of historic climatological, hydrological, oceanographic and related data for the region by converting them into more stable media while they are still accessible; • Preparation of high quality, historical databases, making them available for sophisticated regional climate impact research, climate watch and climate related hazard risk management.
Project activities	Key project activities will focus on: • Locating all existing documents concerning regular instrumental meteorological and hydrological observations made in the region under consideration; • Inventory and image of data sources, including the quality of sources, codes, methods, rules of observations, etc. • Preparation of the Minimum Quality Control Standard (according to WMO guidelines), which should be applied to digitized data; • Preparation of a common strategy concerning imaging, select hardware and software as well as the format in which the pictures should be stored; • Purchase of common hardware and software, and train staff; • Digitization of current and past data into a computer compatible form for easy access and complete time series for selected climatological elements for available climatological stations in the region; • Collection of metadata information for selected historical stations. (photographs, maps, plans and descriptions of instruments, if they exist, should be included in the metadata files. Information concerning relocations of a station should be confirmed by the local authority agencies); • Preparation of guidelines for the provision of proper data archiving (both by imaging and digitalization) as the main task of data rescue in support of the study of the climate issue; • Merging the common metadata inventory with observational data and make them available through the project web site.
Beneficiaries:	The NMHSs of SEE countries: Albania, Bosnia and Herzegovina, Macedonia, Montenegro and Serbia
Duration:	36 months
Preliminary budget	2,500,000 EUR

9. The Sava Project Concept Paper	
Project title	SUB-REGIONAL PROGRAMME 2/ STRATEGIC FOCUS: Hydrological Forecasting and Water Resources Management: **Development & Upgrading of Hydrometeorological Information and Flood Warning/Forecasting System in the Sava River Basin (SRB)**
Location	South-Eastern Europe (Riparian States of the SRB)

Project goals	Primary goals of the proposed project are to assist the Sava River Basin countries to: • Improve hydrological and meteorological real-time data collection systems as appropriate in the SRB; • Reach and put in force cooperation agreements on data sharing and operational data exchange protocols and procedures in the Sava River Basin; • Establish a comprehensive, decentralized and spatially distributed hydrological data base and information system and develop a state-of-the-art hydrological forecasting system capable of producing flood forecasts and flood warnings, with the increased timeliness and accuracy, in each riparian country of the Sava River Basin.
Project activities	Key project activities will focus on the production of the following main project outputs: OUTPUT 1: Common standards for equipping the stations in the network and field measurements of hydrological and meteorological parameters, including data transmission to the national centres, established, tested and in use in each riparian state and the Sava River Basin as a whole. OUTPUT 2: Network the hydrological and meteorological stations in the whole basin, designed, constructed and/or refurbished, equipped as appropriate and commissioned for regular use in each riparian state and in the Sava River Basin as a whole. OUTPUT 3: Communication protocols and procedures for real time data and information exchange between observing stations and each NMHS, between NMHSs in the SRB and the Sava Commission, as well as a public website containing appropriate data, information and flood warnings for users, established and in regular use in the entire Sava River Basin. (Setting up an integrated real time hydrometeorological and flood forecasting information system in the SRB.) OUTPUT 4: A comprehensive database system containing historical and real-time hydrological, meteorological and other related data time series and GIS spatial layers - as necessary for data processing, analyses, modelling, forecasting and river basin management in line with WFD - developed and/or upgraded, installed, tested and commissioned for regular use in each riparian state. OUTPUT 5: Hydrological forecasting system – which includes state-of-the-art rainfall-runoff and flood routing models, coupled with meteorological rainfall information and forecasting products in an integrated system for river flow simulation and hydrological forecasting at the key profiles in the Sava River Basin – developed, calibrated, tested, installed and commissioned for regular use by the NMHS of each riparian country. OUTPUT 6: National hydrological forecasting centres (NHFC) set up, or the existing ones strengthened, in each riparian country, equipped and staffed as appropriate and the staff trained to cope with all tasks concerned with the operation, maintenance and regular updating of a real-time database, and the commissioned, integrated river flow simulation and hydrological forecasting system.

Beneficiaries:	The primary target beneficiaries of the project are the NMHSs of the Sava riparian states and the ISRBC. However, the beneficiaries are also the numerous stakeholders and users of hydrological and meteorological data, information and hydrological forecasting products and in this context of the project outputs. These include, but are not restricted to, the following government authorities, business community, and national economy in general as well as the general public and the media in the Sava River Basin and beyond: • National environmental agencies; • Ministries of Defence, Environment, Energy, Spatial Planning; • Ministries of Transport (river navigation); • Forestry, civil engineering organizations; • Water resources management agencies; • Flood protection and defence authorities and organizations; • Power-supply industry (hydro, thermal and nuclear power plants); etc., etc.
Duration:	4 years
Preliminary budget	15,610,000 EUR

10. GCOS Downscaling and modelling - Project Concept proposed by Serbia	
Project title	SEE/CCFAP-A STRATEGIC FOCUS: CONTINUOUS UPDATE ON SEE CLIMATE CHANGE PERSPECTIVE – URGENT ACTIONS **Capacity Building in Climate Modelling and Regional Downscaling and Employed Integrated Impact Model – A Proposal for Sub-regional Workshops**
Location	South-Eastern Europe
Project goals	• To enhance the capabilities of National Meteorological and Hydrological Services (NMHSs) in regional climate modelling and climate scenario development; • To provide modern tools for vulnerability assessment in the most vulnerable sectors in support of the implementation of the United Nations Framework Convention on Climate Change (UNFCCC); • To establish a network of specialists from the NMHSs and V&A specialists of participating countries, trained to apply a regional climate model as one of the tools for downscaling the results of global climate models, to be further employed in climate impact assessments; • To reduce uncertainties with regard to the timing, magnitude and regional patterns of climate change.

Project activities	• Organization of 7 regional one week training workshops; • Conduct inter-comparison analyses in applying various regional climate models and other downscaling techniques aimed at potentially reducing the uncertainties still remaining in climate change projections; • Development of guidelines and preparation of technical documentation for training courses in using regional climate models and other downscaling techniques and modern tools for impact and vulnerability assessment; • To provide modern tools (software, relevant data sets, etc.).
Beneficiaries:	National Hydrometeorological Services, national authorities responsible for adaptation strategies and UNFCCC implementation, the climate research community and V&A national specialists.
Duration:	24 months
Preliminary budget	600,000 EUR

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