

MOUNTAIN ADAPTATION OUTLOOK SERIES

Outlook on climate change adaptation in the Western Balkan mountains



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Lake Skadar, Montenegro

Foreword

Mountain ecosystems enrich the lives of over half of the world's population as a source of water, energy, agriculture and other essential goods and services. Unfortunately, while the impact of climate change is accentuated at high altitude, such regions are often on the edge of decision-making, partly due to their isolation, inaccessibility and relative poverty.

That is why The United Nations Environment Programme and GRID-Arendal have partnered on a series of outlook reports about the need for urgent action to protect mountain ecosystems and to mitigate human risk from extreme events. Covering the Western Balkans, Southern Caucasus, Central Asia, (tropical) Andes and Eastern Africa, the reports assess the effectiveness of existing adaptation policy measures and the extent to which they apply to mountain landscapes, going on to identify critical gaps that must be addressed to meet current and future risks from climate change.

The result of a broad assessment process involving national governments and regional and international

experts, the reports offer concrete recommendations for adaptation. This includes sharing regional good practices with the potential for wider replication to improve cost efficiency and adaptation capacity.

While each of the regions is covered in a dedicated report, they all face similar issues. On one hand, rising temperatures and changing precipitation patterns affect a range of mountain ecosystems, including forests, grasslands and lakes. On the other, drivers such as pollution from mining and unsustainable agriculture erode their ability to cope with these changes. The combined impact is increasing vulnerability among the local and downstream populations who depend on mountain ecosystems – especially when they are isolated from markets, services and decision-making institutions.

This report explores the Western Balkans, which is a mountainous region stretching across Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia and Kosovo.¹ Climate change

is already having an impact on the region and the mountains are a hotspot for hazards like flooding from intense precipitation and accelerated snowmelt or the growing frequency and intensity of wildfires. These increase the risk to the economy and livelihoods, mortality and morbidity, public safety, ecosystem functions and species loss, as well as reducing energy security through water scarcity.

The analysis concludes that a stronger policy focus is needed for the mountains of the Western Balkans to address key climate risks. The good news is that there are multiple opportunities and relatively cost-efficient measures, such as ecosystem-based adaptation, that can be implemented, and the report includes a gap analysis highlighting specific areas where policy coverage or coordination can be improved.

We hope that this report will serve as a practical companion for local, regional and national policy makers seeking to protect fragile mountain ecosystems and the people who depend on them.



Achim Steiner
UNEP Executive Director and Under-Secretary-General of the United Nations

A handwritten signature in black ink, appearing to read 'Achim Steiner'.



H.E. Andr  Ruppachter
Austrian Federal Minister of Agriculture, Forestry, Environment and Water Management

A handwritten signature in black ink, appearing to read 'Andr  Ruppachter'.

Executive summary

The Western Balkans is a mountainous region and a hotspot of climate change. Over the past decades, warming has accelerated, and throughout the 21st century it is projected to be higher than the world average. The observed changes in precipitation over the past few decades are less clear, but almost all climate models agree the countries within the region will experience a significant decrease in precipitation within the 21st century, accompanied by an increase in drought conditions and therefore water availability. Annual flow reductions in the regions' rivers of up to 15% are projected for 2°C warming above pre-industrial levels, and by up to 45 per cent in a 4°C world. Overall, climatic extremes are projected to become more common, including a significant increase in the number of extreme heat events. Heavier precipitation events are expected in the winter months, whilst summers are projected to become even drier.

Many of the impacts will be manifested in the mountain regions and their downstream areas. Mountain-specific climate hazards include reduced snow cover (up to 50 days less by 2050 across the Dinaric Arc); increasing occurrence of winter and spring flooding from intense precipitation and accelerated snowmelt; increases in the frequency and intensity of wildfires; heavy snow precipitation and cold extremes; the appearance of new disease vectors; and decreasing annual river discharge and low flow periods. Many of these impacts are not only a future issue, but also a present-day concern. The catastrophic flooding in Serbia and Bosnia and Herzegovina in 2014, and regularly occurring

extreme heat events and wildfires across the region are some recent examples.

In the absence of adequate adaptation measures, key risks for the region arising from these hazards include economic and livelihood losses, increased mortality and morbidity, decreased public safety, impaired ecosystem functioning and the loss of species, and decreased energy security through water scarcity.

At present, relatively few sectoral policies or strategies adequately integrate goals and measures related to climate change adaptation, despite these sectors being highly exposed to and vulnerable to climate change. Furthermore, mountainous areas are rarely taken into account.

Many of the key risks arising from climate hazards in mountainous regions identified in this assessment cut across several sectors. This assessment has analysed these existing sectoral policies to the extent to which can they address the most pressing climate change-related risks, and whether they generate positive effects for the socio-economic system and local communities. Gaps exist for most of the key climate risks identified. The most common gaps include inadequate policy coverage at different scales (e.g. regional, national and local); a lack of institutional coordination (including mechanisms) across sectors; a lack of or limited vertical integration from the EU to local administrations; and limited or low financial capacities to finance adaptation measures. In some cases, no policies exist to address existing or future risks.



Wildfire on the outskirts of Dubrovnik, Croatia



In many cases, policies are better suited to existing (or static) conditions rather than preparing for future changes. Although the situation varies greatly between countries, some sectors represent positive exceptions with policies that contain forward-looking elements for adaptation. Policies pertaining to water and flood management, forests and biodiversity, and energy appear to be the most effective in this regard. Several good examples of adaptation in action exist within the region that can be replicated, including trans boundary flood and water management, urban adaptation initiatives, early drought monitoring, and heat wave early warning systems.

The countries of Western Balkans need to improve their existing policy frameworks in order to address current and future adaptation needs, given the existing and future vulnerability of the region to climate change. Besides the fact that EU standards are a requirement in some cases, the EU integration process presents an opportunity, as well as sources of good examples, to further improve and harmonize the policies towards adaptation goals. One good example is the EU Floods Directive, which takes into account future climate impacts and provisions for regular methodological updates and revisions according to the latest scientific information on climate change. The EU Water Framework Directive is another example, which supports an integrated approach to water and drought risk management.

At the same time, a stronger mountain focus is needed for adaptation policies, as most existing policies in the

Western Balkan countries fail to address mountain issues specifically, with only a few exceptions (e.g. winter tourism). Essential to this task is the design, collection and monitoring of mountain-specific data on climate change trends and risks.

Sub-regional coordination and transnational synergies should be strongly promoted, with a specific focus on mountain environments. Processes such as the Dinaric Arc Initiative could be strengthened and built upon. Policy-makers should consider a sub-regional approach to investments (including climate-proof measures) in prevention and preparedness in various sectors to avoid duplications and improve coordination. Sub-regional adaptation strategies and plans would thus further ensure sustainability at national level.

Recommendations

In complying with UNFCCC obligations and reporting requirements, the countries of the Western Balkans have already demonstrated an increased knowledge and awareness of, and action on, climate change risks and adaptation. Nevertheless, enhanced action towards climate change and adaptation in mountain regions remains crucial, both at the policy and technical levels.

1) Promote the design, collection and monitoring of mountain-specific data on climate change trends/risks.

There is currently insufficient access to relevant disaggregated climate/environmental data on mountains in the Western Balkans, although this is essential for informed decision-making and the development of appropriate policies and actions. Specific actions could include developing dedicated national and regional data monitoring programmes for climate change risks and adaptation in mountains.

2) Give a stronger mountain focus to adaptation policies.

Most existing policies in the Western Balkans fail to address mountain issues specifically, with only a few exceptions (e.g. winter tourism). Specific actions that could be taken include (i) acknowledging the important contribution of mountain ecosystems'

goods and services to the sustainable development of the Western Balkans (e.g. through tourism, energy provision and water security); (ii) increasing awareness of the socioeconomic and environmental impacts that climate change and natural disasters have on human well-being, both in mountain and downstream environments (e.g. flooding) and (iii) developing adaptation actions with a stronger mountain focus. These actions should be built on a solid foundation of accessible data for informed decision-making.

3) Improve policy evaluation.

Expected outcomes from policy focus areas – defined using quantitative indicators – should be agreed upon, which would allow progress to be monitored against the objectives and improve policy performance evaluation. Where appropriate, priority should be given to the implementation of existing laws and policies, rather than to the development of new legislation.

4) Implement no-regret measures and avoid maladaptation from the outset.

For action towards a more resilient West Balkan region, it is imperative that policymakers adopt an approach that avoids maladaptation and embraces no-regret measures, especially in the case of limited budget and capacities. No-regret measures imply,

among other things, relatively inexpensive actions such as awareness-raising of climate change among local communities and stakeholders in charge of the most pressing policies such as disaster risk management/reduction, as well as the adoption of innovative means, such as insurance schemes and financial tools. This also includes capacity-building measures.

5) Promote ecosystem-based approaches to adaptation in mountains.

Resilient ecosystems can help curb the impacts of climate change and natural hazards. Ecosystem-based adaptation (EbA) encompasses a range of low-cost options which promote the sustainable use of natural resources while planning for and adapting to changing climate conditions, which can benefit communities in mountainous and downstream areas.

6) Support the development of sustainable solutions and practices in the fields of water, tourism, renewable energy and energy efficiency in mountain areas,

which in turn will also provide benefits for climate change adaptation and disaster risk reduction. The needs of men, women and specific vulnerable groups should be considered.

7) Further harmonize national legislation with relevant EU laws and policies.

In view of progressive integration into the EU, national legislation should be further improved and harmonized with the relevant directives, such as the EU Floods Directive and the EU Water Framework Directive, that take into account future climate impacts and provide regular methodological updates and revisions according to the latest scientific information on climate change.

8) Increase regional coordination and cooperation on climate change adaptation.

Subregional coordination and transnational synergies should be strongly promoted. Policymakers should consider a (sub)regional approach for investments in prevention and preparedness in various sectors to avoid duplications and improve coordination. Subregional adaptation strategies and plans would further ensure sustainability at the national level. The EU Stabilisation and Association Process and its Regional Environmental Network for Accession could become the organizing focus for a regional approach to adaptation. Any new scheme designed to coordinate and promote regional approaches on adaptation would do well to take into account the wide array of organizations, programmes, projects and activities already in place to move the Western Balkans towards a climate-proofed future.

9) The Alpine Convention and the Carpathian Convention can provide a source of inspiration and act as a potential model for regional cooperation and action on mountains in the Western Balkan countries.

UNEP could provide the forum to assist in the development of a (sub)regional approach to climate change and adaptation in the Western Balkan Mountains. A strengthened regional co-operative approach could provide a platform for the design and implementation of regional climate change adaptation strategies/action plans, prioritized action in targeted sectors, and exchange of knowledge and information (including local adaptation knowledge and guidelines), further contributing to the implementation of global Multilateral Environmental Agreements (MEAs) and agreements including the UNFCCC, Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCCD), as well as the Sustainable Development Goals (SDGs).

The Western Balkans region



Introduction

The Western Balkans is a designation used (most commonly by the European Union) for a region which includes Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia and Kosovo.¹

The region, considered mountainous in its own right,² includes the Dinaric Arc mountain range, which stretches across Albania, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, and Kosovo.¹ Mountains and the complex terrain of the region have contributed to shaping this region, forging strong local identities and, with external influences, producing a complex matrix of several languages, religions, and world views. The region retains some of Europe's richest areas with regards to natural habitats, biological diversity, karst phenomena and lakes and rivers.

With the exception of Albania, all the countries of the Western Balkans were formerly part of the Socialist Federal Republic of Yugoslavia, which dissolved in 1991. While the rest of emerging Europe transitioned peacefully out of communism and into democracy, many Western Balkans countries spent the 1990s engulfed in conflict following this disintegration, which caused widespread devastation, delayed the countries' economic transformation and has resulted in markedly lower living standards compared with the EU countries. Yet in the 2000s, these countries all made impressive gains in rebuilding their war-torn economies and transitioning to market economies.

Today, the countries of the Western Balkans are at a turning point in the development of their economies, societies and environment. A number of social, economic and other drivers will shape the region's future. Integration with the European Union and EU accession are the principal objectives for countries in the region (Croatia having joined in 2013), in the hope that they will bring security, stability and prosperity to the peoples of the region. Closer integration with the EU will strongly influence environmental and climate policies, laws and actions in the coming decades.

The region as a whole faces similar environmental problems, which need to be tackled both within the countries themselves and across borders. There are legacy issues related to war, former industrial and mining sites, illegal dumping of waste, and the extraction of minerals. Improving air quality, the protection and use of water bodies, the conservation of biodiversity and the sustainable management of land, forest and water resources are all pressing priorities of the region. The shift from the industrial past to advanced, post-industrial economies is bringing about a shift in consumerism and challenging ecological sustainability. Climate change will bring additional challenges and pose additional risks to ecosystems and society. As a whole, the region is expected to become drier, with more heat extremes. This will coincide with extreme weather events such as heavy precipitation, resulting in flooding.



Velebit, Croatia

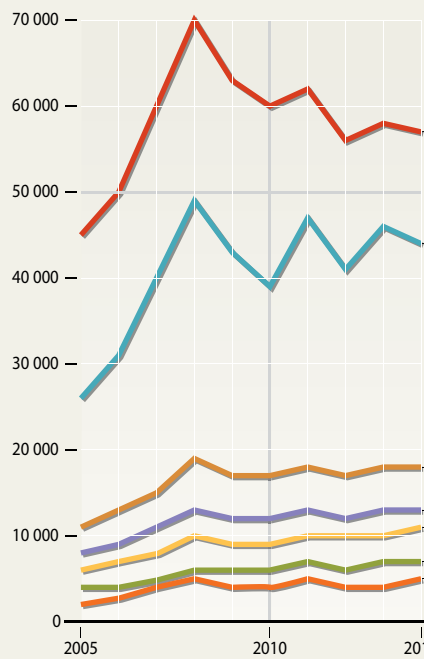


Kamberovica, Bosnia and Herzegovina

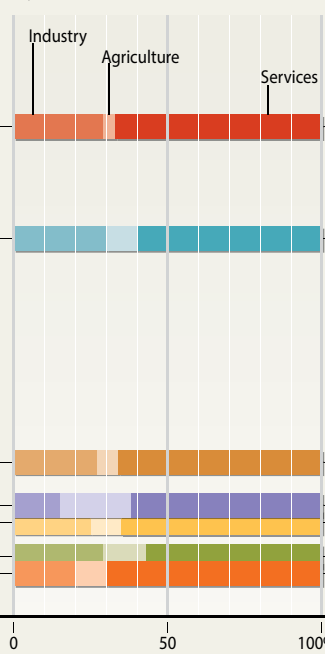
Socio-economic indicators

Gross Domestic Product

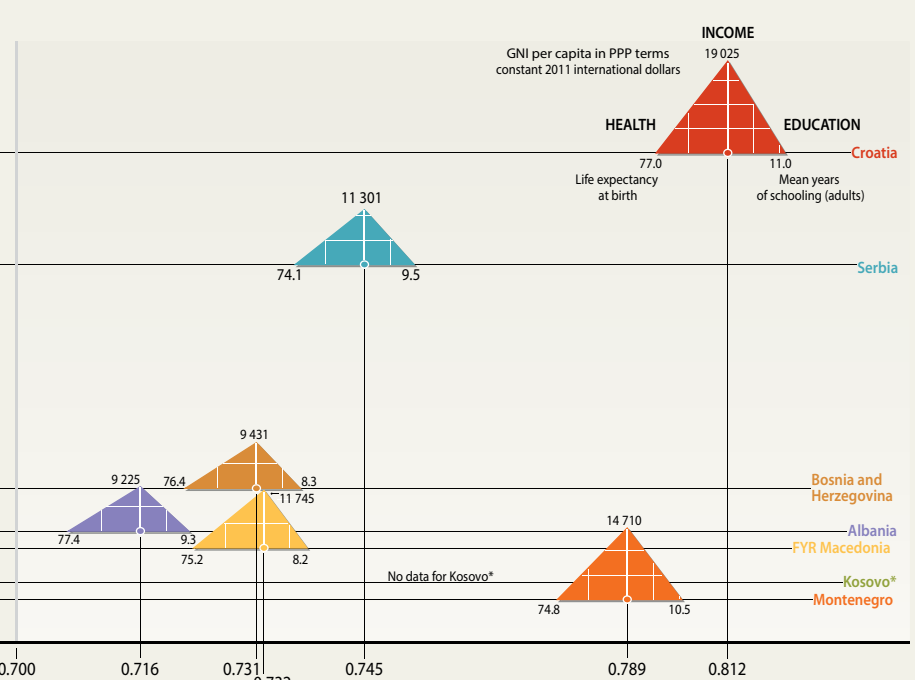
Millions of USD



GDP percentage by sector

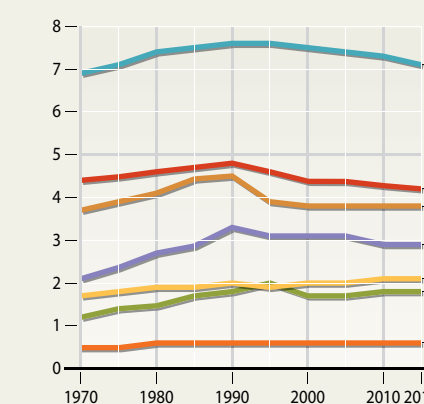


Human Development Index

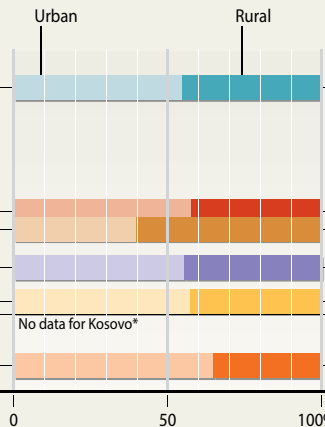


Population

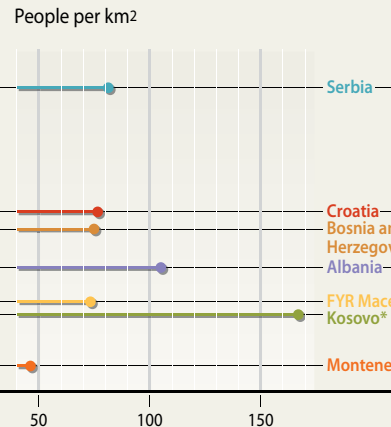
Millions



Distribution of population (%)



Population density



European Union membership status



Sources: The World Bank Databank (databank.worldbank.org, access October 2015); UN, 2015, "World Urbanization Prospects. The 2014 Revision"; United Nations Population Division; UNDP, 2014, "Human Development Report"; europa.eu (access October 2015).

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.



Albanian Alps seen from Shkodër

Globally, mountains are increasingly recognized for their vital importance in providing multiple services to both mountain and downstream communities: the same is true for the mountains of the Western Balkans. These services include that of “water towers”, supplying water (especially in summer) and for hydropower; as centres of both biological and cultural diversity; and as places for tourism and recreation. However, mountain geo- and ecosystems are also highly sensitive to environmental change, and extreme events can have major consequences for both mountain and downstream areas. In order for the mountains of the Western Balkans to continue providing essential services downstream, adaptation policies and actions are therefore needed that take into account or address mountain needs.

Against this background, this Outlook has been prepared by several national and international experts from UNEP, its collaborating centre GRID-Arendal and the Environmental Innovations Association (EIA). This outlook synthesizes and analyses existing climate change adaptation responses in the mountainous regions of the Western Balkans and the extent to which they address key climate risks.

In doing so, the authors and contributors have largely followed the definitions set out in the IPCC’s Fifth assessment report. The outlook has used three main steps: 1) the determination of the main climate hazards, vulnerabilities and key risks. Once identified, these key risks are considered as priorities to be addressed by adaptation policy; 2) the identification of existing measures (policies, strategies) for climate change adaptation, and 3) the analysis of the extent to which these existing measures can respond to the key risks (gap analysis). Several best practice case studies are also highlighted.

This synthesis publication has used as its sources of information: peer-reviewed journal articles, grey literature sources (e.g. those available from NGOs and international organizations); government reports including the National Communications submitted by countries to the UNFCCC; and extensive expert input through stakeholder consultation.

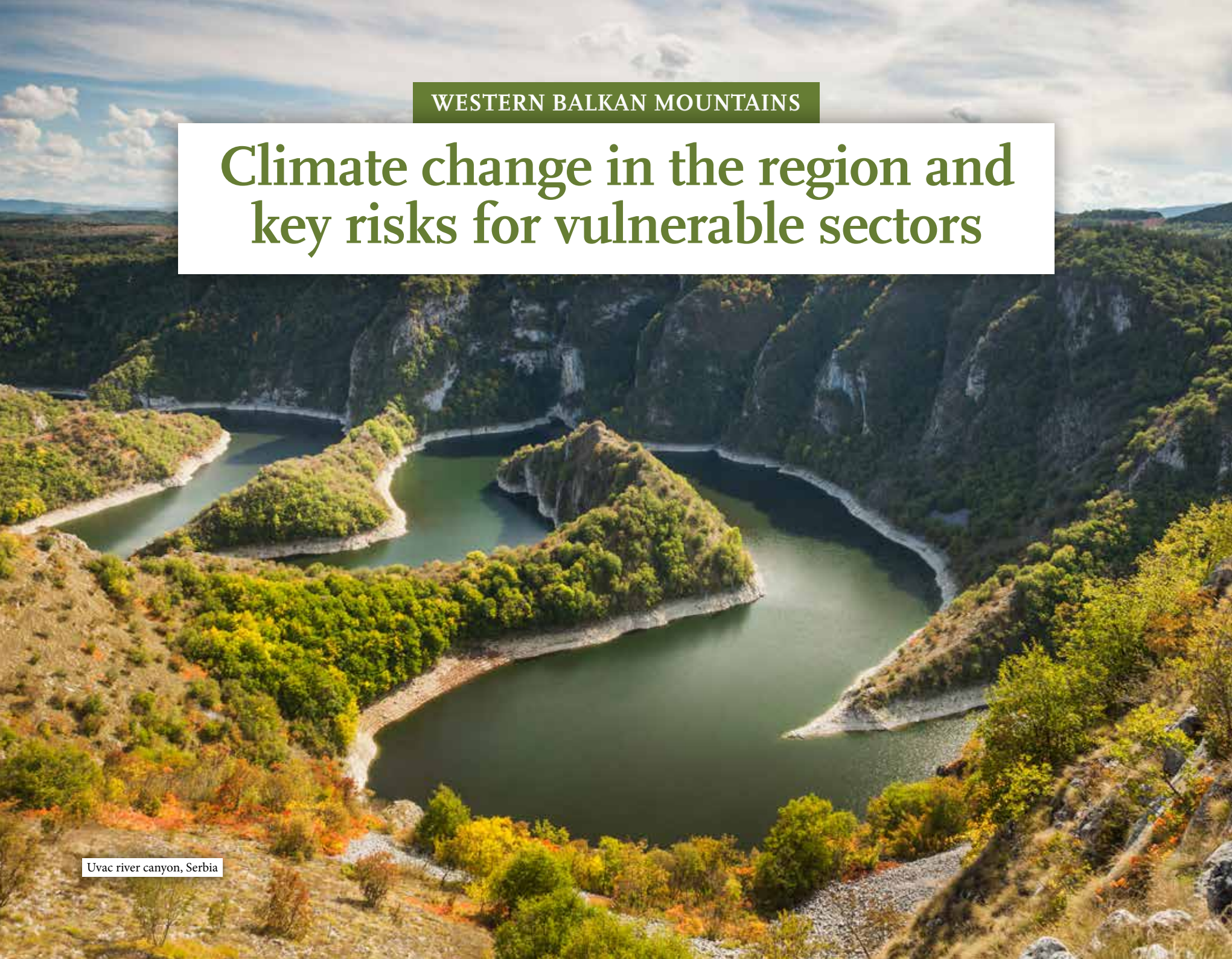
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WESTERN BALKAN MOUNTAINS

Climate change in the region and key risks for vulnerable sectors

Uvac river canyon, Serbia



Trends and scenarios

Observed changes in climate

Temperature

Temperatures have risen in the region in the last fifty years, and every country in the region has experienced warming with this trend accelerating in the most recent decades (UNFCCC National Communications). Summer is the season which

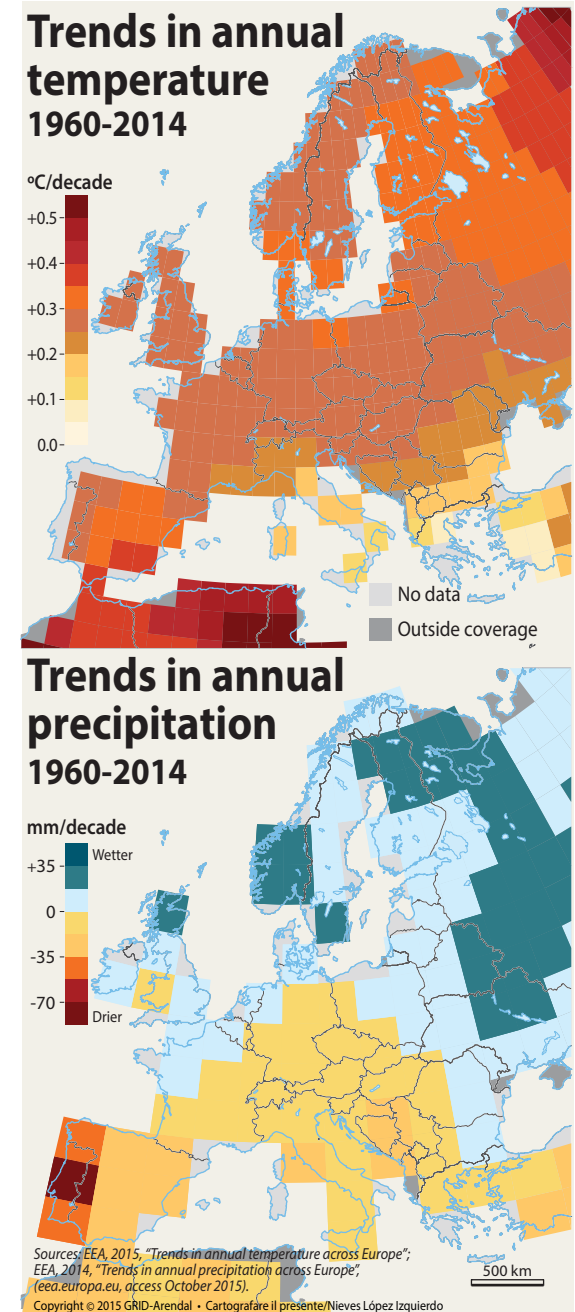


Sunrise in the Dinaric Alps

has warmed the most (Kostopoulou and Jones, 2005). One important effect of this trend is that the frequency and severity of temperature extremes has also increased across the region. In Albania, for example, the increase in the number of days over 40°C has been one of the clearest observed changes in recent decades. Heatwaves across the region are increasing in frequency and severity.

Precipitation

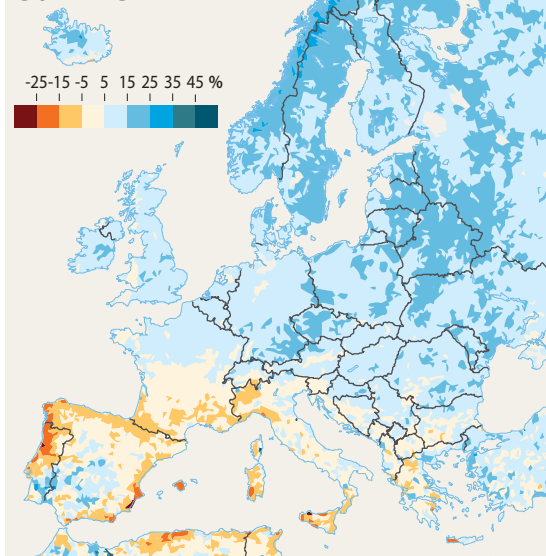
The observed changes in precipitation in the last fifty years are not as pervasive or clear as the observed warming. Generalizing about the observed climatic trends is difficult due to the complex topography of the mountains, especially as the Western Balkans has two climatic areas – the Mediterranean and the alpine/continental. However, overall the region has received a decreasing amount of precipitation, with Albania, Croatia and FYR Macedonia displaying the clearest downward trend. The mountain region of Gorski kotar in Croatia had the greatest decrease. Bosnia and Herzegovina, Montenegro and Serbia experienced mixed or unchanging precipitation patterns. Droughts have become significantly more common in Serbia, FYR Macedonia and Kosovo.¹ Within the region, the Dinaric Alps generally receive the most precipitation (Lelieveld *et al.*, 2012). The mountains in the Western Balkans are therefore central to the flow of fresh water (Schneider *et al.*, 2013), as decreasing precipitation and increasing evapotranspiration are combining to make the region, and soils in general, drier.



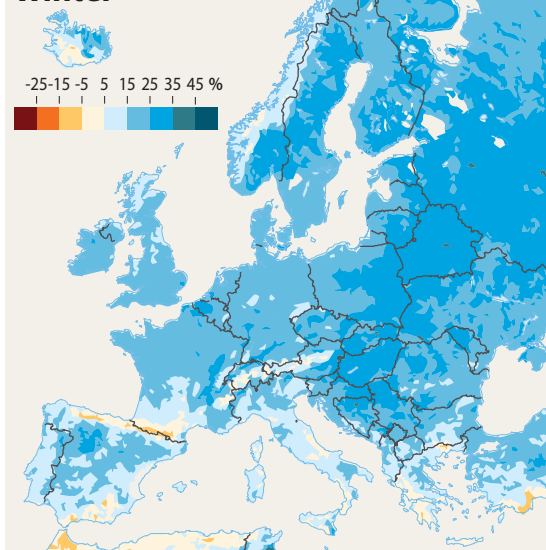
Heavy precipitation change

Projected changes from 1971-2000 to 2071-2100

Summer



Winter



Source: EEA, 2014, "Projected changes in heavy precipitation in winter and summer", (eea.europa.eu, access October 2015).

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500 km

Predicted changes

Temperature

Predicting the climate in mountainous regions is particularly difficult due to the complex topography. Mountains create diverse microclimates, which require high density of measurement. The distinct local differences also require high-resolution climate models, which are scarce. The consensus among the existing models, however, predicts that the Western Balkans will experience substantial warming throughout the twenty-first century. This regional warming will be higher than the worldwide average (World Bank 2014). In Europe generally, warming is expected to increase with altitude (Kotlarski *et al.*, 2011), and some National Communications (including those of Serbia and Montenegro) to the United Nations Framework Convention on Climate Change (UNFCCC) also indicate that the highest warming will occur within the mountainous regions of these West Balkan countries.

According to a regional model based on the medium emission scenario, the Eastern Mediterranean is expected to be 3.5–7°C warmer by the end of the twenty-first century, with the highest daytime increases found in the Balkans (Lelieveld *et al.*, 2012). Another model based on a high emission scenario predicts 5–8°C of warming in the Eastern Mediterranean in summer, again predicting the Western Balkans to receive the highest warming (Önol and Semazzi, 2009). Extremely warm days are particularly damaging to

human life. What are currently regarded as extremely hot summers will become the norm in 2100. By this time, the warmest summer on record from 2007 will become among the 5 per cent coldest (Lelieveld *et al.*, 2013). Days over 35°C are expected to increase by two weeks in the Balkan Mountains and one month in the region. The same model projects winter temperatures to rise by 3°C.

Precipitation

The Western Balkans will witness a significant decrease in annual precipitation. However, projections for precipitation are not as clear or regular as predictions of temperature. The expected precipitation decrease is more pronounced in high emission scenarios than low-emission scenarios and is particularly strong in the summer (Önol and Semazzi, 2009). In winter, on the contrary, precipitation will increase in the mountains and the region in general (Kotlarski *et al.*, 2011; Lelieveld *et al.*, 2012). The annual number of rainy days could decrease by 10–20 days in a medium emission scenario by the end of the twenty-first century. No increase in extreme precipitation events are expected in the region (Kharin *et al.*, 2013); however, flooding is predicted to become more frequent due to more precipitation in winter causing spring floods (Islami *et al.*, 2009).

Key risks for relevant sectors and ecosystems

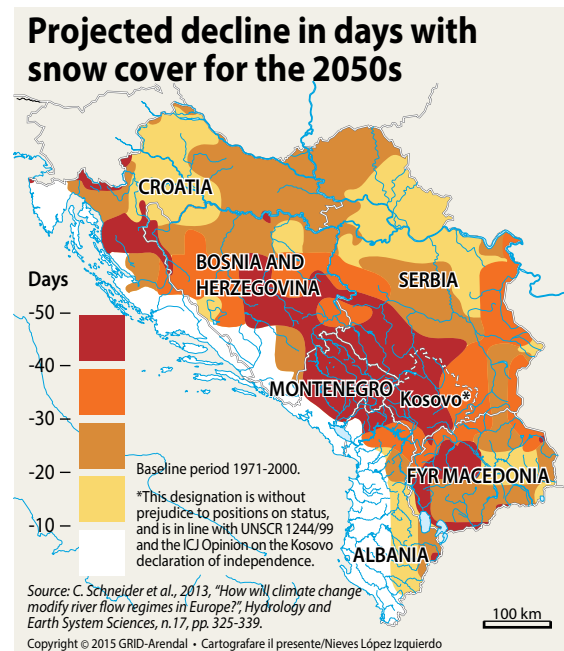
Water

Presently the Western Balkan countries are some of the most water-rich in Europe with regards to the amount of water available per person (10,600 cubic metres, which is twice the European average) (World Bank, 2003). Most of this water originates from the mountainous headwaters (García-Ruiz *et al.*, 2011), and several countries receive a significant share of their water from other countries through transboundary rivers.³ Water resources have always played an important role in the economy of Western Balkans countries, and are exploited for irrigation, drinking water supply, industrial needs, livestock

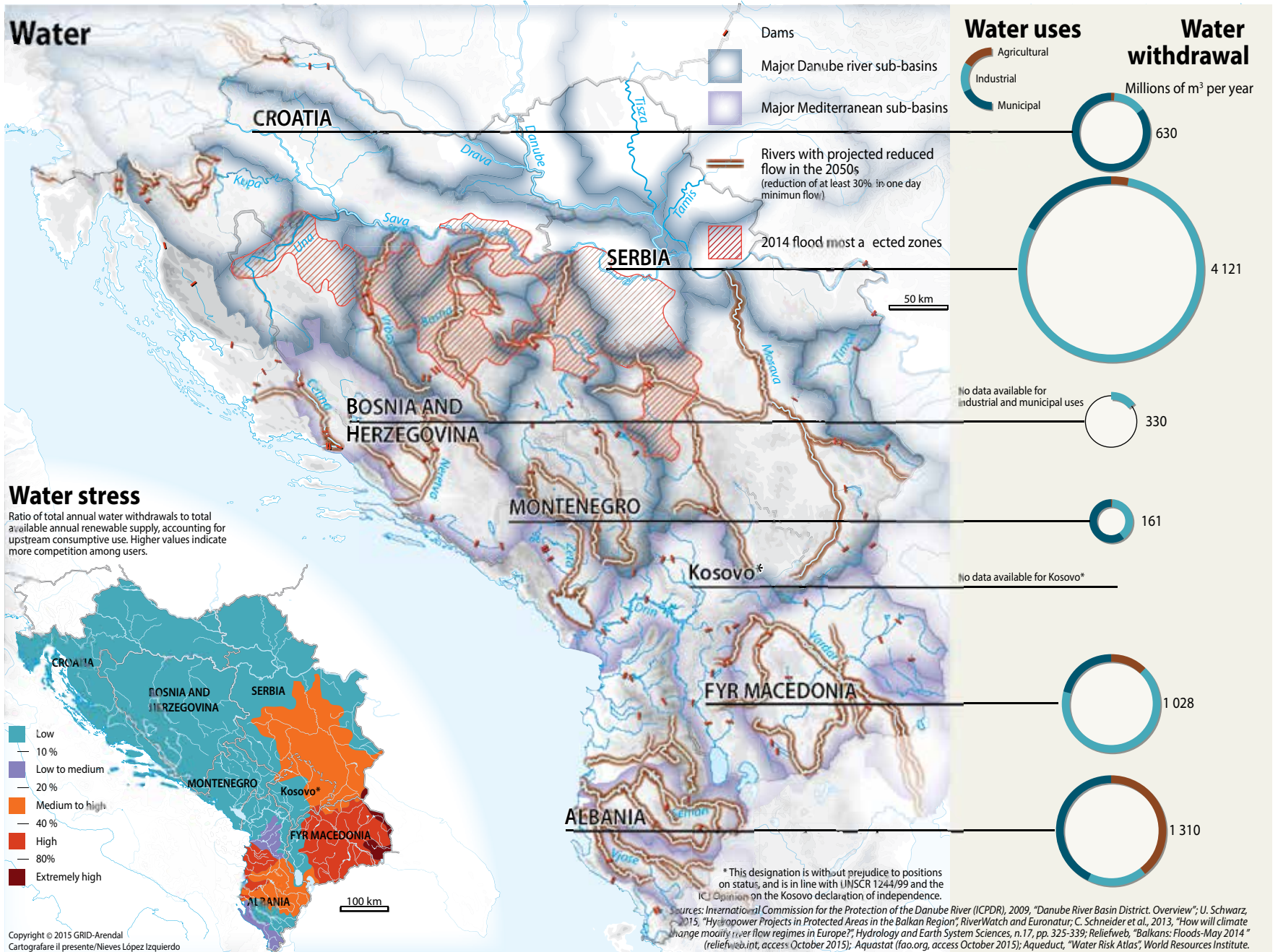
production and tourism. Agriculture still plays an important role in the economies of the region and employment, despite its overall decline compared with industry and the services sector.⁴ Almost 50 per cent of land in the region is used for agriculture: 19 per cent as pastures and 29 per cent for arable land and permanent crops. This sector is heavily water-dependent, where disruptions in the precipitation regime and a higher risk of drought and extreme weather have significant implications on the stability of the sector. Water resources are also used to generate electricity. On average, about 37 per cent all electricity generated comes from hydropower, although this is much higher in Albania (100 per

cent), Croatia (42 per cent) and Montenegro (45.3 per cent). Hydropower can be affected by accelerated evaporation and drought, and changes in the timing and volume of flow to storage systems. More frequent extreme events, such as flooding, may also threaten all types of energy infrastructure, with the associated increase of maintenance costs.

The region faces a number of common water issues across all countries, including weak transboundary cooperation and pollution. Climate change poses additional challenges to water availability, quality and management. Following the breakup of former Yugoslavia, there are more than 13 internationally



Mavrovo ski centre, FYR Macedonia



Groundwaters and karstic aquifers: crucial but understudied water resources

About half of the water that originates in the Western Balkan mountains flows into underground rivers and aquifers, with the other half draining into surface rivers. Groundwater found in aquifers is an extremely important source of water and is often cheaper to extract than surface water in the region (Stevanovic, 2008). Within the region, there are two types of aquifers – karstic, which are dominated by limestone and dolomites, and alluvial-sedimentary. The karstic aquifers are located along the Dinaric coast and within the mountains, while the alluvial aquifers are formed along the rivers. Fifty per cent of the total population of the Western Balkans are thought to depend on groundwater (World Bank, 2003), much of which comes from karstic aquifers. Several cities with over a million people, such as Skopje, Sarajevo and Podgorica, are almost entirely dependent on groundwater from karstic aquifers. Some of the Dinaric karstic groundwater of Bosnia and Herzegovina, Serbia, Croatia, FYR

Macedonia and Albania meets 90 per cent of the total water demand (UNECE, 2007).

Despite the importance of this resource, less information is available in terms of its quantity and quality compared with that of surface waters. Shallow aquifers are at high risk of pollution from point and non-point sources, which is a serious concern given its use as human drinking water.

Many aquifer boundaries – which extend across national borders – have not been delineated, thereby posing additional challenges to transboundary cooperation. Groundwater monitoring and assessment has been neglected during the past ten years and little is known at present about the availability of groundwater or its potential extraction capacity, even though these aquifers are the main sources of drinking and industrial water (World Bank, 2003). Moreover, few studies exist on the impact of climate change on karstic aquifers (Hartmann *et al.*, 2014).

shared river basins and four transboundary lakes. Most countries share one or more of these river basins, making this an important area for regional cooperation and effort. However, transboundary water cooperation remains generally weak, with low political prioritization, insufficient institutional capacity, weak information exchange and joint monitoring and, in some cases, conflicts constituting some of the main factors. Knowledge of transboundary groundwaters and aquifers remains crucially low, despite the importance of this resource (UNECE, 2011).

Water quality is also a cause for serious concern. Discharge of wastewater is a major source of

pollution for both surface and groundwater sources, and wastewater treatment is often poor or non-existent. Although freshwater quality is high in mountain streams and in the upper reaches of rivers, wastewater from urban areas and industry has polluted the course of lower rivers, including the Sava River in Serbia and the Sitnica River in Kosovo¹ (EEA, 2010). In many areas of the Western Balkans, groundwater sources are at risk from contamination from agricultural run-off – the largest contributor of nitrogen pollution – and other sources (World Bank, 2003). Mining sites in the region have also contributed to water pollution through release of heavy metals and tailings.

Climate change will exacerbate already existing pressures on water resources and will pose significant risks to sectors where water is a limiting factor, including agriculture, industry and livelihoods. Almost all climate projections agree that the countries in the region will experience a significant decrease in precipitation in the twenty-first century, accompanied by an increase in drought conditions and therefore a decrease in water availability (Islami *et al.*, 2008; World Bank, 2014).

For the region as a whole, annual run-off is expected to decrease by up to 15 per cent if warming is 2°C above pre-industrial levels, and by up to 45 per cent in a 4°C world (Schewe *et al.*, 2013). The seasonality of rainfall will also change. Longer low-flow periods in rivers and a significant reduction in low-flow magnitudes are expected during the summer season (Arnell and Gosling, 2013; Dakova, 2005; Dankers and Feyen, 2009; Schneider *et al.*, 2013), which will bring a number of problems.

Higher temperatures will also shift the snowline upwards. By 2050, a reduction of up to 20 days in snow cover is expected across the Balkans and up to 50 days in the Dinaric Arc (Schneider *et al.*, 2013). More intense rainfall and increased snowmelt during the winter will increase the river flood risk in both winter and spring across the region (World Bank, 2014), but the time of greatest risk will change from spring to winter for snow-influenced rivers.

Albania contains glaciers with a spatial area of less than 0.05 km², which are some of the lowest-altitude glaciers in the Northern Hemisphere. Although their ice has been steadily thinning and their glacier fronts have retreated, they have survived until now due to local influences in climate and topography, including avalanches and wind-drift snow and shading. In Montenegro, there are no glaciers; only

areas of permanent snow accumulation at Debeli Namet (Ministry of Sustainable Development and Tourism, 2015). However, predicted future warming (especially in the summer) alongside drier conditions might result in the disappearance of all glaciers within the coming decades (Grunewald & Scheithauer, 2010).

Land resources

The quality of soil and land has widespread implications not only for agriculture but also for the productive capacity of the land, and the risk of soil and land degradation is likely to increase with climate change. Increases in temperature, changing precipitation patterns, floods and droughts directly influence the properties and processes in soils, which can lead to accelerated erosion, land degradation and desertification (EEA, 2008). When droughts (which are forecast to increase significantly during the summer periods in the Balkans) are followed by periods of intense rain on steep, unstable terrain, the soil is not able to absorb rainfall, resulting in excessive run-off, landslides and floods. Wildfires and overexploitation of resources can further contribute to desertification.

The Western Balkans is characterized by a mountainous landscape and abundant forest coverage; hence there are areas where desertification and land degradation is a concrete environmental issue. Degraded soils and land are unable to retain as much water, leading to increased flooding, and increased pollution and sedimentation in rivers and streams. The loss of topsoil is a global problem, which also affects the Western Balkan countries. In Albania, erosion affects about 25 per cent of the country, with the most critical areas being Shkodra, Tropoja, Saranda and Gjirokastra. In Croatia, about 90 per cent of the soil surface is exposed to



Satellite image of wildfires on the Balkan peninsula, 2007

water and wind erosion (UNEP/ENVSEC, 2012). In Serbia and Montenegro, the excessive cutting of trees in mountainous areas is among the causes of increased erosion and flooding (ENVSEC and UNEP, 2012). However, the quality of land has improved in certain areas. Parts of Montenegro have, rather than degrading, become steadily more resilient since the 1950s, due to a significant increase in vegetation across the country, leading to decreased run-off and better infiltration (Nyssen *et al.*, 2012).

Food resources

All countries in the region have extremely diverse natural potential for agricultural production, ranging from fertile plains and river valleys to the less productive karst, hilly and mountainous areas. Agriculture remains an important part of the economies of Western Balkan countries, despite the growth of industry and service sectors. It employs a large number of people, and occupies a large proportion of land in each country. On average, 11 per cent of gross domestic product (GDP) is generated by the agricultural sector in the region (the share of agriculture, forestry and fishing in national GDPs for 2012 ranged from 5 per cent in Croatia to 21.3 per cent in Albania; far above the EU-27 average of 1.7 per cent) (FAO, 2014). Eighteen per cent of the population (up to 41 per cent in Albania) are employed in agriculture (World Bank, 2012), which is often the economic and development engine for rural areas, where the proportion of people employed in agriculture is much higher than the national averages.

Agriculture is also one of the sectors most vulnerable/sensitive to changes in climate, because the growth cycles of animals and crops are closely bound to climate and weather conditions. Most crops within the region are rain-fed, with little irrigation or storage

capacity available. This makes crops susceptible to rising temperatures, increasing evaporation and changing precipitation patterns. In particular, the increasing occurrence of droughts in the Balkans has been identified as a key risk for agricultural production (Giannakopoulos *et al.*, 2009; Gocic and Trajkovic, 2014; Kos *et al.*, 2013).

The effects of climate change are already present in the agriculture sector in the Western Balkans. One regional analysis (REC, 2011) showed that extreme events and higher intra-annual variability of minimum temperature have led to a higher probability of crop failure from frost damage. Increases in the occurrence of hot days and declines in rainfall or irrigation have also resulted in reduced yields, while warmer winters can reduce the yields of stone fruits that require winter chilling. On the other hand, increased temperatures in spring and summer have been shown to accelerate crop development for short-cycle crops.

Future projections of climate change and its impact on agriculture at the European level indicate that in southern areas, including the Balkans, there will be more losers than winners. Key risks include lower harvestable yields, higher yield variability, and reductions in area suitable for growing traditional crops (Olesen and Bindi, 2002). Climate change in the absence of adaptation measures will be largely detrimental to agricultural production, including for the most important agricultural products in terms of production area and economic output, cereals and fruits (predominantly grapes), of which Serbia is the biggest producer (Mizik, 2010; Volk, 2010).

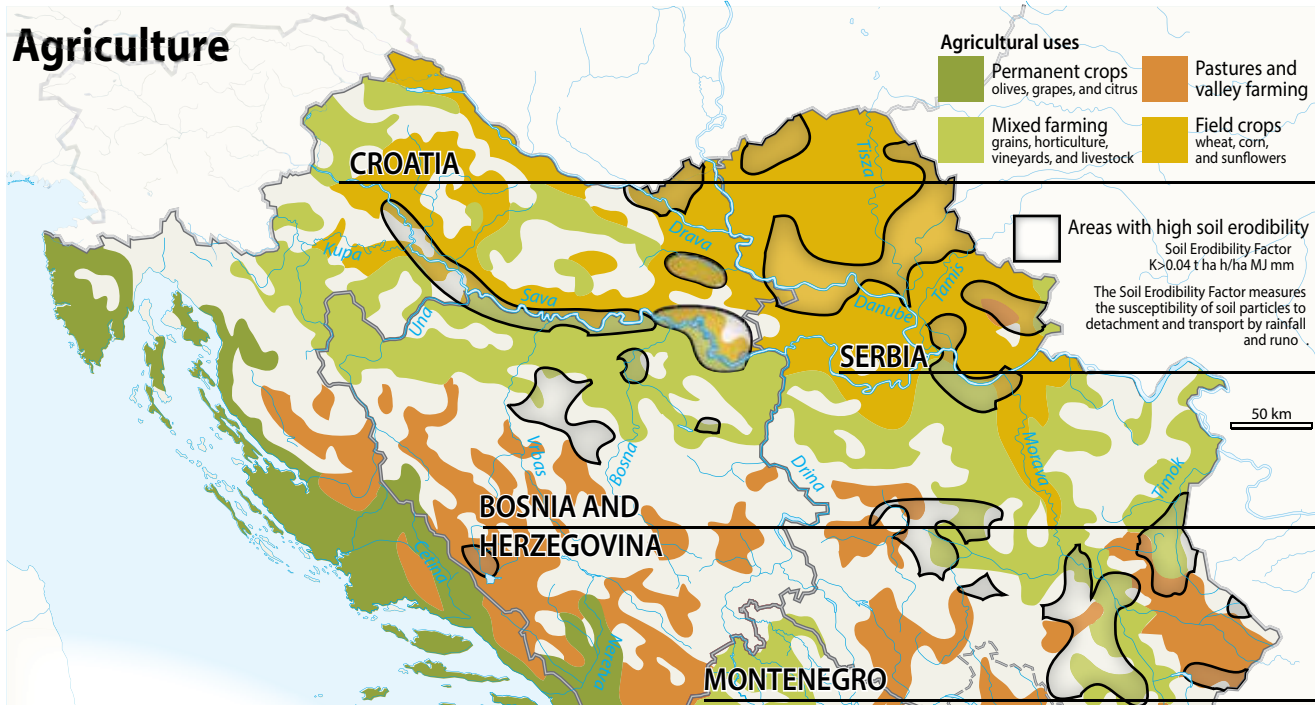
Significant declines in yield are predicted, according to the limited studies available. Projections for Albania indicate that the production of rain-fed grapes and olives will decline by about 20 per cent

if there is 1.8°C warming. In FYR Macedonia, yield declines of up to 50 per cent are expected for maize, wheat, vegetables and grapes at 1.62°C warming in the Mediterranean and continental areas (Sutton *et al.*, 2013). In Serbia, most yields are projected to decline for rain-fed crops for the period 2030 to 2060, compared with present day (Giannakopoulos *et al.*, 2009). However, negative impacts of climate change on yield could be reduced or even reversed if adaptation options were implemented, but these would require 40 per cent more water (Giannakopoulos *et al.*, 2009).

Some alpine/mountainous regions, which are today characterized by lower average temperatures and shorter growing seasons than lowland areas, may benefit. For example, wheat yields in alpine areas are projected to increase considerably in Albania (by 24 per cent) and FYR Macedonia (50 per cent) due to rising temperatures and the extension of the growing season (Sutton *et al.*, 2013).

On the other hand, pasture yields and grassland ecosystems for livestock grazing may be negatively affected by sustained drought and heat, and decline over large parts of the Western Balkans (World Bank, 2014). Overall, the livestock sector is currently under-represented in climate impact research for the region and few modelling studies exist (World Bank, 2014), although there is evidence that livestock in the region can be adversely affected by a greater heat stress (REC, 2011). Declining quantity and quality of feed could impact prices and lead to greater fluctuations (Miraglia *et al.*, 2009). People in the Western Balkans spend a relatively higher proportion of their income on food. Between 35 and 50 per cent of household expenditure is spent on food, drink and tobacco, compared with 16 per cent in the EU-27, making households more vulnerable to increasing food prices (Volk *et al.*, 2010).

Agriculture

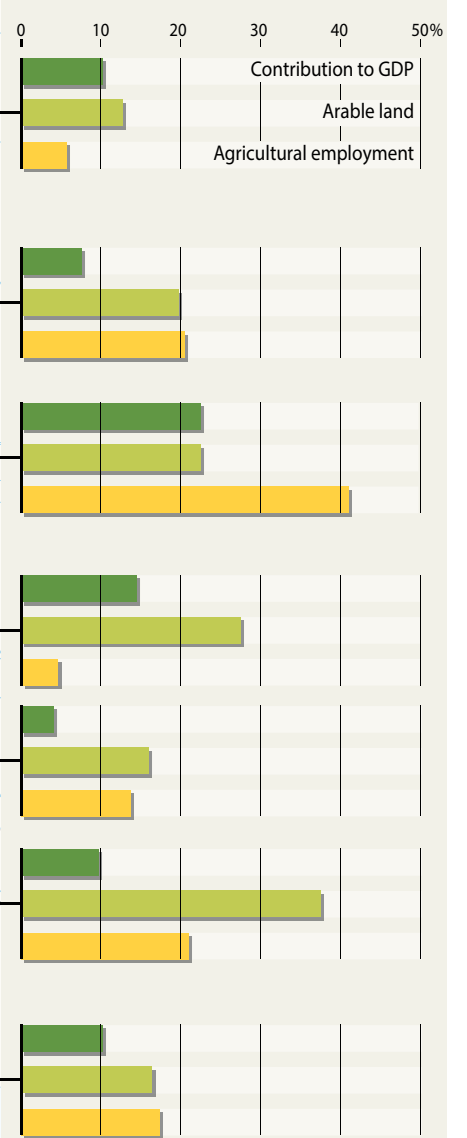


Organic farming



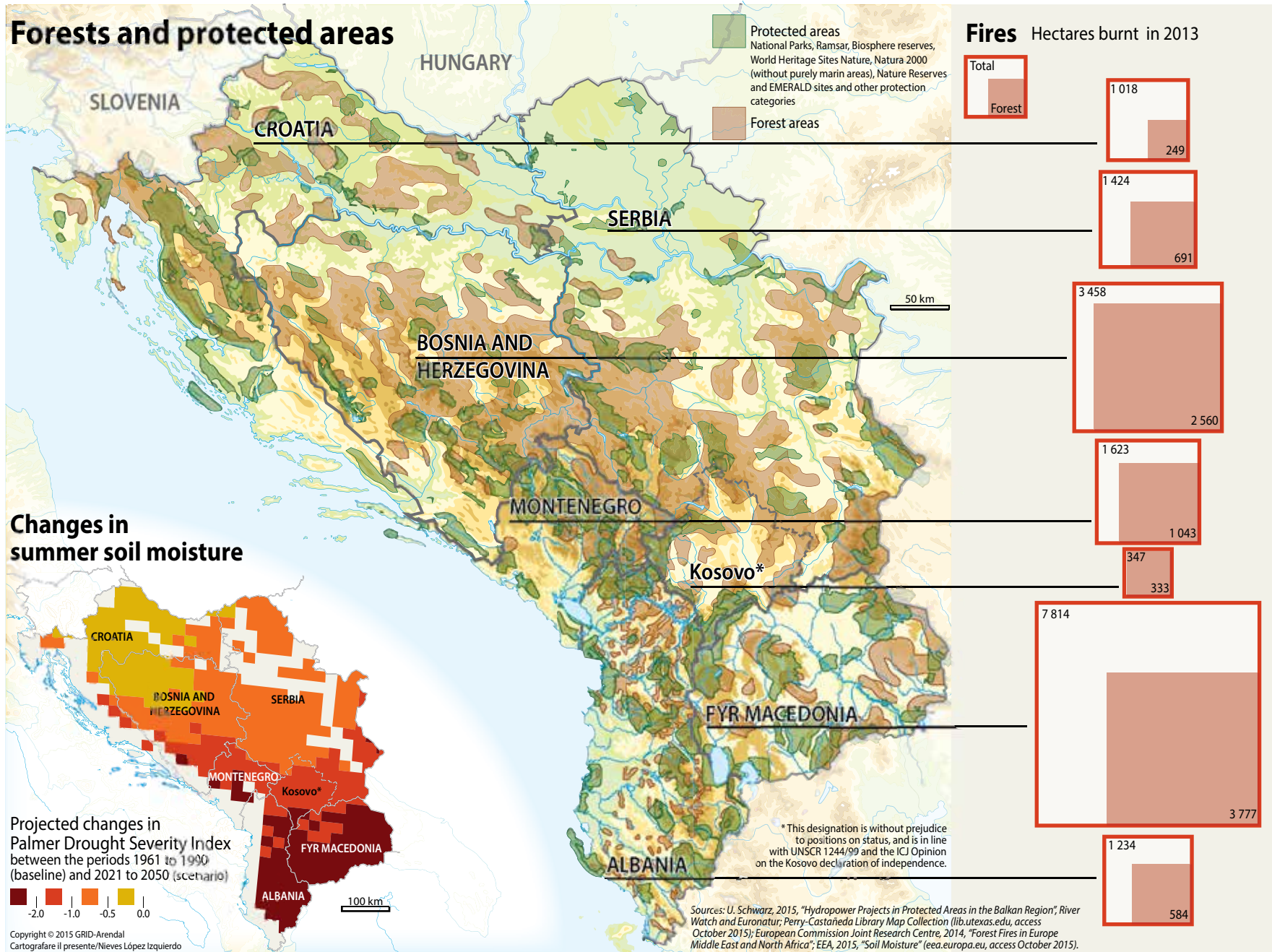
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Agricultural indicators

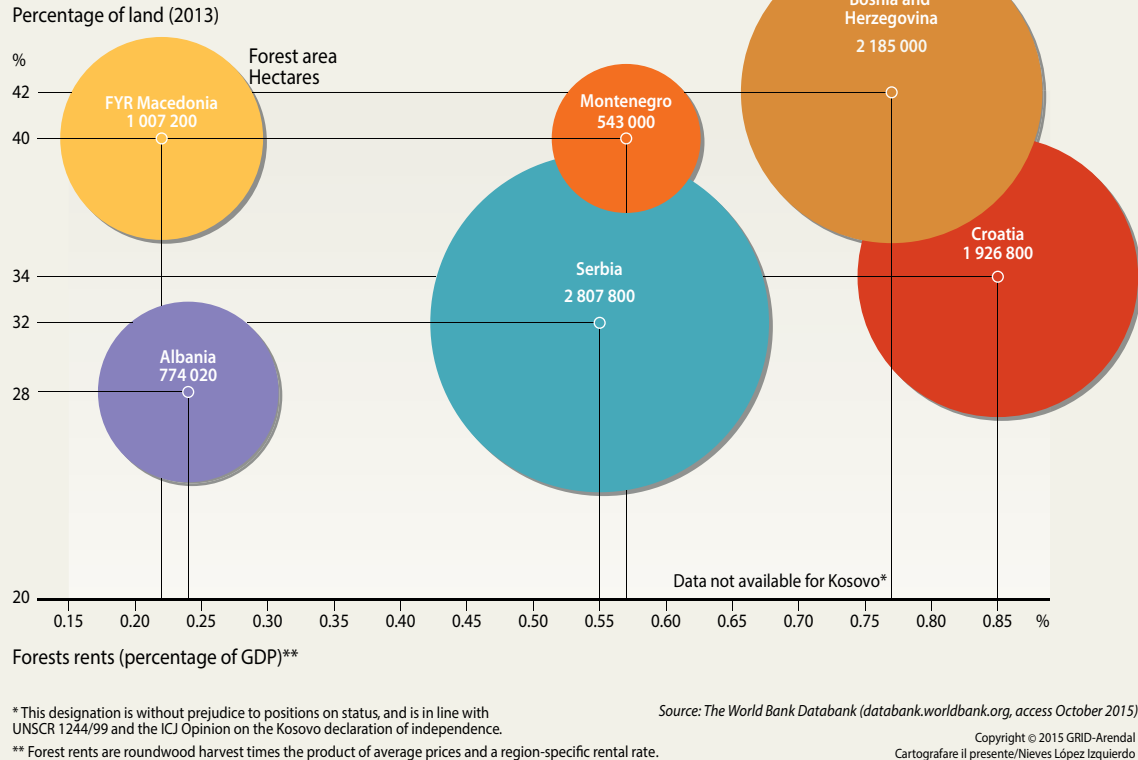


* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

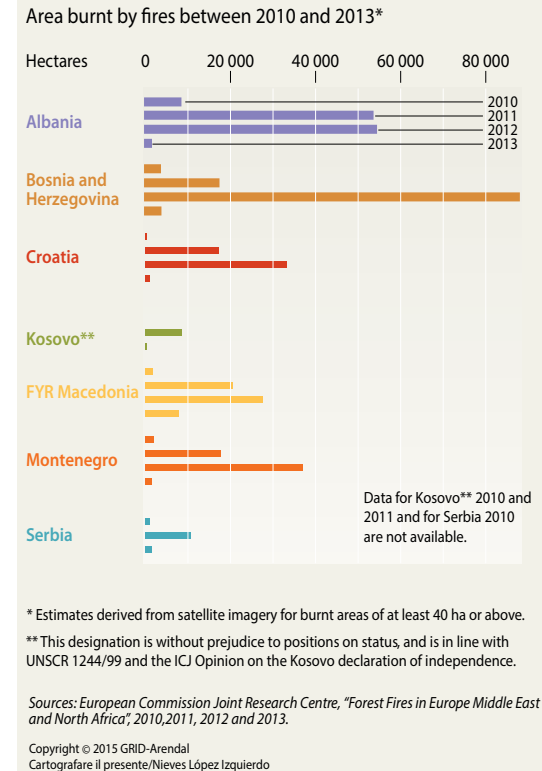
Sources: J. Van der Knij et al., 2000, "Soil Erosion Risk Assessment in Europe", European Soil Bureau-European Commission; Perry-Castañeda Library Map Collection (lib.utexas.edu, access October 2015); The World Bank Databank (databank.worldbank.org, access October 2015); M. Vittuari, 2011, "Organic Balkans. Stakeholders, policies, and institutions: a regional perspective", Osservatorio Balcani e Caucaso.



Forests coverage per country



Forest fires



While climate change poses risks to current and future crop and livestock production, other factors play an important role in determining productivity, which is currently considered low within the region. Although the yields in Western Balkans countries have improved since around 2000, they remain below the EU average, and most of the countries remain net importers of agri-food products (Volk, 2010). The key weaknesses are predominantly small-scale farms, poor execution of agricultural policy reforms, inefficient institutions and a lack of infrastructure (Volk, 2010; World Bank, 2014). The considerable portion of the Western Balkans that is

mountainous or hilly is less suitable for agriculture. In addition, ageing and depopulation/migration of these areas can hold back agricultural development (Volk, 2010).

Forests and biodiversity

Forests occupy a large proportion of the land area in the Western Balkans – from 28 per cent in Albania up to 44.7 per cent in Kosovo¹ (Tomter *et al.*, 2013, World Bank, 2012) – and play a significant social and economic role in all of the countries, both in terms of the national economies and local livelihoods.

People in rural areas rely heavily on fuelwood not only for energy, but also for employment and additional income. The wood industry is an important contributor to the development of local economies. In some countries, the contribution of forestry to GDP is high (8 per cent in Montenegro), but in other countries it ranges between 0.5 and 2.5 per cent (Markus-Johansson *et al.*, 2010); however, the true value to local economies and livelihoods is estimated to be much higher. Forests also provide numerous ecosystem services including maintaining biodiversity, mitigating and adapting to climate change effects and regulating soil and water regimes.



Mountain village, Serbia

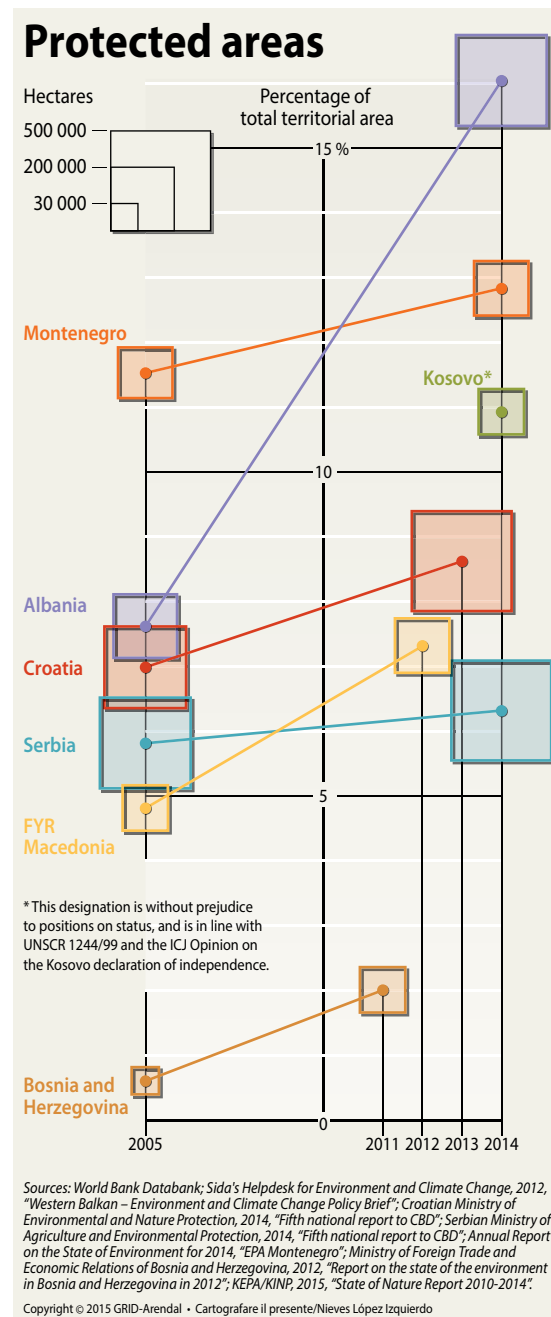
The mountain areas of Western Balkan countries are predominantly covered by forests very rich in biodiversity, both in terms of flora and fauna of either global or European conservation importance. There are vast areas of still preserved, natural and semi-natural ecosystems providing benefits to both nature and people through the ecosystem services on which the majority of local communities still very much depend. Scattered relics of virgin forest still exist in remote areas, mountainous areas and wetlands, being the last refuge of these forests in Europe (Parviainen, 2005).

Overall, forests in the region are experiencing a number of positive and negative trends. Both deliberate and natural afforestation on abandoned agricultural land have increased forest cover in some areas. The area classified as high conservation value forests (HCVFs) is increasing and improving the sustainable management of forests and their resources, including from the perspective of maintaining the flow of ecosystem services, prevention of soil erosion, and conserving threatened or endemic species. The conservation of forests for cultural, historical, or religious reasons is also advocated through HCVFs (Ioras *et al.*, 2009), which also provide a buffer against illegal activities. In addition, declining rural populations and rural to urban migration, particularly from mountain areas, is resulting in fewer young people being involved in forestry and is placing less pressure on logging for household fuelwood. However, there is still concern in the region over the quality of the forests due to a history of coppicing and sub-standard management of both state-owned and privately-owned forests in some areas (Markus-Johansson *et al.*, 2010), while factors such as illegal logging and corruption at various points in the value chain are thought to be hindering the forestry sector reaching its full potential.

Climate change is also a very real risk for forests and their management. Forest fires are already a major hazard across the Balkans. A significant increase in the number and intensity of wildfires across the region has been linked to higher temperatures in summer, prolonged droughts and earlier melting of snow in the mountains (Mátyás, 2010). In the future, the probability of forest fires occurring, the length of the fire season, and fire frequency and severity are likely to increase in the Mediterranean (Alcamo *et al.*, 2007). Furthermore, rising atmospheric CO₂ concentration, higher temperatures, changes in precipitation, flooding, and drought duration and frequency will have significant effects on tree growth. These changes will also have associated consequences for the frequency of pest and disease outbreaks and changes in fire occurrence, and changes in wind storms and frequency – all of which will have big implications for forest ecosystems (European Commission, 2008). Mountain forest ecosystems are especially vulnerable due to a rise in the elevation of snow cover and altered river run-off regimes.

Biodiversity and protected areas

The Western Balkans is a biodiversity hotspot within Europe and contains a large variety of ecosystems. The territory encompassing the former Yugoslavia is one of six European centres of biological diversity, containing 39 per cent of Europe's vascular plants, 51 per cent of fish, 74 per cent of birds, and 68 per cent of mammals (World Bank, 2003 in UNEP/ENVSEC, 2012). There is a high level of endemism in the Balkan countries because of the extremely varied diversity of geology, soils, climatic ranges and altitude. For example, FYR Macedonia has 900 endemic species (UNEP/ENVSEC, 2012). Some of the highest levels of endemism occur at high altitudes. For example, the mountainous Sutjeska National Park in Bosnia and Herzegovina, which



borders Montenegro, has 2,600 different species of vascular plants, a high percentage of endemic and rare species and contains one of the last two primeval forests in Europe.

The number and size of protected areas in the region has been increasing, although the share of protected land is still low if compared with that of the EU. Some protected areas have been established recently or are in the process of being included in the transboundary protection system, such as Neretva River Delta, Lake Skadar, Lake Ohrid, Lake Prespa, Bjeshkët e Nemuna Mountains, Djerdap National Park, Balkan and Tara Mountains, and the Danube River.

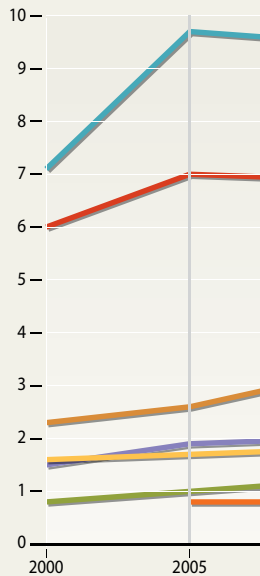
Biodiversity within the region faces a number of threats, including deforestation, soil erosion, uncontrolled land use and pollution, as well as unsustainable levels of hunting, fishing and grazing (Centre for Climate Adaptation, 2015). Generally speaking, there are significant gaps in information and knowledge related to the impact of climate change on biodiversity in the region and across the countries.

Climate change is expected to impact all ecosystems in the region, however certain ecosystems with limited possibilities for species to migrate are considered particularly at risk. High mountainous and mountain ecosystems (above 1,500m) are particularly sensitive because temperature is rising faster at these altitudes than at lower altitudes, and high-altitude species that live in cooler temperatures have nowhere to go. Predicted large reductions in snow cover are expected to lead to declines in alpine flora and fauna because vegetation of the pre-mountain regions will be replaced by vegetation from temperate zones. Individual species such as oak will be threatened in hilly ecosystems, because migration will be hindered due to their heavy seed.

Energy

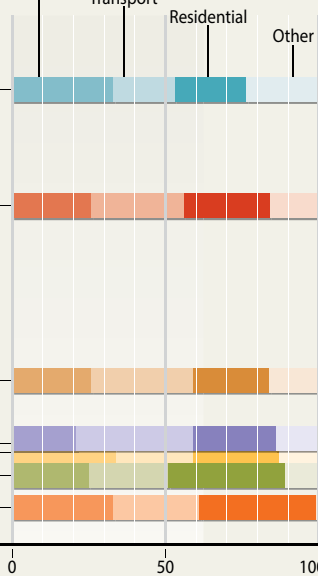
Total Final Consumption(TFC)**

Millions of Tonnes of oil equivalent



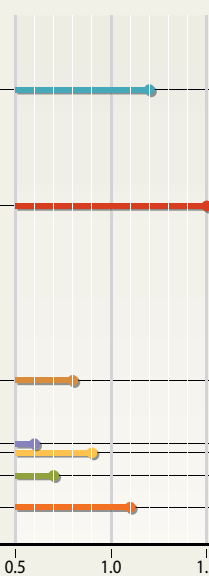
TFC percentage by sector

Industry Transport Residential Other



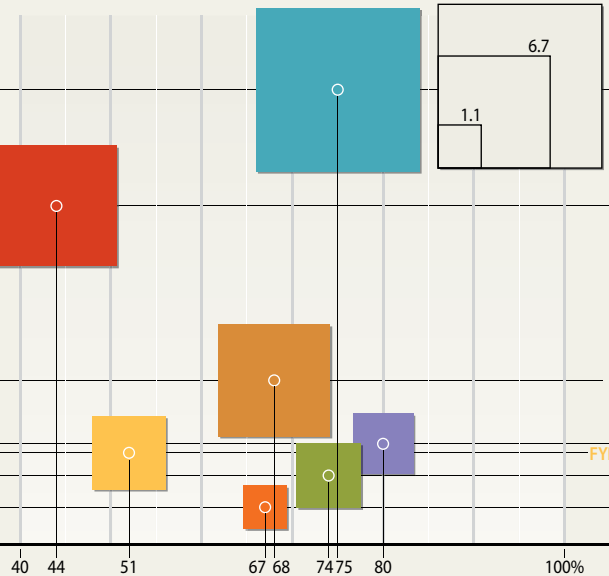
TFC per capita

Tonnes of oil equivalent



Total Primary Energy Supply***

Millions of Tonnes of oil equivalent



* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

** The sum of consumption by the different end-use sectors: industry, transport, buildings (including residential and services) and other (including agriculture and non-energy use). It excludes international marine and aviation bunkers.

*** Equivalent to total primary energy demand. It represents inland demand only and excludes international marine and aviation bunkers.

Overall energy self-sufficiency

Source: IEA, "Energy Atlas", (iea.org, access October 2015).

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Energy

The energy sector is considered highly important for the economic growth of the Western Balkan countries, where there is large potential for the development of this sector to bring new investments to the region. A high dependence on imported energy, especially on oil and natural gas, raises various concerns for the security of energy supply and the need to diversify the supply sources with renewable energy such as biomass, solar and wind energy, as well as to introduce energy efficiency.

Current patterns of energy use in the Western Balkans lead to significant impacts on the environment. The region as a whole has a high carbon intensity due to its heavy dependence and use of coal (lignite). Other environmental concerns include pollution from energy combustion (e.g. indoor and local air pollution from inefficient and improperly used stoves) and deforestation and land degradation (from excessive use of wood for fuel). Taking into consideration all of these features, the energy sector in the region is a major source of greenhouse gas emissions, air pollutants (acidifying

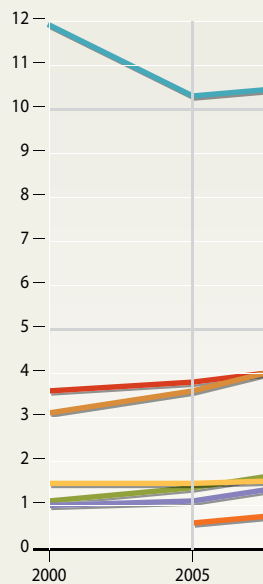
substances, ozone precursors and particulates) and oil spills.

The main domestic sources of electricity generation in the region are lignite and hydropower. Serbia, Bosnia and Herzegovina, FYR Macedonia and Kosovo¹ depend mainly on lignite (coal)-fired thermal hydropower plants for electricity. Albania derives almost all its electricity from hydropower. Bosnia and Herzegovina, Croatia and Montenegro also have significant hydropower capacity (IEA, 2008). There is also a high level of shared energy

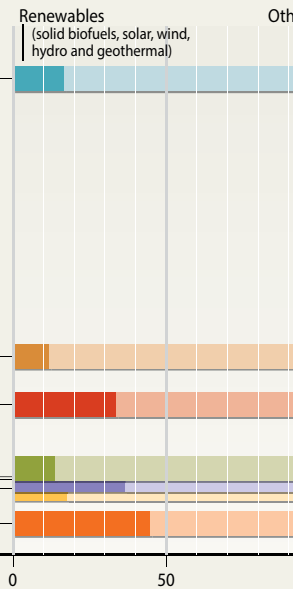
Energy

Total Production

Millions of Tonnes of oil equivalent

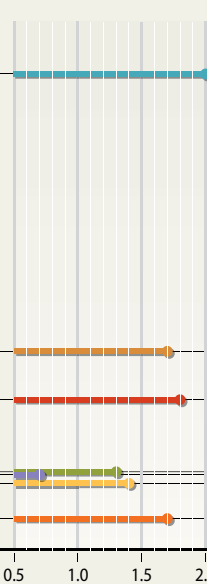


Production by type of source



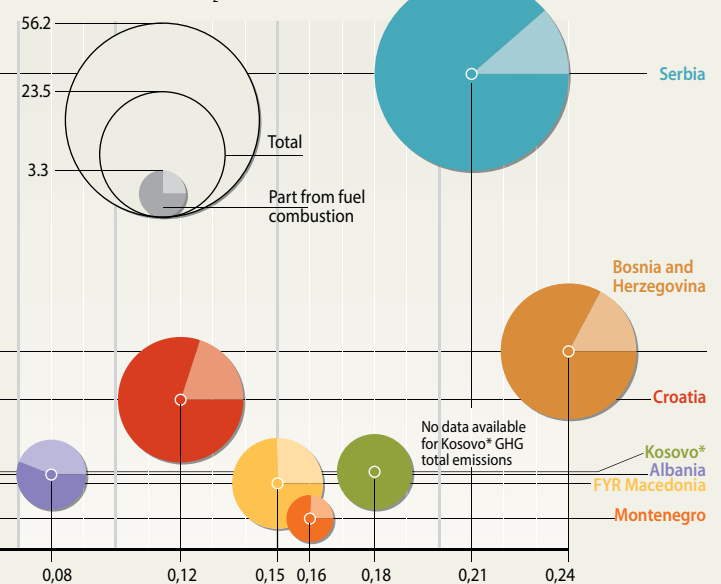
Production per capita

Tonnes of oil equivalent



GHG emissions Excluding Land-Use Change and Forestry

Millions of Tonnes of CO₂ equivalent



Energy intensity

Tonnes of oil equivalent/1 000 USD

Sources: IEA, "Energy Atlas" (iea.org, access October 2015); WRI, "Climate Data Explorer" (cait.ori.org, access October 2015).

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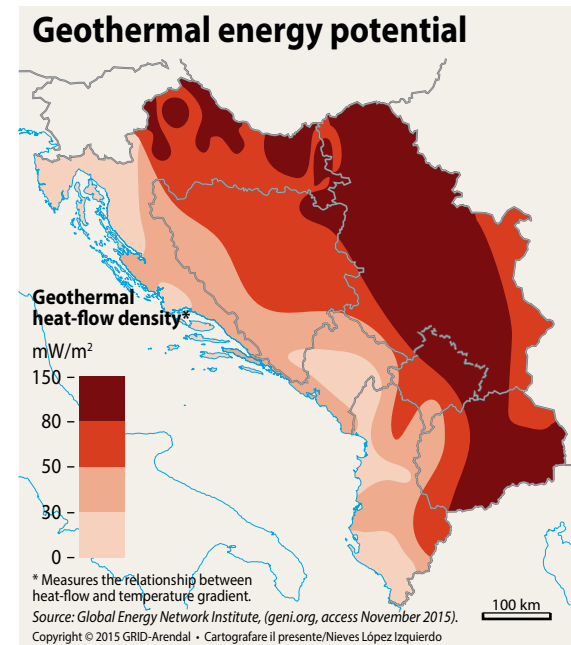
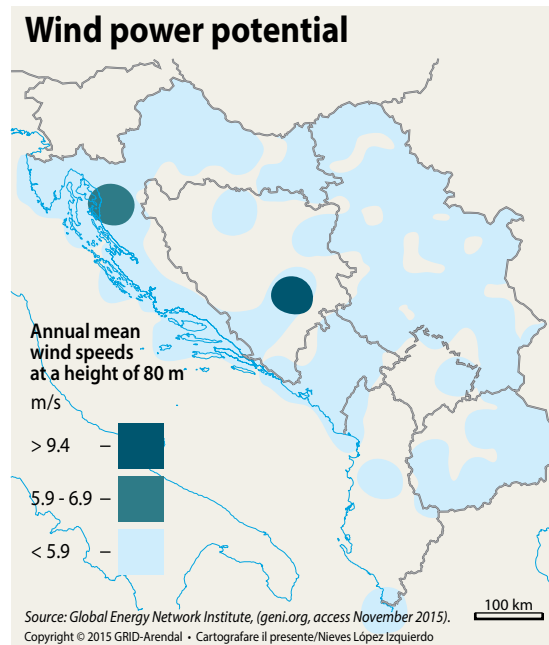
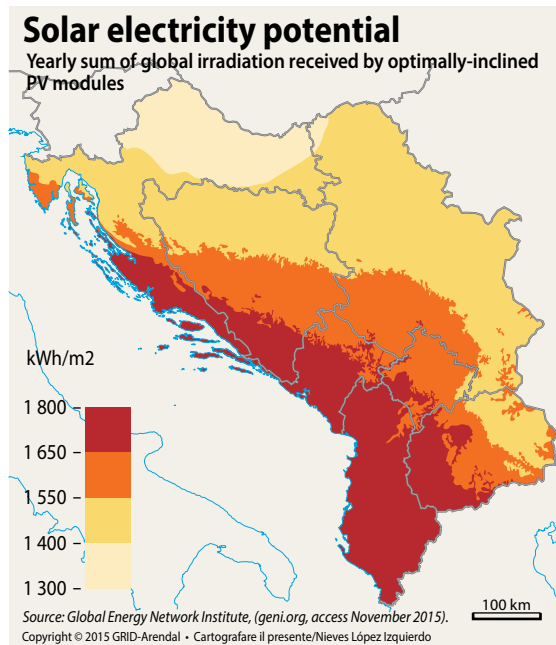
infrastructure across countries, with extensive daily and seasonal exchanges of electricity occurring. The energy intensity (an indicator of energy efficiency)⁵ of the Western Balkans is high. This can be attributed to three main factors: the degraded state of the energy infrastructure; high energy losses during transformation, transmission and distribution; and inefficiency in the end-use sector.

Energy systems within the region are considered to be very vulnerable to extreme events and changes in river temperatures (World Bank, 2014). The

extent and nature of the impacts depend on the degree to which countries rely on different energy sources. Thermal power production is vulnerable to changes in climate through water availability and temperature, due to the high dependence of these power plants on cooling water. Lower levels in lakes and rivers, reduced run-off, accelerated evaporation and warmer water could also reduce the amount of water for cooling or cause restrictions on cooling water intake or discharge, constraining generation capacity (World Bank, 2009). Taking into account the effects of climate change on river

water temperatures and river flows, the capacity of nuclear and fossil-fuelled power plants in Southern and Eastern Europe could face a 6–19 percent decline for the time period 2031–2060 compared to 1971–2000 (Van Vliet *et al.*, 2012).

More frequent extreme events, such as flooding, will also threaten all types of energy infrastructure and possibly drive up maintenance costs (UNEP/ENVSEC, 2012), although there is only a limited number of studies assessing this (World Bank, 2014). Much of the energy infrastructure in the Western



Renewable energies in the Western Balkans and future plans

Renewable energy provides a significant share of the region's energy and is higher than the EU-27 average (EEA, 2008). Almost all of the renewable energy comes from large hydropower plants; wind, solar and geothermal sources remain negligible at less than 1 per cent of the total. The EU, as part of its terms for accession, will require all countries to have larger proportions of energy from renewable sources. Investments in hydropower, biodiesel, wind and solar power stations will multiply (Ralchev, 2012). The share

of renewable energies within the total energy mix is expected to increase significantly, with hydropower remaining the largest source of renewable energy (EEA, 2008).

More than 500 hydropower projects are under development in the Western Balkans region (IUCN, 2015). Many of these will take place on largely intact river systems and within or in proximity to key biodiversity sites within the region (IUCN).

Balkans countries was built in the 1960s and 1970s and is already in need of widespread rehabilitation and replacement (IEA, 2008). Climate change is expected to pose risks to power transmission network functions, and reduce efficiency or alter structural integrity, especially for older, poorly maintained facilities (UNEP/ENVSEC, 2012).

Accompanying the expected decreases in annual river discharge and changing seasonality of river flows, overall hydropower production in Europe including the Western Balkans is expected to decrease by 1.66 TWh, or 1.43 percent compared to 2005 production levels (Hamududu and Killingtveit, 2012). One study from Croatia predicts that energy generation from

hydropower could decrease by 15–35 per cent in a 4°C world (Pasicko *et al.*, 2012). Given that severe decreases of up to 15 per cent in annual discharge are expected across the Western Balkans in a 2°C world, similar reductions in hydropower generation are possible elsewhere.

From the demand side, the trend of warmer winter temperatures and even hotter summers are expected to flatten the electricity consumption profile, as the demand for cooling energy rises and heat energy declines (UNEP/ENVSEC, 2012). Electricity systems may strain to meet the heavier demands for air conditioning, particularly if they rely on hydropower (World Bank, 2009).

Energy consumption in the Western Balkans has already increased by 53 per cent⁶ between 1995 and 2005, and demand is expected to grow by a further 34 per cent from 2006 to 2030 (EEA, 2008). Economic development, population growth and climate impacts (decreased production and power generation disruption) may together contribute to a rise in electricity prices and the risk of electricity shortages in the region (McDermott & Nielsen 2014).

Transport, infrastructure and communication

In the Western Balkans region, achieving efficient and modern internal transport networks and infrastructure and communication networks between the region's countries will be a key enabler of economic growth and transition. This is a political priority of the countries themselves and the European Union, because it is an important means of improving links across the region and integrating the countries in the area into the political and economic mainstream of Europe (Matsoukis, 2008). A series of infrastructure

projects are planned, including through funding from the Instrument for Pre-Accession Assistance (IPA) funds, which will link up capitals, major cities and airports in the region, enabling faster economic progress by 2030.

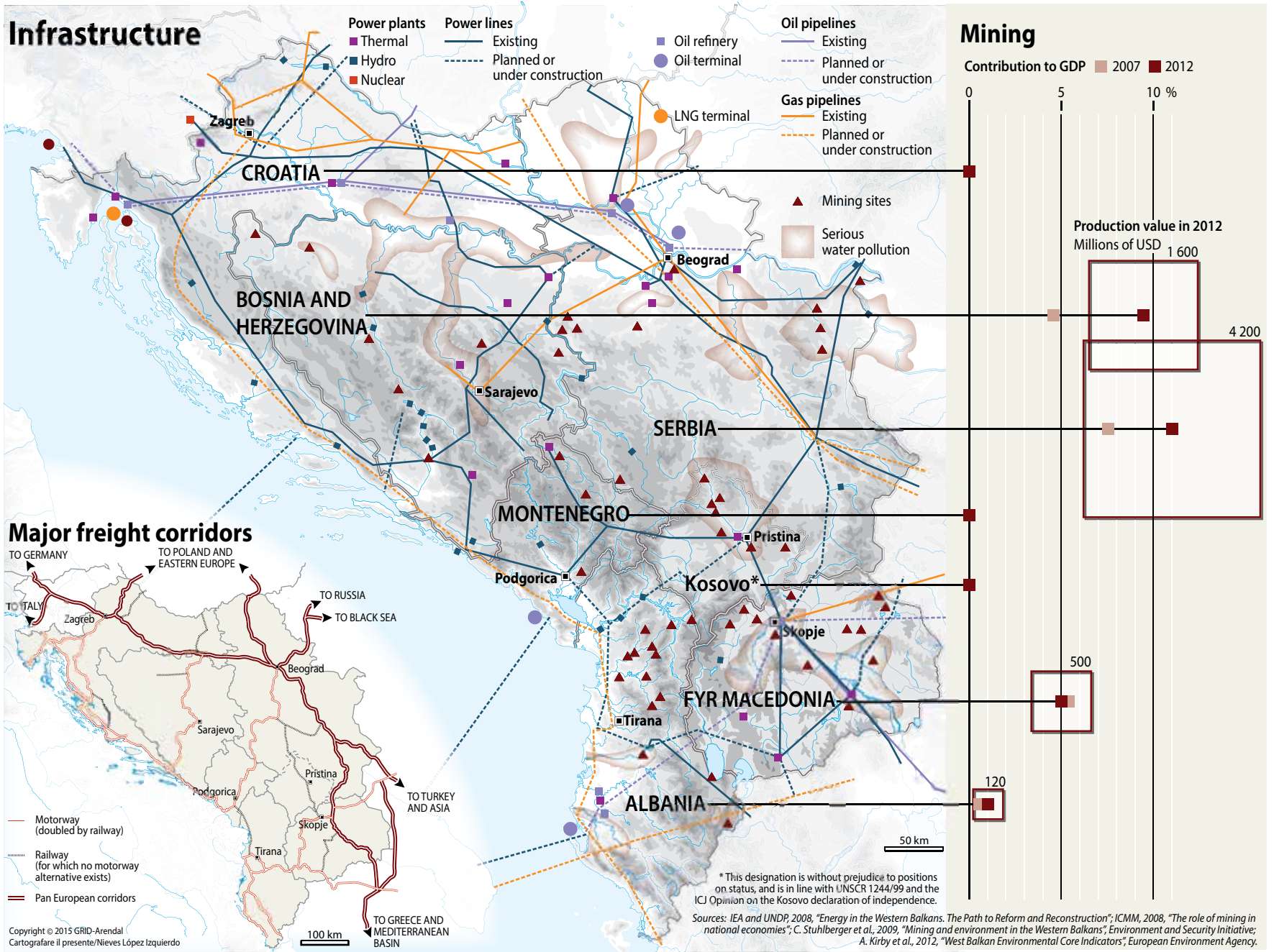
Although the transport system has improved over the years, the standards are considerably lower than those of Europe. Among the challenges, road congestion in and around cities, ageing vehicles, poor vehicle maintenance, and the variable condition of roads all contribute to poor air quality. Pressure on the road networks has also increased, with freight transport almost doubling between 2001 and 2006, and public transport within and between cities

considered to be inadequate (UNEP/ENVSEC, 2012). Transport accounts for almost a quarter of the global CO₂ emissions. While the figure is lower for the Western Balkans region, at approximately 14 per cent, reflecting the relatively low level of car ownership, the transport sector's share of emissions is growing in line with socioeconomic development. This represents a key challenge for the region.

The vulnerability of transport infrastructures to climate change is well understood. For example, extreme events (flooding, heatwaves, forest fires and storms) can weaken or damage infrastructure and cause disruptions. Higher temperatures can cause pavements to soften and expand, reducing the lifetime



Durdevića Tara Bridge, Durmitor National Park, Montenegro



and increasing costs to build and maintain roads and supplies. Railway systems are similarly vulnerable. Inland navigation will more often be faced with restrictions associated with extremely low and high river discharges. Changes in transport capacity may lead to changes in transport costs or to a shift between transport modalities. Economic impacts are closely related to the frequency of events that damage, disrupt and restrict transport, and the availability of transport alternatives. Furthermore, the costs associated with monitoring and maintenance of these networks is likely to increase. Few studies exist on the impacts of climate change on the transport networks within the region, including the mountainous areas. However, one study on the EU-27 transport network can give some indication of potential economic costs of climate change for the region. For road infrastructure, weather stresses already represent 30 per cent to 50 per cent of current road maintenance costs in Europe. Ten per cent of these costs (0.9 billion euro) are associated with extreme events, with flooding taking the lead. A significant extra cost for road transport infrastructures is projected due to more frequent extreme precipitation and flooding events (50–192 million euros per year between 2040–2100). At the same time, increasing temperatures could reduce road costs related to maintenance operations in colder areas (for snow and ice) (JRC, 2012).

Climate change also interacts with transport to have a strong influence on air quality. Transport emissions contribute to air pollution and the greenhouse gases that cause climate change; the effects of which – higher temperatures, in particular – exacerbate the human health responses to air pollution. An efficient transport sector would reduce greenhouse gas (GHG) emissions and lessen the health effects of air pollution. While the transport system in South-Eastern Europe has improved in recent years, the standards are generally low, and in the region's large,

rapidly growing cities, traffic is one of the main causes of poor air quality. The use of leaded fuel has been reduced, but it is not yet banned in FYR Macedonia, Bosnia and Herzegovina (BiH) and Serbia.

Industry (mining)

There is a long history of mining within the region, reaching back to at least the fifth century BC. Richly endowed with minerals, the region contains some of the largest deposits in Europe. Many of the deposits that are mined today have been exploited since the twelfth and thirteenth centuries. By the 1930s exploitation had increased to include aluminium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel and zinc. Precious metals include gold, palladium and platinum, and hydrocarbon

fuels include coal (lignite), natural gas and petroleum (UNEP/ENVSEC, 2012). By the 1990s, mining, mineral processing and downstream exploitation had established the region as a major European source of copper, lead and zinc, and the mining industry was one of the flagship industrial sectors (UNEP, 2009). However, following the disintegration of the Yugoslav common market in the 1990s, industrial output dropped significantly, resulting in a decrease in pollution, but also many abandoned or so-called orphan sites scattered across the region that have no liable legal ownership. Within Bosnia and Herzegovina, Montenegro, Serbia, Albania, FYR Macedonia and Kosovo,¹ about one-third of the 180 sites identified are considered to be of significant environmental and security concern, and one-fifth are considered to pose transboundary risks.



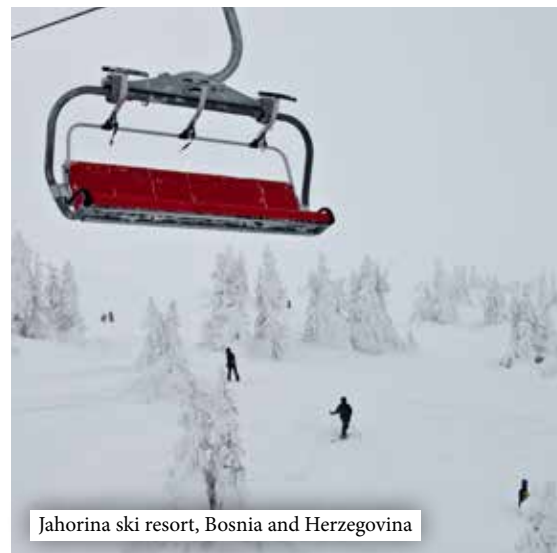
Abandoned mine, Serbia

The environmental legacy of these mining sites, as well as existing and operation mining sites, is wide-ranging. Environmental problems include the production of waste, air pollution, adverse impacts on land use and biodiversity, water pollution and availability, hazardous materials, noise and vibration, energy use, and visual/aesthetic impacts (UNEP, 2009). The dominant pathway of exposure is through rivers, posing a critical transboundary pollution risk to countries within the region.

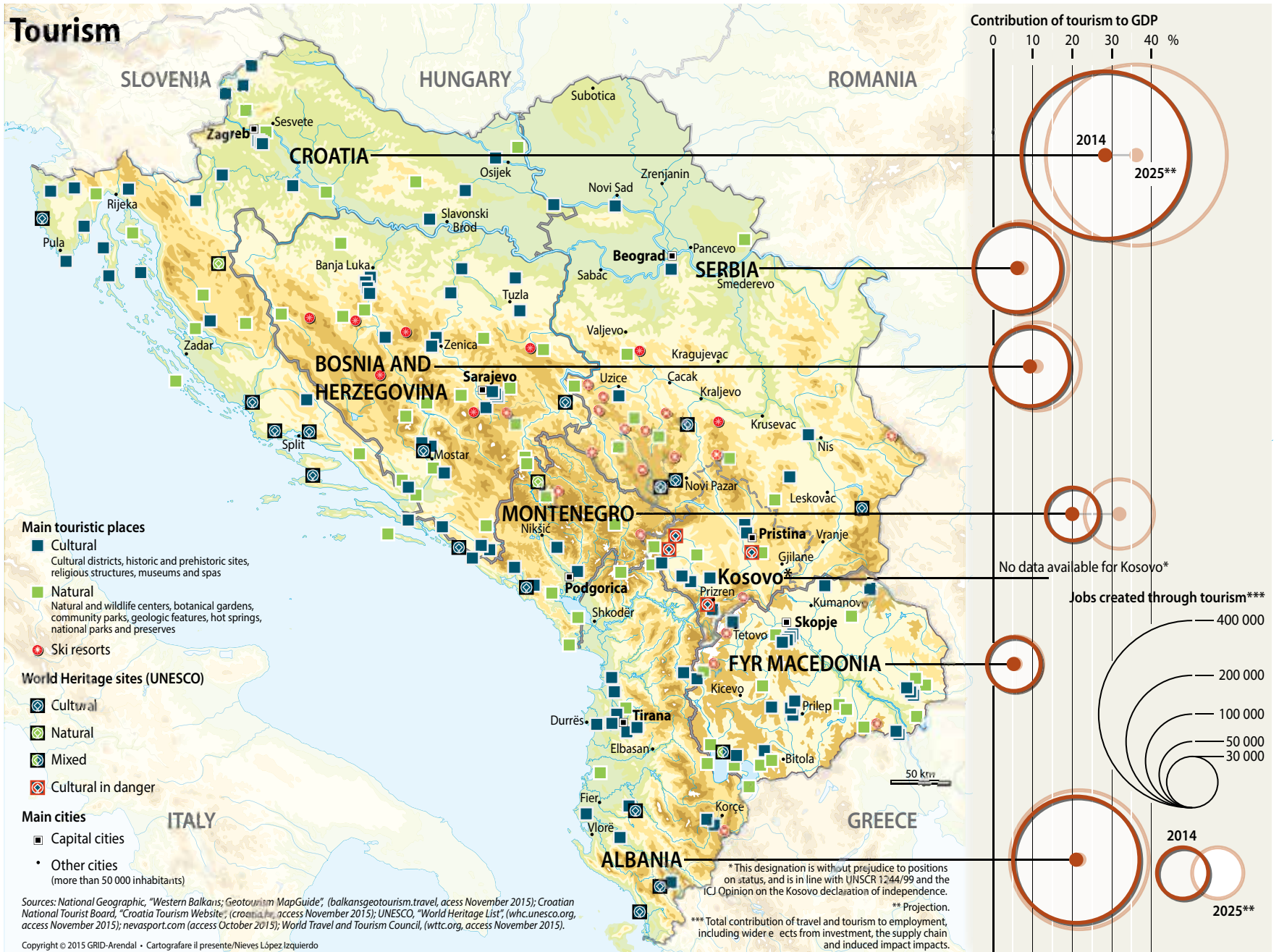
Climate change can compound the aforementioned existing environmental problems and pose increasing risks of water pollution. The waste produced from mining – known as tailings – contains large quantities of metals and minerals, ranging from benign to very toxic. These tailings, which are stored within tailing management facilities such as ponds and dams, are the most common cause for concern regarding pollution. Many tailing management facilities within the region are abandoned or neglected and do not receive regular maintenance, making them vulnerable to failure and therefore the release of contaminants into watercourses. This risk is increased through a combination of flooding (as a result of the more intense rainfall expected in the winter and spring months) and poor infrastructure. Apart from the pollution effects, potential for conflicts between countries increases if such contaminants cross national borders.

Tourism

The Western Balkans has vast potential for sustainable tourism due to its rich cultural heritage and diversity, attractive coastlines and historic cities, and some of Europe's largest and wildest landscapes. Tourism is one of the largest and also fastest-growing economic sectors in the region, and for most countries is expected to grow significantly both in



terms of contribution to GDP and creation of jobs. Croatia, Montenegro and Albania have the potential for further development of tourism in coastal areas, while FYR Macedonia, Serbia, Kosovo¹ and BiH have potential for winter tourism, and all have interesting historical sites and cultural and religious sites to visit. While tourism is mostly concentrated in coastal areas and historic cities, mountain tourism is also present and includes both winter and summer activities. All the countries have at least one ski resort and offer other winter activities as well. In warmer weather, tourism within mountains focuses on natural heritage, national parks, and local culture (UNEP/ ENVSEC, 2012). Although mountain tourism has received increasing attention over the past few years, its contribution to overall tourism remains low (e.g. Callaway *et al.*, 2010).



Similarly to agriculture, tourism depends on natural conditions to attract visitors – especially in coastal and mountain regions. Climate change is projected to have substantial impacts on sensitive mountain environments, with implications for the attractiveness of mountain environments for tourism and the occurrence of natural hazards (JRC, 2009). Mountain ski resorts are among the tourism sectors considered most at risk, as the duration of the snow season is expected to decrease significantly in the future (see Water chapter 2.2.1 above). The concentration of activities within a smaller surface area and a shorter period of the year could also place more pressure on sensitive mountain ecosystems. Coastal regions are also considered to be highly vulnerable to climatic conditions, with most visitors concentrated during between two and three summer months: the hottest periods of the year. As countries bordering the Adriatic Sea, Croatia, Montenegro and Albania⁷ can be considered highly sensitive to climate change, which could impact their tourism sectors in particular. In fact, the Mediterranean region as a whole is expected to become less attractive due to drought and heatwaves, which could raise the

temperatures above the comfort zone, and lead to a general scarcity of water (European Commission, 2009). On the other hand, increasing temperatures on the coast may favour tourism in hilly and mountainous areas, and shift coastal tourism towards the end of spring and the beginning of autumn (EU Adaptation Platform). Furthermore, tourists normally visiting “hotter” countries such as Greece may move further north to the Balkan countries for their holidays.

There are a number of other wide-ranging, potential indirect climate impacts on tourism within the region. River discharge and lake water levels, fresh water quality and temperature may be impacted, and karst aquifers may be particularly vulnerable. Changes or loss in biodiversity, altered agricultural production (e.g. wine tourism), increasing natural hazards (e.g. landslides and wildfires) and the increasing incidence of vector-borne diseases may all impact tourism to varying degrees. Mitigation policies that seek to reduce GHG emissions will lead to an increase in transport costs and may have an effect on tourists’ travel patterns. However, the

tourism industry will undoubtedly continue to be a growth sector in the region, despite the challenges of climate change.

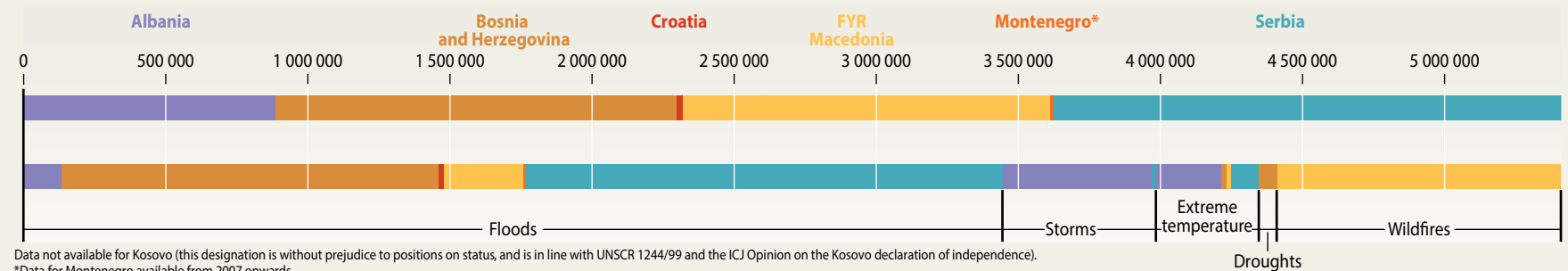
Human health

While warmer temperatures may bring some localized benefits, including fewer winter deaths in temperate climates, overall the effects of climate change on human health are expected to be negative worldwide (WHO, 2014). Despite the limited modelling of climate change impacts on human health in the Western Balkans, clear risks emerge; many of which are already manifesting themselves.

Heat extremes contribute directly to deaths from cardiovascular and respiratory disease, particularly among elderly people, with heat stress triggering heart attacks and strokes. Warmer air temperatures and heatwaves can also worsen air pollution and the concentrations of ground-level ozone. Even small increases in ground-level ozone can have an impact on health, including lung inflammation, decreased lung function, and an increase in asthma attacks. Poor

Climate-related disasters

Total affected people from 2000 to 2015



Data not available for Kosovo (this designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence).

*Data for Montenegro available from 2007 onwards.

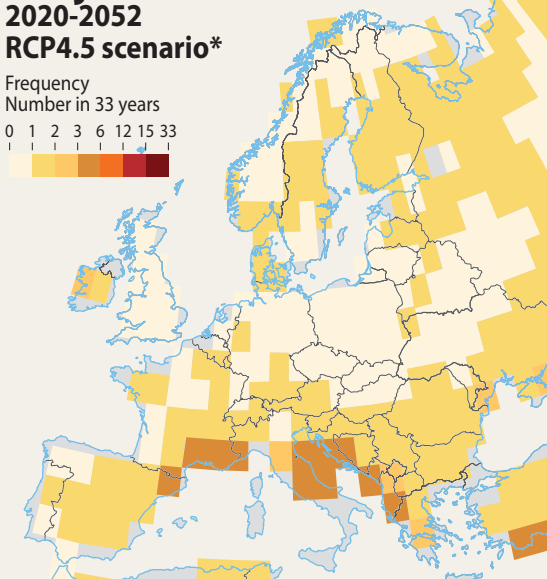
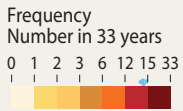
Source: The International Disaster Database (emdata.be, access October 2015).

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Projected extreme heat waves

2020-2052

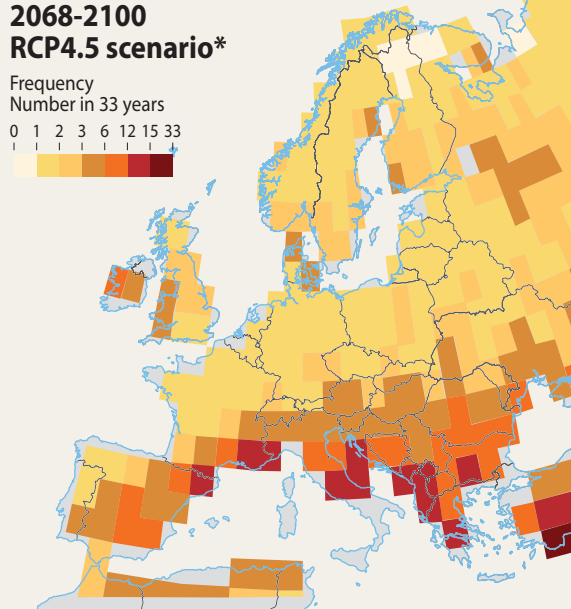
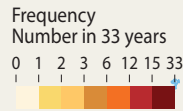
RCP4.5 scenario*



*RCP 4.5 scenario assumes that greenhouse gas emissions peak around 2040, then decline.

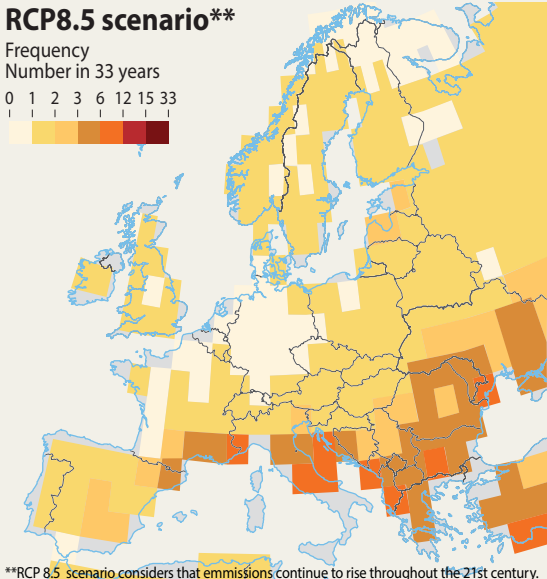
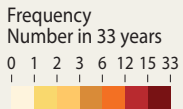
2068-2100

RCP4.5 scenario*



2020-2052

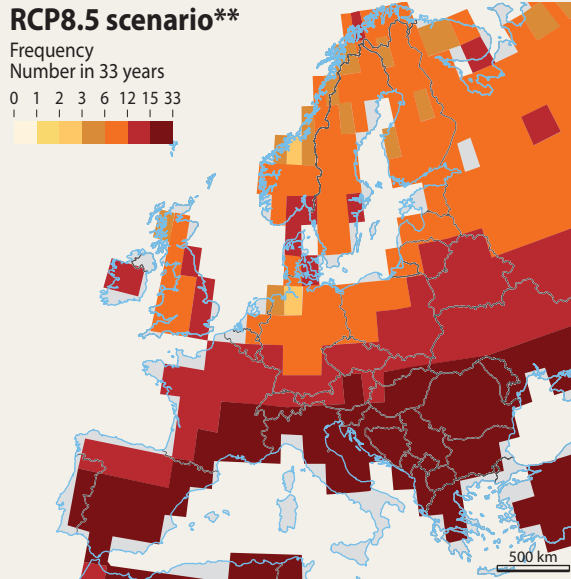
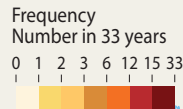
RCP8.5 scenario**



**RCP 8.5 scenario considers that emissions continue to rise throughout the 21st century.

2068-2100

RCP8.5 scenario**



Source: EEA, 2015, "Number of extreme heat waves in future climates under two different climate forcing scenarios" (eea.europa.eu, access October 2015).

urban waste management, including uncontrolled waste dumping and sewage ground dumping, can also raise the level of ground-level ozone. This has been documented in Pristina, Kosovo¹ (Faber and Ramadani, 2014).

Climate-related natural disasters and extreme events, such as droughts, floods, and wildfires, also directly affect people's health and well-being. Apart from the risk of being directly killed by floods, they (together with droughts) often cause population displacement, which can lead to outbreaks of infectious disease due to inadequate public health infrastructure, poor water and sanitation, overcrowding and lack of shelter (McMichael *et al.*, 2006). Most recently, incidents of *Sarcoptes scabiei* (a parasitic mite that causes scabies) were reported in Tuzla Canton, Bosnia and Herzegovina, following flooding events in May 2015 (Elmedina Krilasevic, personal communication, 2015). Warming temperatures are also likely to lengthen the transmission season for important vector-borne diseases (such as dengue fever) and extend their range, thereby increasing the occurrence of diseases.

The increased incidence and intensity of heatwaves are expected to shift temperature-related mortality from winter to summer, with fewer colder-related deaths and more heat-related ones. In the long-term, the net total number of climate-related deaths is expected to increase for the period 2050–2100 (Ballester *et al.*, 2011). Albania and FYR Macedonia are considered particularly exposed to heatwaves (UNEP/ENVSEC, 2012). In these countries, unprecedented heat extremes could occur in 60 per cent of summer months and droughts could increase by 20 per cent in a 4°C warmer world (World Bank, 2014).

Over the last few decades, the climatic conditions in the Balkans have become more suited to one of the

potential vectors of dengue fever and Chikungunya fever: the Asian tiger mosquito (*A. albopictus*) (Caminade *et al.*, 2012). Such conditions could promote the spread of the mosquito, which is currently found in most of Albania and Montenegro, and north-western areas of Serbia and Bosnia and Herzegovina, while local transmission of dengue in Europe was first reported in Croatia and France in 2010 (WHO, 2014b). There also appears to be a significant risk of the spread of tick-borne encephalitis (TBE) in the Western Balkans under future warming (Lindquist & Vapalahti, 2008).

Landmines pose a constant risk to human populations in some areas. Bosnia and Herzegovina has one of the most severe landmine problems in the world, with the majority concentrated in mountainous and forest areas, although lowland agricultural areas are also affected. Of the landmines laid during the 1992 to 1995 war, an estimated 120,000 landmines and un-exploded ordnance (UXOs) remain in the ground and 2.3 per cent of the total country is still considered suspect (BHMAL, 2015). With regards to landmines and climate change, recent flooding events highlight the key risks to human health. Many of the mines are made of plastic and can easily be shifted by the floodwaters. Following the floods in May 2015, one mine exploded in the Brčko district during clean-up operations. Residents within Bosnia and Herzegovina and Serbia reported mine sightings. Many of the warning signs delineating mine fields were also damaged and needed to be repaired (ReliefWeb, 2014).

Naturally-occurring flooding can also prove challenging for the regular identification and updating of landmine maps, such as is the case within Livno Polje (Bosnia and Herzegovina) where peatlands are regular flooded (Elmedina Krilasevic, personal communication, 2015).



Flooding from the Sava River, Serbia

Flooding in Croatia, Serbia and Bosnia and Herzegovina, 2014: Impacts for humans, agriculture and energy

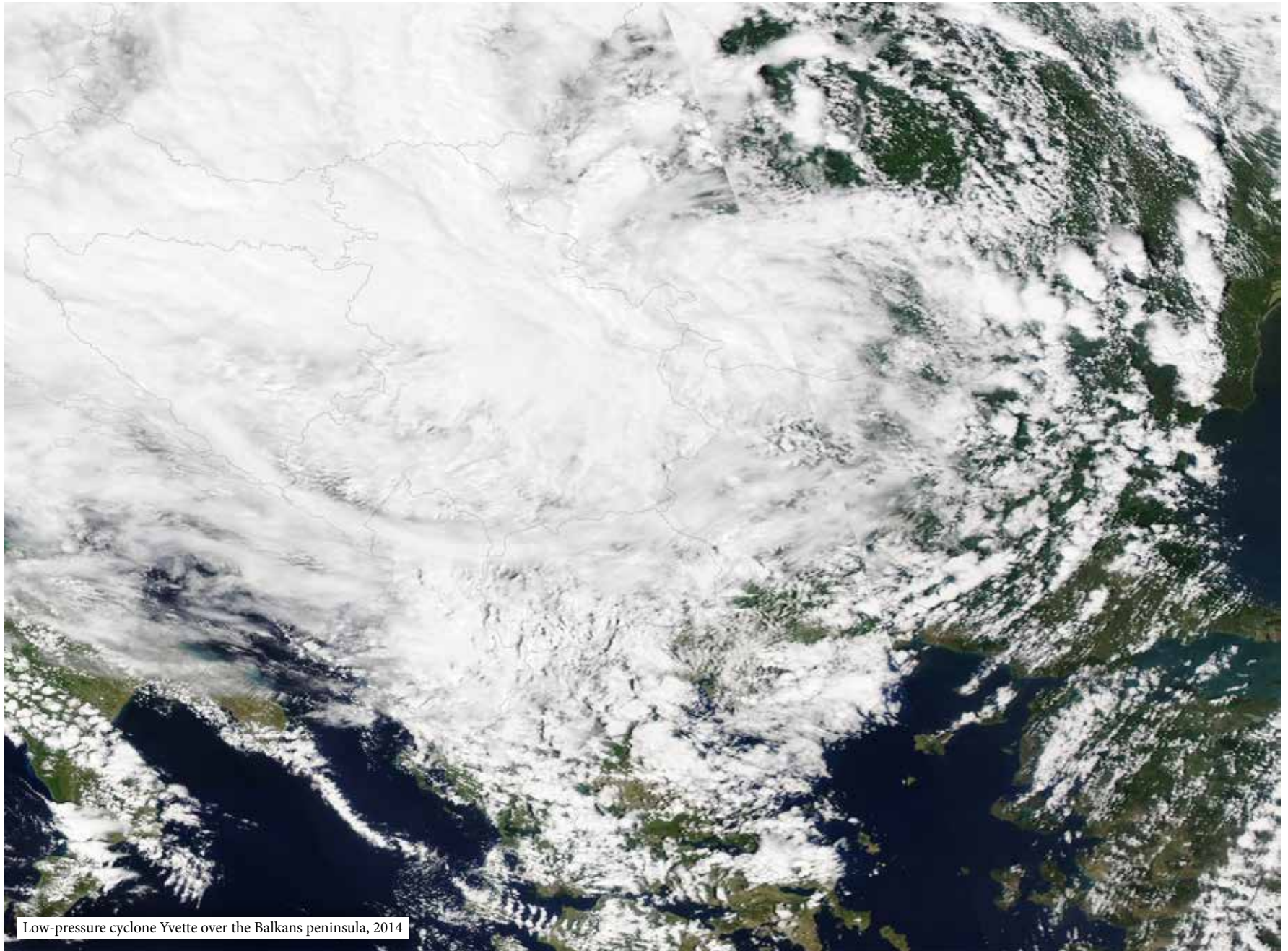
The risk of riverine floods is expected to increase in the future in the Western Balkans (World Bank, 2014), where recent events have demonstrated the vulnerability of human populations to floods. The equivalent of two months' rainfall arrived in just three days in 2014, causing extreme floods (the worst in 120 years for Serbia), killing 51 people and making an additional 31,000 homeless. Fifty-one thousand jobs were temporarily lost, and an estimated 125,000 people were driven below the poverty line. Overall, an estimated 1.6 million people were affected (United Nations Serbia *et al.*, 2014).

The flooding triggered 2,100 landslides in Bosnia and Herzegovina and 1,000 in Serbia. Flooding and

landslides are thought to have exposed landmines from the 1990s war and toppled warning signs, prompting fears of mines being transported far downstream.

The floods were a disaster for agricultural production. An estimated 80,000 hectares of arable land was flooded, damaging cereal crops, soybeans and sunflowers as well as horticultural crops. Infrastructures, processing facilities and farm equipment were also affected.

In addition, the flooding disrupted power supplies and led to a reported 40 per cent reduction in Serbia's electricity production (World Bank, 2014).



Low-pressure cyclone Yvette over the Balkans peninsula, 2014

Summary of Key hazards, vulnerabilities and risks

Climate hazard	Key vulnerabilities		Key risks ⁸
Reduced snow cover	<ul style="list-style-type: none"> • Heavy reliance of winter tourism economy on steady snow cover 	<i>ECONOMIC</i>	<ul style="list-style-type: none"> • Economic and livelihood losses for mountain communities reliant on ski tourism due reduced snow cover
Flooding from intense precipitation and accelerated snowmelt in spring and winter	<ul style="list-style-type: none"> • High geographic exposure of agricultural and farming land, homes, property and assets, including physical exposure of rural and urban populations to potentially flooded areas • Ageing energy infrastructure located in downstream flood-prone areas • Poor land management and spatial planning practices • Limited capacity of local and national public institutions to respond immediately to natural disasters, as well as to adapt to increased floods 	<i>SOCIAL ENVIRONMENTAL INSTITUTIONAL ECONOMIC</i>	<ul style="list-style-type: none"> • Significant economic and livelihood losses at the individual, local and national levels (including affecting GDP of national economies) due to flooding, including loss of land productivity due to land pollution (e.g. sludge) • Risk of landslides • Death and injury due to flooding • Displacement of populations post-flood event • Outbreaks of existing or novel diseases post-flood event
	<ul style="list-style-type: none"> • Tailings dams containing toxic pollutants in abandoned or poorly maintained/poorly monitored facilities at risk of failure due to flooding events • Exposure of landmine sites in at-risk floodplains with possibility of dislodging landmines 	<i>ECONOMIC ENVIRONMENTAL SOCIAL</i>	<ul style="list-style-type: none"> • Polluted water courses and related health issues due to flooding in industrial hotspots • Pollution-related damages to riparian habitats and agricultural land due to flooding in industrial hotspots • Decreased public safety due to flooding in landmine sites • Loss of habitats and ecosystem services
Increase in frequency and intensity of wildfires	<ul style="list-style-type: none"> • High exposure of forests, agricultural land and other important habitats (e.g., protected areas) 	<i>ENVIRONMENTAL</i>	<ul style="list-style-type: none"> • Loss of biodiversity, habitats and ecosystem services, as well as land degradation due to wildfires
	<ul style="list-style-type: none"> • High exposure of settlements and physical assets, including tourism operations, in wildfire-prone areas including coastal mountains and inland mountain areas • Lack of early-warning and fire-fighting capacities 	<i>ECONOMIC INSTITUTIONAL ENVIRONMENTAL SOCIAL</i>	<ul style="list-style-type: none"> • Significant economic and asset losses and disruptions to livelihoods at the individual, local and national levels and/or high rehabilitation costs • Displacement of people and communities
	<ul style="list-style-type: none"> • Populations, including urban, living in the vicinity of wildfire areas and exposed to gas and particulate matter (PM) from wildfire smoke 	<i>SOCIAL</i>	<ul style="list-style-type: none"> • Death or injury through direct or in-direct health impacts e.g. respiratory health problems due to wildfires

Summary of Key hazards, vulnerabilities and risks *(continued)*

Climate hazard	Key vulnerabilities		Key risks ⁸
Heavy snow precipitation and cold extremes	<ul style="list-style-type: none"> Rural mountain communities, particularly the elderly and children, located in high-altitude settlements with poor road access and/or poor housing and infrastructure to cope with heavy snowfalls and extreme cold 	<p><i>ECONOMIC</i> <i>SOCIAL</i> <i>INSTITUTIONAL</i></p>	<ul style="list-style-type: none"> Inaccessibility of essential services (e.g. emergency healthcare for elderly at times of need) and reduced communication due to heavy snow precipitation and cold extremes Increased cold-related mortality and morbidity especially among vulnerable sectors of the population Economic and livelihood losses due to loss of livestock
Appearance of new disease vectors	<ul style="list-style-type: none"> Urban and rural populations exposed to and unaware of prevention measures for new vector-borne diseases such as dengue fever, Chikungunya and tick-borne encephalitis, the spread of which is favoured by warming temperatures Limited capacities of health sector 	<p><i>INSTITUTIONAL</i> <i>SOCIAL</i></p>	<ul style="list-style-type: none"> Morbidity, illness and increased burden on healthcare systems due to emerging diseases Epidemics
Decreasing annual river discharge and low-flow periods in the summer, including droughts	<ul style="list-style-type: none"> Hydropower and thermal power facilities which are exposed to decreases in annual discharge and changing seasonality of river flows, and rising river temperatures 	<p><i>ECONOMIC</i> <i>INSTITUTIONAL</i></p>	<ul style="list-style-type: none"> Decreased security of energy supply, with inability/strain to meet energy demand during peak summer months when demand is highest and output is lowest
	<ul style="list-style-type: none"> The irrigation and water supply needs of agriculture and farming 	<p><i>SOCIAL</i> <i>ECONOMIC</i></p>	<ul style="list-style-type: none"> Loss of crop yield and livestock
	<ul style="list-style-type: none"> Poor water supply infrastructure, with high losses in the system 	<p><i>SOCIAL</i></p>	<ul style="list-style-type: none"> Water shortages, and water supply outage in major urban areas
Rising temperatures	<ul style="list-style-type: none"> Agricultural crops require certain temperature range to grow productively 	<p><i>ENVIRONMENTAL</i> <i>ECONOMIC</i></p>	<ul style="list-style-type: none"> Lower productivity leading to economic losses in the agricultural sector
	<ul style="list-style-type: none"> Significant presence of rare, endemic and vulnerable species and habitats that are sensitive to change temperature regimes 	<p><i>ENVIRONMENTAL</i></p>	<ul style="list-style-type: none"> Loss of valuable species and habitats

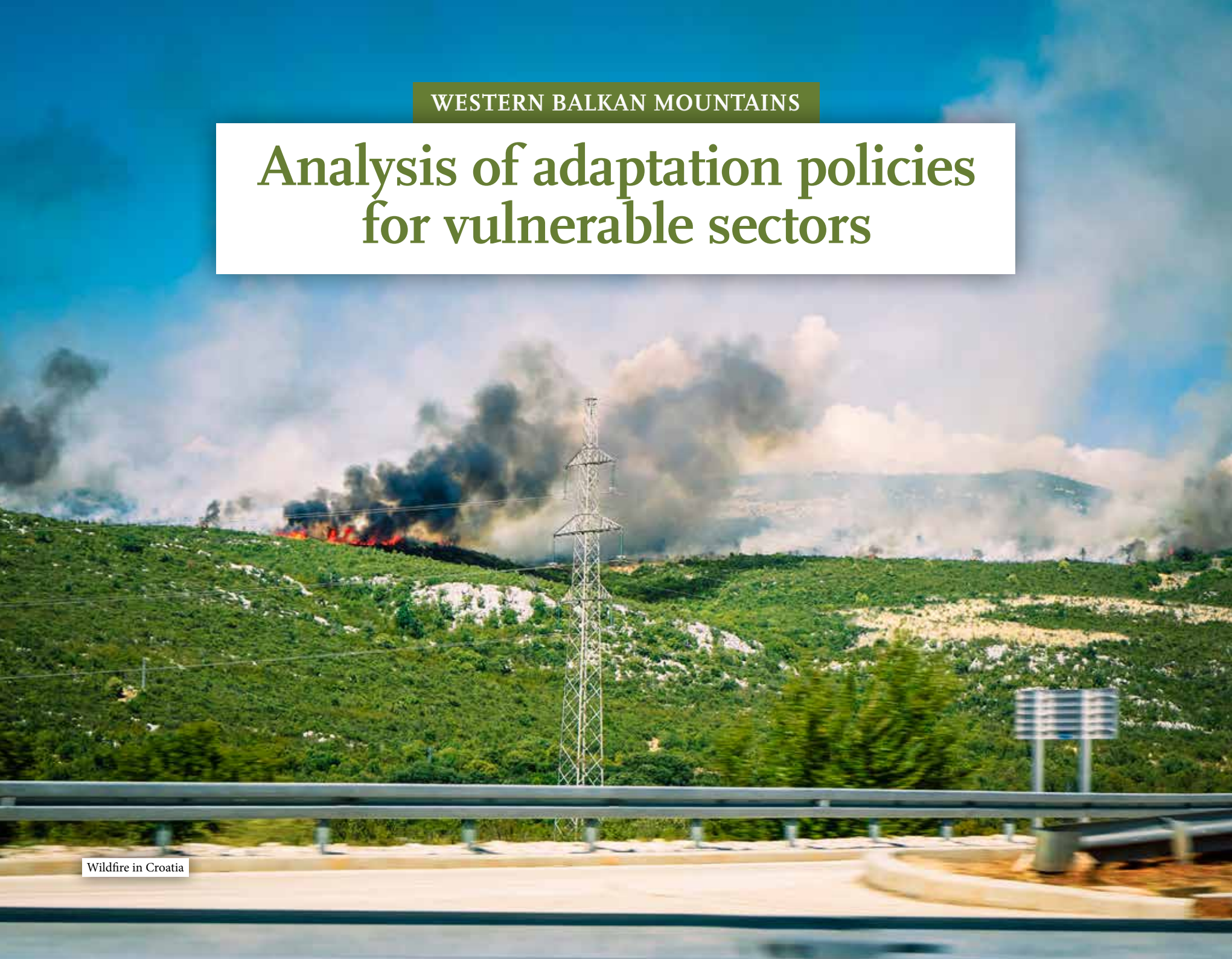


Summary of Key hazards, vulnerabilities and risks *(continued)*

Climate hazard	Key vulnerabilities		Key risks ⁸
Rising temperatures <i>(continued)</i>	<ul style="list-style-type: none"> • Temperature requirements of ecosystems to function as expected 	<i>ENVIRONMENTAL</i>	<ul style="list-style-type: none"> • Changes and disruption of balance of ecosystems leading to loss of ecosystem services and change of ecosystems distribution and diversity (e.g. migration to higher altitudes)
	<ul style="list-style-type: none"> • Soil moisture relevance for managing floods and fire risks 	<i>SOCIAL ECONOMIC ENVIRONMENTAL</i>	<ul style="list-style-type: none"> • Progressive decline in soil moisture leading to increased fire risk, reduced agricultural productivity, economic losses, and reduced ecosystem functioning
Increasing frequency and intensity of heatwaves	<ul style="list-style-type: none"> • Rural and urban populations alike, especially elderly, who are more likely to experience respiratory and cardiovascular problems during heatwaves 	<i>SOCIAL</i>	<ul style="list-style-type: none"> • Deaths from cardiovascular diseases in vulnerable populations (elderly); increased morbidity in the form of lung inflammation; increased asthma attacks due to heatwaves

WESTERN BALKAN MOUNTAINS

Analysis of adaptation policies for vulnerable sectors



Wildfire in Croatia

Policy responses at the Global, Regional and Sub-regional level

Global level

Over the past 20 years, governments have been intensifying their consideration of the threats posed by climate change by progressively implementing strategic policy action to tackle such changes, and in parallel, advancing scientific knowledge on the climate system for more informed decision-making.

The global policy response so far has mostly centred on mitigating climate change by reducing anthropogenic greenhouse gas (GHG) emissions. This strategy has been pursued by setting binding reduction targets of international instruments, such as the Kyoto Protocol, to the United Nations Framework Convention on Climate Change (UNFCCC). Most industrialized nations listed in Annex I of the Convention, including the European Union (EU), have committed to reductions until the end of 2020.

The complementary response to mitigation is adaptation, which entails facing the consequences of unavoidable changes by adjusting to new climatic conditions and climate variability, regardless of future emissions. At the global level, the UNFCCC and its Kyoto Protocol refer specifically to adaptation in several of their Articles and require the Parties' cooperation in this area. Industrialized countries have committed to supporting the most vulnerable developing countries with limited capacities to cope with the impacts of climate change (UN, 1992).

Within the UNFCCC process, adaptation covers five key elements needed to enable knowledge sharing and learning, namely:

- Observation of climatic and non-climatic variables
- Assessment of climate impacts and vulnerability
- Planning
- Implementation and

- Monitoring and evaluation of adaptation actions (UNFCCC, 2015).

In order to allow the functioning of such adaptation components, Parties should ensure technical and institutional capacities, as well as technological and financial support.

A number of institutions, mechanisms and workstreams have been established under the UNFCCC to allow Parties to undertake activities associated with knowledge on climate change impacts, vulnerability and adaptation, mostly coordinated under the Cancun Adaptation Framework.

The actual implementation of adaptation projects, programmes, policies and other activities is funded through the financial mechanisms of the Convention, via the Global Environment Facility (GEF) Trust Fund and three special funds under the UNFCCC and Kyoto Protocol: the Special Climate Change Fund (SCCF); the Least Developed Countries Fund (LDCF); and the Adaptation Fund (AF). The Green Climate Fund (GCF) represents the largest scheme under the UNFCCC, through which developing country Parties receive support both for adaptation and mitigation actions. Funding for adaptation also flows through bilateral and multilateral channels.

Outside the Convention, several UN agencies such as UNEP, UNDP, the United Nations Office for

Status of Western Balkan countries within the UNFCCC

Albania	ratified the Convention in 1994 (Non-Annex I)
Bosnia and Herzegovina	ratified the Convention in 2000 (Non-Annex I)
Croatia	ratified the Convention in 1996, added to AI in 1998 (Annex I, EIT)
FYR Macedonia	ratified the Convention in 1998 (Non-Annex I)
Montenegro	ratified the Convention in 2006 (Non-Annex I)
Serbia	ratified the Convention in 2001 (Non-Annex I)
Kosovo ¹	not ratified the Convention

Institutional arrangements on adaptation under the UNFCCC

Workstreams		Groups and Committees		
Approaches to address loss and damage associated with climate change in developing countries that are particularly vulnerable to the adverse effects of climate change	Nairobi Work Programme on impacts, vulnerability and adaptation to climate change	Adaptation Committee	Least Developed Countries Expert Group	Executive Committee of the Warsaw International Mechanism for Loss and Damage
National Adaptation Plans	National Adaptation Programmes of Action			

Disaster Risk Reduction (UNISDR), FAO and WHO, support the most vulnerable developing countries in adaptation-related activities. Other multilateral processes, such as the United Nations Convention to Combat Desertification (UNCCD), the Convention on Biological Diversity (CBD), the post-2015 process on the Sustainable Development Goals (SDGs), the Hyogo Framework for Action (HFA) 2005–2015 and the Sendai Framework for Disaster Risk Reduction 2015–2030 are also to be considered relevant fora where adaptation-related policies are discussed at the global level.

A new legally binding agreement on climate involving both developed and developing countries for the period from 2020 onwards is mandated to be adopted by the 21st Session of the Conference of the Parties (COP21) in Paris (30 November–11 Dec 2015). Acknowledging that the primary focus of the future agreement is reducing global GHG emissions and thus succeeding the Kyoto Protocol, Parties have made several proposals to also address adaptation and the issue of loss and damage, among other key elements, under the future climate regime.

These proposals are intended to raise the profile, enhance action and improve coordination of existing initiatives under the Convention, often mirroring the options being put forward on mitigation (e.g. a global adaptation goal, universal individual commitments on adaptation and an adaptation registry) (Helgeson and Ellis, 2015). Several countries, especially developing country Parties, have conveyed their eagerness to cover adaptation-related matters in the 2015 agreement by including an adaptation component in the so-called Intended Nationally Determined Contributions (INDCs) that were requested to inform the negotiations towards COP21 (UNFCCC, 2015b).

The characteristics of adaptation as opposed to mitigation (e.g. levels of implementation, stakeholders, timescale of assessment and link with Sustainable Development Goals), have raised great controversy among Parties as to the possibility of including binding provisions on adaptation in an international agreement. While UNFCCC is global in scope, science tells us that adaptation must be tailored to the context and the subjects involved, as it

is a function of the specific impacts of climate change of a country, region, or territory.

In addition, whether addressing loss and damage should be considered as a component of adaptation, or a distinct and separate category of measures and commitments to adaptation and mitigation, is one of the most critical issues under discussion.

With respect to the evolving scientific information on climate change, the latest IPCC Fifth Assessment Report (WGII AR5) dedicated to impacts, adaptation and vulnerability has shifted the focus of the analysis towards risks related to a changing climate. Such an approach highlights that risks are generated by three main components: vulnerability (lack of preparedness) and exposure (people or assets in peril) resulting from socioeconomic pathways and societal conditions which depend on changes in both the climate system and socioeconomic processes, coupled with hazards (triggering climate events or trends).

Actions to reduce future risk should target each of these factors either separately or jointly. In this light,

adaptation can be seen as a dynamic process through which countries and communities become more capable of preventing or managing the impacts of climate change by reducing risks, increasing resilience and addressing sustainable development needs.

Regional and subregional level

Global response actions need to be complemented with regional, national and local adaptation strategies that can address the numerous, varied and unavoidable impacts associated with climate change that will occur in spite of any successful mitigation actions. The UNFCCC requires that national and regional programmes contain measures for climate change adaptation.

Since climate change is likely to negatively affect countries at temperate zones to the same extent as countries at lower latitudes, adaptation has proved to be a major issue for developed nations too (Ford *et al.*, 2011). The EU and its Member States have widely engaged in adaptation and started to tackle these challenges through the establishment of adaptation strategies at all levels. The European Commission (EC) officially adopted the European Adaptation Strategy in 2013, following the release of a Green Paper in 2007 and a White Paper in 2009 that respectively opened the way to more attentive consideration of adaptation issues in Europe and outlined the fundamental concepts of the future Strategy.

The European Adaptation Strategy describes the objectives and a number of concrete actions to be taken by the EC in three priority areas in order to forge a more resilient Europe (EC, 2013), namely:

- Encouraging and supporting adaptation action by the Member States
- Ensuring informed adaptation decision-making processes and

- “Climate proofing” EU action and promote adaptation in sectors that are particularly vulnerable.

The Commission has encouraged all Member States to develop adaptation strategies that are consistent with national disaster risk reduction and management plans while including cross-border issues. Through the European funding scheme “LIFE”, EU financial support on adaptation and resilience focuses on building adaptive capacity, cross-cutting issues, cross-border and cross-sectoral adaptation (<http://ec.europa.eu/environment/life/>). The first LIFE calls for action grants, issued in 2014 and 2015 under the climate action sub-programme, included a series of themes of great relevance for climate change adaptation.

The EC also supports the efforts of European cities towards the preparation of local adaptation strategies and plans, and has invited them to make a commitment through the “Mayors Adapt” initiative. This aims to increase support for local activities, providing a

platform for greater engagement and networking by municipalities, and raising public awareness about adaptation (<http://mayors-adapt.eu>).

In order to support informed decision-making, the EC aims to fill the knowledge gaps on adaptation through a dedicated line in the “Horizon 2020” research and innovation funding programme (<http://ec.europa.eu/programmes/horizon2020/>). In addition, the European portal “Climate-ADAPT” (<http://climate-adapt.eea.europa.eu>), established in 2012 as a one-stop shop on adaptation information, has been improved through easier access to information and greater interaction with other platforms.

To address adaptation of the most vulnerable sectors, the EC continues to integrate adaptation into EU policies. Dedicated guidance for mainstreaming climate change into sectoral budgets has been provided for the Common Agriculture Policy (CAP), the Cohesion Policy and the Common

The 2013 EU Adaptation Strategy Package

The Strategy consists of a package of thirteen documents, the main element being the Commission’s Communication, “An EU Strategy for adaptation to climate change”.

The preparatory technical Impact Assessment accompanying the EU Adaptation Strategy document sets the context for the Strategy and presents possible enforcement options, ranging from non-binding measures to regulations (EC, 2013b; 2013c).

Furthermore, guidelines are provided for the preparation of Member States’ national adaptation

strategies (EC, 2013a), as well as for mainstreaming adaptation into cohesion policy and rural development.

A Green Paper on the insurance of natural or man-made disasters was also issued, launching a consultative process open to stakeholders (EC, 2013d). Other Commission staff’s working documents in the package explore the issue of adapting specific sectors and policy areas of interest to the Strategy, such as coastal and marine issues, health, infrastructure, environmental degradation and migration.

Fisheries Policy. The EC is also seeking to enhance the resilience of infrastructure to climate change in Europe through a review of the existing standards in the fields of energy, transport and construction.

Finally, the EC is promoting the use of insurance to protect against disasters, and other financial products for risk management and reduction in the European market.

The “Climate Change Committee” representing EU Member States coordinates the adaptation actions based on the Strategy. In addition, each country has appointed a national contact point to coordinate communication between the state and the Commission. The Commission envisages maintaining an open dialogue with stakeholders to ensure proper and timely implementation of the Strategy over time.

The European Environment Agency (EEA) assists European countries and EU institutions in deepening their understanding on ways to meet adaptation needs arising within regions, sectors or communities by regularly publishing updated reports on adaptation with a pan-European scope (see for instance EEA, 2012; 2013; 2014a; 2014b; 2015). According to the EEA, there is an appetite for further research that would support a sound and coherent political response on adaptation to climate change in Europe (EEA, 2013). Although the transferability of adaptation knowledge across European and neighbouring countries is considered key to facilitating countries at early stages of adaptation planning to swiftly and efficiently develop and finalize the policy process and implement concrete measures, the context-dependency of adaptation may affect the actual transferability. Therefore, special consideration should be given to subregional and local vulnerability, as well as to exposure and adaptive capacity factors, when drafting policies and plans for adaptation within a larger Europe.

Several cooperation initiatives are increasingly being undertaken on adaptation to climate change in the Western Balkan countries as a subregion. The EU has financed cooperation programmes and projects for the broader South-East Europe transnational region and other initiatives as part of the EU accession process to support candidate countries to transpose and implement a new set of climate change legislation.



Shepherd huts in the mountains, Bosnia and Herzegovina

The 2013 EU Forest Strategy

The EU Forest Strategy was adopted by the Commission in 2013 (EC, 2013e). In the context of the new challenges facing forests and the forest sector from a changing climate, the Strategy mentions the importance of adaptation actions to be undertaken in synergy with actions to mitigate climate change.

In particular, it calls on Member States to demonstrate “how they enhance their forests’ adaptive capacities and resilience, building on the actions proposed in the EU Strategy on Adaptation to Climate Change and the Green Paper on Forest Protection and information, such as bridging knowledge gaps and mainstreaming adaptation action in forest policies.”

National policy frameworks for adaptation

With regard to planned national adaptation efforts, Western Balkan countries have been designing, developing and implementing adaptation policies at different paces. Some countries have adopted or are currently developing policy instruments that are specifically designed to address climate change adaptation. Others currently rely on National Communications to the UNFCCC and different sectoral strategies that contain measures that are beneficial to adaptation.

Albania is highly vulnerable to climate change, and economically reliant on the sectors that are at risk from climate change. It joined the UNFCCC in 1995 and ratified the Kyoto Protocol in 2004. Since the ratification, Albania adopted and submitted two National Communications, while the third one is under preparation. The First National Communication contains an action plan (National Climate Change Action Plan) which contains mitigation and adaptation measures. This action

plan has been adopted until 2020, and is expected to be regularly reviewed. It foresees monitoring based on indicators that cover policy, legal, financial and awareness aspects of responses to climate change. The country has also adopted some strategic documents that contain adaptation measures.

Bosnia and Herzegovina (BiH) ratified the UNFCCC in September 2000 and has submitted its First and Second National Communications to the Convention Secretariat. In 2013, the Climate Change Adaptation and Low-Emission Development Strategy for BiH was adopted by the Council of Ministers in cooperation with the entity governments, representing the first step towards defining a comprehensive policy framework to respond to climate change. The Strategy identifies the vulnerability of BiH to climate change due to its geographic position, the economic importance of agriculture and forestry sectors, and its limited adaptive capacity. It addresses climate change mitigation and adaptation that is gender responsive,

foresees development of specific measures to ensure adequate support for the most vulnerable groups, and addresses governance issues. The Adaptation Strategy does not have allocated sources of financing, and relies heavily on foreign donors and development organizations for implementing concrete actions and programmes.

Croatia is recognized as a country that is vulnerable to climate change due to its climate and geographical features, as well as its heavy reliance on sectors potentially vulnerable to climate change and extreme weather. It became a Party to the Convention in 1996, and has already prepared six National Communications. By joining the EU in July 2013, Croatia has legally incorporated reporting obligations on the implementation of policy and measures intended to reduce emissions and increase CO₂ sequestration, and to periodically submit the long-term emission projections to the EU bodies. The Ministry of Environment and Nature Protection is currently preparing the Adaptation Strategy and action plan financed by the EU, with adoption envisaged for 2016. This Strategy will set the adaptation goals and priorities, in line with recommendations of the EU Strategy on Adaptation to Climate Change. In 2013, Croatia developed its Framework for Low-Emission Development Strategy to serve as a basis for the Low-Carbon Development Strategy, planned for adoption in 2015. The National Program to Reduce Road Transport Emissions, and the Strategy of Marine Environment and Coastal Areas Management will be completed by the end of 2015.

National Adaptation Strategies in the Western Balkans

Albania	–
Bosnia and Herzegovina	2013 – Climate Change Adaptation and Low-Emission Development Strategy
Croatia	under preparation
FYR Macedonia	–
Montenegro	–
Serbia	–
Kosovo ¹	2014 – National Adaptation Component (as part of the Climate Change Strategy)

Croatia has developed its administrative capacity for climate change issues. According to the Air Protection Act (Official Gazette No. 130/11, 47/14), the Ministry of Environmental and Nature Protection is responsible for climate change issues, and is the national focal point for the UNFCCC. The Directorate of Climate Activities, Sustainable Development and Protection of Air, Soil and Sea, hosted by this Ministry, carries out administrative and technical work related to climate change mitigation and adaptation. The Commission for Inter-Sectoral Coordination of Policies and Measures to Mitigate and Adapt to Climate Change has been appointed by the Decision of the Government (Official Gazette No. 114/14). The Commission includes institutional representatives of ministries and agencies to discuss policy issues, while experts and practitioners from various sectoral institutions will address technical issues. Being an EU member, Croatia has full access to EU funds for the development of its climate-related strategies, as well as for their implementation. According to the Air Protection Act (Official Gazette No. 130/11, 47/14), the implementation of climate change adaptation measures will be financed also by the Environmental Protection and Energy Efficiency Fund.

FYR Macedonia ratified the UNFCCC in 1997 and the Kyoto Protocol in 2004. The government of FYR Macedonia submitted the First, Second and Third National Communications to the UNFCCC Secretariat in 2003, 2008 and 2014, respectively. The First Biennial Update Report will be carried out in the coming two years. Taking into consideration the EU

association process, FYR Macedonia needs to develop a comprehensive policy and strategy on climate change, in accordance with the expected EU 2030 policy framework for climate and energy. The country has not yet put forward a mitigation commitment for 2020, as required by the Copenhagen Accord that it signed. Climate change issues are incorporated into the Law on Environment, which details the preparation of GHG emissions inventory (Article 188), and adoption of a National Plan for Mitigation (Article 187). In 2000, the Climate Change Project Office was established within the Ministry of Environment and Physical Planning aimed at improving the monitoring and coordination process of the implementation of UNFCCC in FYR Macedonia. This Office provides logistic support to the National Climate Change Committee – the inter-ministerial body meant to supervise and coordinate the implementation of UNFCCC, and climate change-related activities. The Committee is comprised of government institution's representatives, but also has members from public institutions and the non-government sector.

Domestic financial support for climate adaptation activities is limited: there are no allocations for climate change response within the relevant ministries' budgets. The projects handling climate change were therefore mainly funded by international organizations such as UNDP, GEF and USAID, as well as bilateral and multilateral donors.

Montenegro forests are extremely important from the ecosystem and economic perspective. Tourism

is considered as very important for the overall economy of Montenegro. Montenegro became a member of the UNFCCC as a non-Annex 1 Party in 2007 and ratified the Kyoto Protocol the same year. It prepared and submitted its First National Communication in 2010, while the Second National Communication was submitted to the UNFCCC in May 2015. National Strategy on Climate Change by 2030 was adopted by the government of Montenegro in September 2015. The Strategy has a strong focus on mitigation, but strongly recommends development of the National Adaptation Plan, for which it provides detailed guidance.

Montenegro is in the process of transposing the *acquis communautaire* into its national legislation, particularly in environment and energy sectors, due to its membership of the Energy Community. Based on the Proposal of the new Law on Environment, Montenegro needs to adopt a national plan for climate change mitigation and another to combat desertification and soil pollution. The Technology Needs Assessment for Climate Change Mitigation and Adaptation (National Strategy and Action Plan) was adopted in 2012.

The Ministry for Spatial Planning and Environment is the body responsible for environmental policy, including climate change. The Environmental Protection Agency plays an important role in its implementation through permitting, inspection control, monitoring and reporting. The Agency maintains a national GHG Inventory. Another

significant role in adaptation to climate change is played by Institute for Hydrometeorology and Seismology. In 2008, the Ministry was designated as the national authority for approving Clean Development Mechanism (CDM) projects. As with other Western Balkans countries, funding for climate change is heavily dependent on international support (EU funds, EBRD, KfW, GEF/UNEP, GIZ), although some projects are implemented through national budget funding.

Serbia joined UNFCCC as a non-Annex I Party in 2001, and ratified the Kyoto Protocol in 2008. Under the Convention, Serbia does not have GHG emission reduction commitments, but it has obligations to establish and implement measures and activities that contribute to achieving the objectives of the Convention. It submitted its First National Communication in 2010. The Second National Communication – currently under development – will contain an overview of realized adaptation measures, and will also analyse the climate change impacts and risks for water management, forestry and agriculture sectors, since they have been identified as vulnerable and important to national development goals. At present, the First National Communication is the only strategic document for climate change responses which also addresses the needs of other sectors in Serbia. Considerable progress has been made to harmonize national legislation with the EU requirements. The Air Protection Act (Official Gazette of RS, 36/2009 and 10/2013) deals with climate change mitigation. It foresees adoption of the Air Protection Strategy (including response to climate change).

The Ministry of Agriculture and Environmental Protection is a national focal point for UNFCCC and the Kyoto Protocol, with a recently opened Department for Climate Change. The Environmental Protection Agency is responsible for the GHG Inventory.

The national budget contributes to financing climate change projects, but its funds are not enough to meet climate change adaptation requirements for Serbia. Climate change responses are therefore mainly financed through projects funded by international donors and ministry programmes, although these sources are not strictly oriented to adaptation.

Kosovo¹ is highly vulnerable to climate change since two of its most important economic sectors – agriculture and forestry – are climate dependent. Kosovo¹ has not yet been recognized by the United Nations system. Consequently, it is not eligible for the ratification of international conventions, although it could participate in negotiations as an observer under UNSCR 1244. Kosovo¹ is, however, committed to aligning its legislation with the EU legislation, given its EU approximation process. Additionally, the climate change adaptation strategy is relevant for Kosovo¹ to meet the EU approximation requirements, particularly in its assessment and management of flood risks under the EU Flood Directive.⁹

While there is a need for innovative approaches to secure adaptation, current institutional arrangements are insufficient to manage these new challenges adequately. The authority responsible for

climate change is the Ministry of Environment and Spatial Planning (MESP), namely its Department of Environmental Protection, while Kosovo¹ Environment Protection Agency (KEPA) monitors the state of the environment.

National funding allocations to environmental issues are still not sufficient, and it is expected that domestic funding will remain low for the foreseeable future. Therefore, the funding for adaptation will heavily depend on the private sector, international donors and the EU funds. Establishment of an environmental fund is foreseen for the end of 2015.

Specific consideration of mountain areas is particularly poorly represented in the climate change policies of all the countries. Most countries, apart from Croatia, are in the initiation stages of their overall policy response to climate change, with most climate considerations being either donor-driven or a part of EU accession requirements. Most countries have started recognizing the importance of and vulnerability to climate change, especially of the sectors reliant on natural resources. Concrete and innovative responses to climate change adaptation are still in the inception phase, hampered by limited capacity and sources of funding for adaptation.

Sectoral Strategies

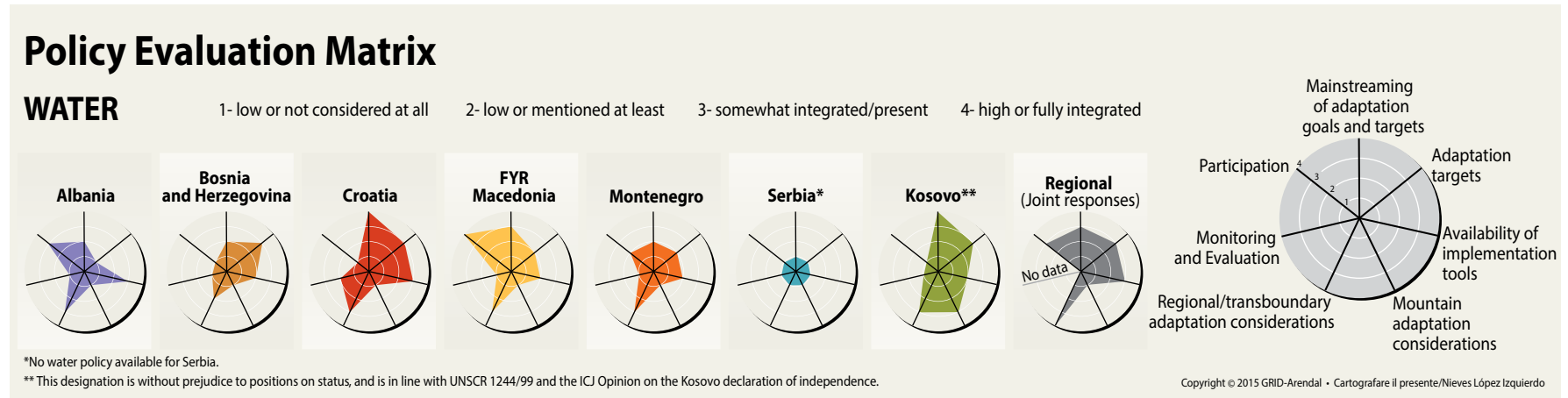
Water

Water sector legislation is quite similar in all of the Western Balkan countries, with the exception of Croatia due to its direct implementation of the key EU directive. The water sector is regulated at the state level in all countries, except in BiH where the entity governments are responsible for adoption of legislation, planning and development of the sector. There are no direct references within policies which link climate change in general, or climate change in mountain regions specifically, to water management. However, water legislation deals with water-related natural disasters such as flooding, which can be associated with climate change in certain cases.

BiH, Croatia, Serbia and Slovenia are Parties to the Framework Agreement on the Sava River Basin (FASRB).¹⁰ The purpose of this agreement includes the establishment of sustainable water management and the undertaking

of measures to prevent or limit hazards on the Sava River, which was the biggest national river in former Yugoslavia. One of the projects implemented under this Framework Agreement was the pilot project on climate change, entitled “Building the link between flood risk management planning and climate change assessment in the Sava River Basin”, which was implemented between March 2011 and December 2013. Through expanded and strengthened collaboration among the countries in the Sava River Basin, the project’s goal was to address transboundary management of floods while taking into account the impacts of climate change under different scenarios and the perspective adaptation measures. The project outcomes included several reports and studies, including the Report on climate change adaptation measures for flood protection in the Sava River Basin (2014) which recommended a series of measures including the implementation of flood early warning systems and the renovation or construction of new flood protection measures (Brilly *et al.*, 2014).

Albania, BiH, Croatia, and Montenegro are contracting Parties to the Barcelona Convention against Pollution in the Mediterranean Sea,¹¹ a regional convention meant to prevent and abate pollution from ships, aircraft and land-based sources in the Mediterranean Sea. This Convention has seven protocols addressing specificities of Mediterranean environmental conservation, one of which is the Integrated Coastal Zone Management (ICZM) protocol for the Mediterranean.¹² The ICZM Protocol has six goals, including the prevention and reduction of natural disasters and climate change (European Union, 2011). The Action Plan for the implementation of the ICZM Protocol 2012–2019 was adopted in 2012. It has identified the need for climate change to be fully integrated into the ICZM process, and has defined specific objectives that include mainstreaming of climate change responses in the delivery of the Protocol by promoting the development of methodologies and



Adaptation to climate change: the ENVSEC Initiative

Established in 2003, the Environment and Security Initiative (ENVSEC) recognized climate change as a core development challenge with potentially serious implications to international peace and security. The objective of ENVSEC's climate change and security work is to enhance the capacities of countries (including in South-Eastern Europe) in the management of security risks resulting from climate change, many of them water-related.

The key areas of its assistance are:

1. Providing technical assistance to enhance knowledge base of climate change impacts and their interrelation with security: vulnerability assessments of security impacts of climate

- change, and identification of hotspots
2. Providing support to regional dialogues and cooperation: information sharing and regional coordination through regional meetings and transboundary projects
3. Strengthening relevant policies, institutions and capacities on the national and regional levels to address climate change risks and develop regional adaptation strategies
4. Facilitating risk communication and raising awareness on security impacts of climate change: information dissemination, establishment and support to knowledge networks.

For further information, please visit <http://www.envsec.org/>

Land resources

Even though the Western Balkan countries are facing serious land degradation threats and Albania has several laws focused on establishing the measures and structures for preventing land degradation),¹⁴ in general legislation for land protection is scarce and insufficient. For the countries other than Albania, only certain strategic documents pay attention to land resources either as a distinct sector or as mentioned within sector-specific policies on agricultural land, spatial planning, geological research, and mining.

Besides evaluating the current state of land resources qualitatively and quantitatively in each country, these strategic documents define goals or targets as well as short- and medium-term measures. These include: preventing soil erosion and degradation; promoting sustainable land management in hill and mountain areas; improving sustainable financial mechanisms for land use and coastal zone management; developing plans and programmes to combat desertification; establishing and strengthening information systems for land

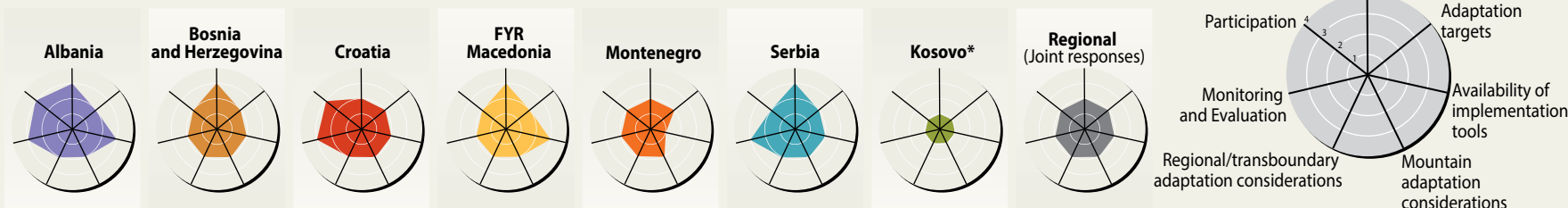
tools for mainstreaming climate change into ICZM Plans and Strategies, as well as into coordination mechanisms committed to this action.¹³ The project, entitled Integration of Climatic Variability

and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean (ClimVar project), was launched in January 2013 within the MedPartnership.

Policy Evaluation Matrix

LAND

1- low or not considered at all 2- low or mentioned at least 3- somewhat integrated/present 4- high or fully integrated



* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

management and land monitoring; establishing measures against fires and floods; and raising public awareness about the importance of land protection. Although issues regarding climate change adaptation are not mentioned specifically in laws, there are competencies among ministries and relevant bodies.

In addition to these strategic documents, all countries except Kosovo¹ have undertaken the National Capacity Self-Assessment (NCSA) for Global Environment Management, which assesses the key capacity needs and cross-cutting capacity bottlenecks in relation to implementation of the three Rio conventions (biodiversity, climate change and desertification/land degradation). This NCSA document calls for the fulfillment of national reporting obligations by each UNCCD Party, which the countries have accomplished to varying extents over successive reporting cycles.¹⁵ All countries except Kosovo¹ included performance indicators in their Fifth National Reports to the UNCCD in 2014.

Another significant document on land degradation is the National Action Program (NAP), currently being developed through a participatory approach. The NAP should provide practical steps and measures to combat land degradation in specific ecosystems. Most of the NAP documents are under different stages of development,¹⁶ and none of them have yet been officially adopted.

One of the significant initiatives/programmes for climate change adaptation at the regional level is the Drought Management Centre for South-Eastern Europe (DMCSEE). Other interesting and relevant initiatives/programmes for land resources are the Adriatic Ionian Program 2014–2020 including Croatia, Albania, BiH, Montenegro, and Serbia,

Regional cooperation on drought monitoring

Over the past decades, drought-related damages have had a significant impact on welfare and the economy within the Western Balkans. In 2009, a Drought Management Centre for South-East Europe (DMCSEE) was established, largely thanks to the work of the International Commission on Irrigation and Drainage (ICID), the World Meteorological Organization (WMO), UNCCD and national meteorological and hydrological services.

The mission of the DMCSEE is to coordinate and facilitate the development, assessment, and application of drought risk-management tools and policies in South-Eastern Europe in order to improve drought preparedness and reduce drought impacts. It also focuses on monitoring drought and assessing its related risks and vulnerability. As part of its information services, it publishes a monthly drought bulletin.

For more information, please visit www.dmcsee.org

among others; the Danube Transnational Programme 2014–2020 including Croatia, BiH, Montenegro, and Serbia, among others; and the Balkan-Mediterranean Transnational Programme 2014–2020 including Albania and FYR Macedonia, among others.

Mountainous areas are partially mainstreamed through the land resource sector policies. For example, in strategic documents, mountain areas are mentioned in terms of sustainable land management (e.g. rehabilitation of irrigation and drainage infrastructure, improving watershed management, and forest regeneration/afforestation), which can be indirectly linked to the climate change adaptation responses. For instance, the National Adaptation Strategy (2014) for Kosovo¹ foresees several actions to address adaptation for mountain regions, which include soil conservation measures.¹⁷

Monitoring and reporting on land resources is generally scarce in Kosovo,¹ FYR Macedonia and BiH since there is no national soil monitoring. Efforts are limited to ad hoc observations on the scope of projects, soil quality evaluations, studies and other activities performed by different

institutions and organizations. However, in the other countries monitoring and reporting is being enhanced. In Albania, the Integrated Environmental Monitoring System has been established and expanded for soil pollution and monitoring, while in Montenegro, monitoring of soil contamination by hazardous substances and monitoring of soil quality is undertaken. The Croatian Environment Information System (CEIS) is underway to link various databases including soil/land issues.

Generally speaking, the participatory process for policy development includes consultative and inter-ministry meetings, seminars and conferences which involve various sectors that are directly or indirectly linked to land resources (e.g. water, agriculture and forests) and their institutions and organizations. Although a gender balance within the National Coordination Body (NCB) for UNCCD has been reported for Croatia, Albania and FYR Macedonia, an analysis of strategic documents shows that gender issues do not appear to be pertinent to land degradation and desertification.



Food Market, FYR Macedonia

Food resources

Agricultural legislation defines the basis for sustainable agriculture in all Western Balkan countries. However, so far this legislation has not integrated climate change adaptation, nor are mountain areas reflected. The only exception is the recently adopted Law on Agriculture of the Republic of Croatia, given that the EU directives have been transposed to Croatian legislation as part of its recent accession to the EU. This law refers to promoting competitiveness of agriculture through a multi-purpose production adapted to climate change, and to ensuring sustainable management of natural resources that entail actions to respond to climate change. Particular attention is paid to the adaptation aspects important for rural development.

Forests and biodiversity

All countries are undergoing several important forest policy processes, such as developing national forest programmes, revising forest legislation, developing national action plans to combat illegal logging, forest certification, and the preparation of forest

Policy Evaluation Matrix

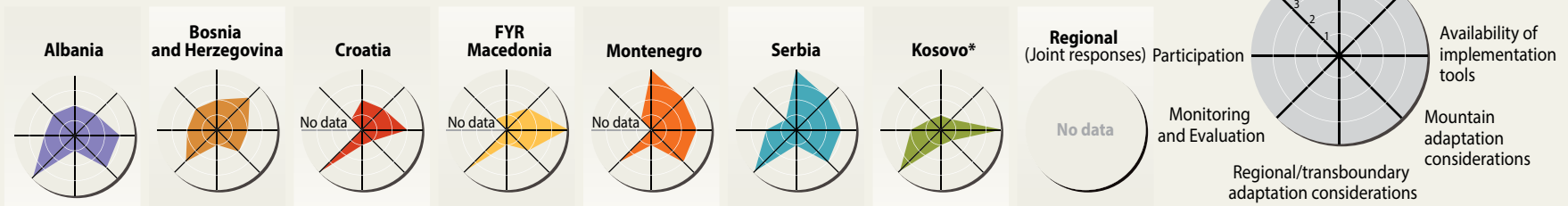
FOOD

1- low or not considered at all

2- low or mentioned at least

3- somewhat integrated/present

4- high or fully integrated



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inventories. All countries, except Albania, FYR Macedonia, Kosovo,¹ and Federation BiH (one of the two Entities within BiH),¹⁸ have adopted new forest legislation aiming to introduce multifunctional and sustainable of forest management. A number of nature protection regulations have been integrated into forest legislation.

Forest and nature protection legislation has not been designed specifically to deal with climate change adaptation. The legislation does, however, cover many important aspects for climate change mitigation and adaptation through the sustainable use of forests and nature, preserving biodiversity and maintaining the functions of ecosystems. Such laws regulate the conservation and restoration of biological and landscape diversity, environmental monitoring, establish a system of protection for natural areas and areas of high conservation value, as well as providing safeguards from harmful social and economic activities. Forest legislation provides the framework for the conservation and management of forests (e.g. silviculture, exploitation and afforestation). It also covers water protection, climate, biodiversity and other social values of forests through establishing a

framework of forest areas conserved and managed for such purposes (e.g. water protection zones, seed forests, high conservation value forests, recreation forests and protected forest areas). These laws also provide financial frameworks for afforestation and reforestation by establishing special purpose funds, which in most cases are replenished from profits of forest utilization, and taxes on air polluters such as vehicles and/or industry.

With the exception of Kosovo,¹ all the Western Balkan countries have ratified the Convention on Biological Diversity (CBD) and have adopted National Biodiversity Strategies and Action Plans (NBSAPs) as the principal instrument for implementing the Convention at the national level.¹⁹ Nevertheless, Kosovo¹ has adopted a NBSAP as unilateral commitment. Often these policies serve more than one goal by including sustainable use of resources, nature protection, and a climate change adaptation perspective.

Protected areas

Protected areas – which have been recognized as an essential tool for conserving biodiversity – are

Afforestation measures prescribed by forest legislation in Serbia

According to Law on Forests in Serbia (Article 16), the owner or user (either state or private) of the forests shall perform rehabilitation and reforestation measures on specific areas. These include bare lands as a result of a natural disasters (fire, wind, snow, etc.), areas where rejuvenation and afforestation have failed, and devastated surface areas from illegal clear cutting, forest clearing and illegal cutting of rare tree species. According to Article 80, the budget of Serbia and Vojvodina shall include resources for the implementation of priority measures and development for programmes aimed at:

- Increasing forest cover by afforestation
- Improving the state of coniferous forest plantations
- Conversion of coppice into higher silviculture forms
- Production of forest reproductive material (seeds and seedlings).

Policy Evaluation Matrix

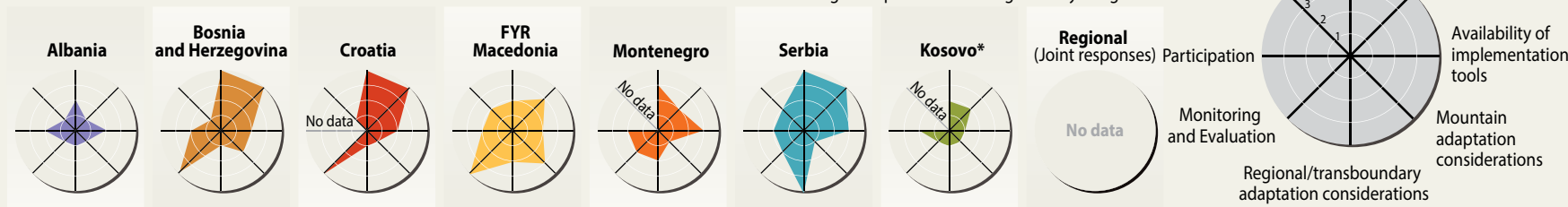
FORESTRY AND BIODIVERSITY

1- low or not considered at all

2- low or mentioned at least

3- somewhat integrated/present

4- high or fully integrated



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A green tax based on the Croatian Law on Forests

Croatia's "green tax" is prescribed by the Law on Forests, and is a fee that is charged to all legal and physical persons in Croatia that engage in economic activity as a percentage of all revenues acquired in Croatia and abroad. This fee was set at 0.07% of all revenues in 2005, but was subsequently reduced to 0.0265%. The total funds for 2012 were € 27m.

These funds are allocated to the state budget and then transferred to Croatian Forests Ltd., which uses these funds for forests-related activities, including scientific research. In 2011 these funds were allocated to the following activities (in descending monetary value):

- Demining of forests and forest land
- Forest infrastructure
- Forest keeping
- Division for private forests
- Management of forests on karst terrain
- Forest protection
- Forest monitoring
- Fire prevention
- Pre-commercial thinning
- Scientific research

important for climate change adaptation. They play a crucial role in: (i) supporting species to adapt to changing climate patterns and sudden climate events by providing refuges and migration corridors; (ii) protecting humans from sudden climatic events and reducing vulnerability to floods, droughts and other weather-induced problems; and (iii) supporting economies to adapt to climate change by reducing the costs of climate-related negative impacts.

The Dinaric Arc Initiative and other nature protection networks in the Western Balkans

The **Dinaric Arc Initiative (DAI)** is a joint effort by international organizations including WWF, IUCN, UNESCO, FAO, UNDP, Council of Europe, UNEP, SNV and EuroNatur. Among its goals, it seeks to preserve the wealth and integrity of the Dinaric Arc eco-region by establishing networks of protected areas and ecological corridors, and providing support to initiatives for the conservation of the eco-region's biological diversity and the sustainable management of its resources. The Dinaric Arc has proposed the Framework Convention on the Protection and Sustainable Development of South-Eastern Europe Mountain Regions, which aims at preserving the wealth and integrity of the Dinaric Arc and other mountain regions in South-Eastern Europe.

For further information, please visit <http://www.dinaricarc.net/dai.html>

Natura 2000: The south-eastern countries have begun cooperating on conservation through various European and International Conventions.

Two widely known networks are the Emerald Network (working under the Bern Convention) and the Natura 2000 Network (working under the EU Birds and Habitats Directives). As a Member State of the European Union, Croatia greatly contributes to the natural heritage of the EU with 87 bird species and 53 regularly occurring migratory bird species, 135 other species and 74 habitat types on reference list. About 29 per cent of Croatia's territory is included in Natura 2000 Network. Through its EU accession and technical adaptations of the EU Directives, Croatia proposed inclusion of 11 species and two habitat types specific to Croatian and Dinaric karst to Natura. This demonstrates Croatia's strong responsibility for nature conservation policy.

For further information, please visit:

- Sida's Helpdesk for Environment and Climate Change (2012). Western Balkan – Environment and Climate Change Policy Brief. Available at: <http://sidaenvironmenthelpdesk.se>
- State institute for nature protection of Croatia. Available at: www.dzpp.hr

The number and size of protected areas in the region has been increasing, although the share of protected land is still low if compared to that of the EU. Protected areas that have been established recently, or are in the process of being included in the transboundary protection system, include Neretva River Delta, Skadar Lake, Ohrid Lake, Prespa Lake, Bjeshkët e Nemuna Mountains, Djerdap National Park, Balkan and Tara Mountains, and Danube River.

Energy

Emerging policies and actions aim to increase the efficiency of energy production and consumption, and to promote a transition to low or zero-carbon energy sources. These policies, which are clearly relevant to climate change, entail synergies (and trade-offs) between often overlapping mitigation and adaptation strategies. While the introduction of renewable sources

of energy is considered more of a climate change mitigation measure, energy efficiency can also be seen as an adaptation measure since it contributes to the reduction of energy demand and energy consumption. Reduced energy consumption can also be observed through the indicator of lower energy intensity.

The energy sector is one of the most polluting sectors of the regional economy and is a major source of GHG emissions. Energy policies related to climate change focus mainly on mitigation. All Western Balkan countries have energy development strategies at the national level, with the exception of BiH which has adopted them at the level of its two entities: the Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS). Some Western Balkan countries have adopted further strategies, such as the Heating Strategy in Kosovo,¹ the National Strategy for Energy Efficiency and the Strategy for Utilization of Renewable Energy Sources in FYR Macedonia, and the Energy Efficiency Strategy in Montenegro.

Albania, BiH, FYR Macedonia, Montenegro, Serbia and Kosovo¹ are Contracting Parties of the Energy Community, established in October 2005 by the



Perućac lake and dam, Bosnia and Herzegovina

Policy Evaluation Matrix

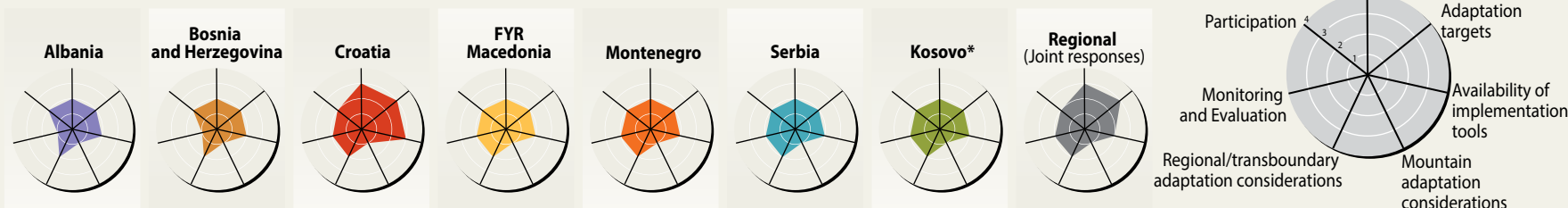
ENERGY

1- low or not considered at all

2- low or mentioned at least

3- somewhat integrated/present

4- high or fully integrated



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European Union and countries from South-East Europe and the Black Sea region.²⁰ In October 2012, the Energy Strategy of the Energy Community was adopted; the first step towards streamlined and cost-efficient energy infrastructure planning in the region. The Strategy considers the impacts of climate change in order to appropriately adapt the current energy production and consumption patterns.

An Energy Efficiency Law has been adopted by all countries, with the exception of the FBiH and FYR Macedonia. Nevertheless, in FBiH, this law is currently undergoing the adoption procedure within parliament, while the Ministry of Economy in FYR Macedonia has adopted certain energy efficiency measures, including a Rulebook on Energy Performance of Buildings and a Rulebook on Labelling of Energy-Related Products.

Western Balkan countries submitted their first and second NEEAPs, apart from BiH (pending its first and second NEEAPs) and Albania (pending its second NEEAP). Measures contained in the NEEAPs are targeted at buildings, industry, appliances and lighting, transportation, and agriculture. In addition,

there are horizontal measures which include awareness-raising and training, innovative financing schemes, metering and billing provisions, subsidies, and fiscal measures. The NEEAPs of Albania, FYR Macedonia, Serbia and the United Nations Interim Administration Mission in Kosovo¹ (UNMIK) foresee setting up National Energy Efficiency Funds to contribute to the implementation of the NEEAPs. Croatia has had an Environmental and Energy Efficiency Fund in place since 2007, with one of the most developed incentive systems in the region. The Croatian NEEAP plans to establish energy efficiency teams within units of local and regional authorities, to ensure continuous monitoring of energy consumption in their own facilities, implement awareness-raising activities, and enable systematic energy management and local energy planning.

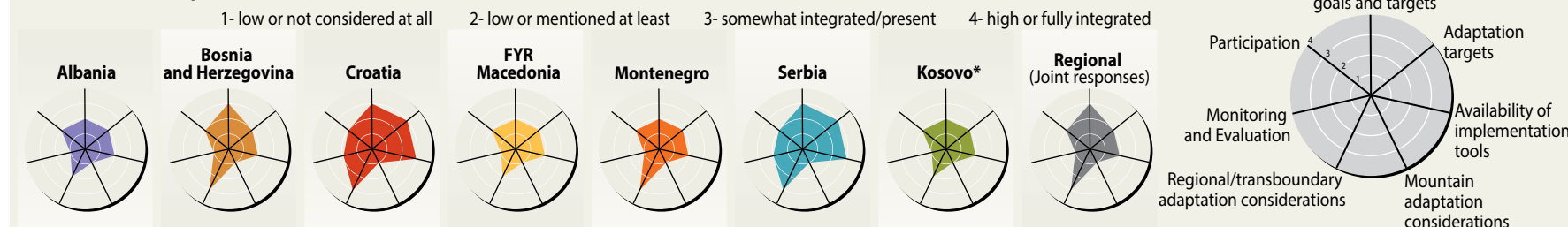
It should be noted that adaptation measures in the energy sector in the Western Balkans are not explicitly indicated as such, and there are no specific adaptation measures for mountainous areas. The policies take into consideration sectors such as industry, building, transport and the economy. Gender issues are addressed in the policies.

Transportation, infrastructure and communication

Transportation, infrastructure and communication policies are key to economic growth and transition in the Western Balkans region. The transportation sector, in particular, has significant environmental implications; an efficient transportation sector would reduce the emissions of GHG and lessen impacts of air pollutions on human health. While the transportation system in South-Eastern Europe has improved in recent years, standards are still generally low, and in the region's large, rapidly growing cities, traffic is one of the main causes of poor air quality. Among the problems contributing to inefficiencies in the transportation sector are ageing vehicles, poor vehicle maintenance, variable fuel quality, the poor condition of many roads, and frequent traffic congestion. In FYR Macedonia, BiH and Serbia, the use of leaded fuel has been reduced but not yet banned. Public transportation within and between cities is inadequate, although demand for it has grown steadily in recent years, and demand for freight transportation doubled between 2001 and 2006.

Policy Evaluation Matrix

TRANSPORT, INFRASTRUCTURE AND COMMUNICATION



* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

Sustainable transportation in the city of Belgrade (GEF-funded)

The UNDP-GEF project Support to Sustainable Transport in the City of Belgrade was initiated in 2011. Project activities include institutional support and policy development, public awareness campaigns, and promotion of alternative modes of transportation, as well as the implementation of pilot projects to improve road safety, and education on environmental protection and transportation. Expected results of the project are:

- the development of a Sustainable Urban Transport Plan for Belgrade
- a shift towards clean and energy-efficient transportation
- increased safety of cyclists
- reduced traffic flow
- awareness-raising on sustainable transportation
- capacity building for professional drivers, and
- a reduction of 285 tons of CO₂ emissions per year.



The Western Balkan countries have been Participants in the South-East Europe Transport Observatory (SEETO) since 2006. Each country has a national coordinator to establish a SEETO Comprehensive Network Development Plan to show progress in the development of transportation infrastructure within and between the countries.

This assessment found that the legislation governing transportation infrastructure in the Western Balkan countries offered little or no information about adaptation to climate change, although laws relating to infrastructure development overall do state that the impacts of

climate change should be taken into consideration. While the laws differ in each country and some do make reference to pollution, in general they are not directly concerned with ecological or climate issues. For example, Serbia has partially focused on adaptation by developing a project for sustainable transportation, but only at the city level (Belgrade). On the other hand, BiH recognizes sustainable development as one of its strategic goals in its Development Strategy of 2010, which also includes transportation and communications issues, as well as environmental protection. Meanwhile, the Kosovo¹ Climate Change Strategy 2014–2024 refers to some adaptation measures, including the

development of a more environmentally sensitive road infrastructure, use of better-quality fuel, and use of alternative, lower emission transportation.

It should be noted that adaptation measures for the transportation, infrastructure and communication sector in the Western Balkan countries are not explicitly stated as being for adaptation, and there are no adaptation measures or strategic goals for the mountain regions. Gender issues are not taken into consideration in the transport, infrastructure and communication sector.

Tourism

Albania, Croatia, Serbia, and Montenegro have developed active tourism strategies, while Kosovo¹ has a draft document. The previous tourism strategy for FYR Macedonia, valid until 2014, has not been updated, although the country does have a strategy for Rural Tourism Development. BiH has strategies for development of the tourism sector at the entity level only (the Federation of Bosnia and Herzegovina and the Republika Srpska).

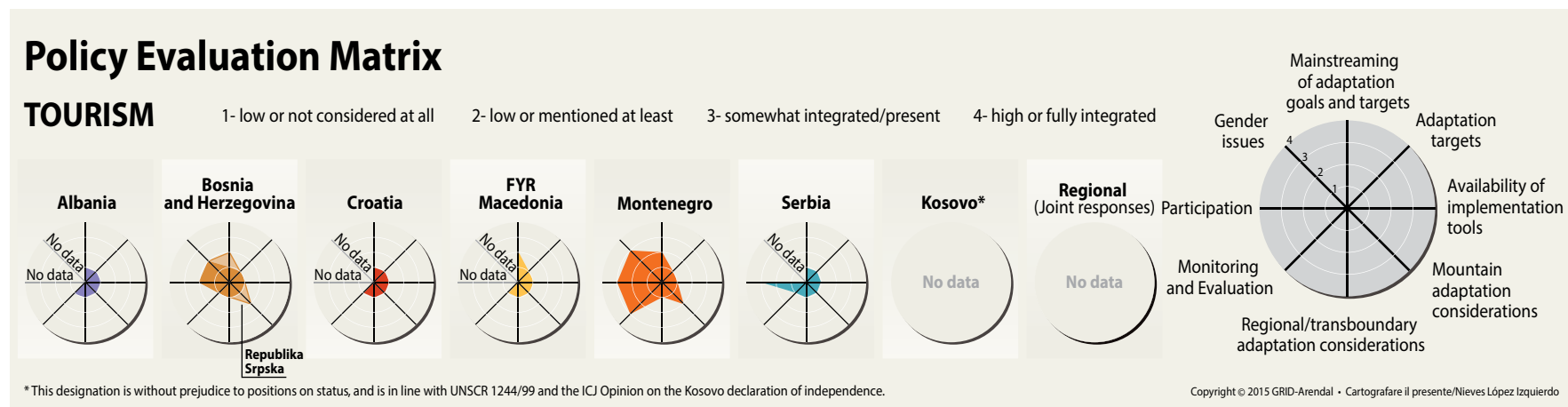
Although many studies indicate that the tourism sector in the Western Balkans is highly vulnerable to climate change, such issues are generally not considered in tourism policy documents, and the goals and measures related to climate change adaptation are not present in any of the existing tourism strategies. Nevertheless, climate change is being slowly integrated into the decision-making activities of a range of tourism stakeholders, while some strategies recognize climate as a limiting factor for tourism development (in Montenegro, Republika



Mostar old town, Bosnia and Herzegovina

Srpska and FYR Macedonia). For instance, the strategies of Montenegro and the Republika Srpska entity of BiH recognize the importance of mountain tourism, which would suffer especially from a shortened skiing season, and therefore propose

using artificial snow. The previous FYR Macedonian tourism strategy stressed the importance of climate considerations in future strategies and plans for tourism development. Even though FYR Macedonia does not have a current tourism strategy, tourism



development is an issue for the Government Program (2014–2018), although it does not foresee any actions related to adaptation in this sector.

Human health

The laws governing healthcare in the countries of the Western Balkans create the conditions to maintain and improve the health of their citizens. According to these laws, healthcare measures include prevention and protection from any harmful ecological factors. None of these laws, however, include measures directly related to climate change or adaptation to climate change.

In order to increase and improve knowledge and build capacity on adaptation-related health issues, prevent diseases aggravated by climate change, and reduce risks from extreme weather events, it is necessary to develop climate change adaptation strategies for public health. Albania and FYR Macedonia are the only Western Balkan countries to have developed these strategic documents (see Annex 1).

Protecting health from climate change: a seven-country initiative

The initiative of the WHO Regional Office for Europe aimed to protect human health from the impacts of climate change through addressing adaptation, strengthening health systems, and building institutional capacity in seven countries: Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, FYR Macedonia, and Uzbekistan.

The pilot initiative provided a wealth of valuable information and policy lessons for the whole WHO European Region (e.g. methodology and tools developed throughout this initiative are based on well-established frameworks and adapted to country-specific needs and requirements). The experiences and developed good practices are documented and transferable to other countries.

General core activities carried out in all seven countries were:

- Development of national health adaptation strategies or action plans
- Assessment of health vulnerability, impact and adaptive capacity
- Capacity development and national outreach, including education activities
- Research and innovation
- Inter-country exchange of knowledge and good practices

The Albanian Strategy for Health System Adaptation into the Climate Change was adopted by the Ministry of Health in October 2011. The Climate Change Health Adaptation Strategy and the Heat–Health Action Plan were adopted by the government of FYR Macedonia in February 2011.

For more information, please visit <http://www.euro.who.int>

Policy Evaluation Matrix

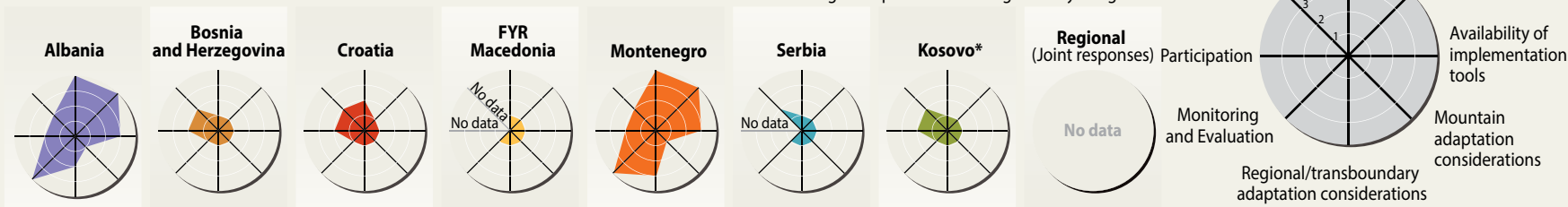
HUMAN HEALTH

1- low or not considered at all

2- low or mentioned at least

3- somewhat integrated/present

4- high or fully integrated



* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/99 and the ICJ Opinion on the Kosovo declaration of independence.

Institutional and stakeholder analysis

In order to determine the extent to which a policy framework could support improvements to the adaptive capacities of mountain ecosystems and the people living there, it is necessary to analyse the influence and power dynamics of all the actors in the climate change adaptation regime (Sova *et al.*, 2013). According to the Multilevel Stakeholder Influence Mapping in Climate Change Adaptation Regimes (ibid), there is a power imbalance between different stakeholders in a variety of contexts around the world.

Stakeholder mapping

Using the International Institute for Environment and Development (IIED) (Sova *et al.*, 2013) tool and the analysis of the policy and strategic documents in Albania, BiH, Croatia, FYR Macedonia, Montenegro, Serbia and Kosovo,^{1,21} the main groups of stakeholders and beneficiaries for climate adaptation were identified:

- Representatives of national governments, including ministries of environment, agriculture, forestry, energy, water management, health, and spatial planning
- Government institutes, agencies and inspectorates for food security, agriculture, forestry, water management, hydrometeorology, environment and related funds, bodies responsible for disaster preparedness and response (including flooding, forest fires, landslides, earthquakes, wind, and hail), and civil security
- Management and staff of protected areas
- UN conventions & GEF National Focal Points
- Representatives of NGOs
- Academia

- Other local and international experts on climate change adaptation measures and mountain ecosystems (including related topics of biodiversity, land management, hydrometeorology, water, energy, and industry)
- International bodies with a strong presence in the country, including international and regional projects and bilateral donors
- Private sector (including farming co-ops, and trade unions)
- Healthcare
- Chambers of commerce
- Forest industry
- Environmental businesses, including eco-tourism businesses
- Forestry associations
- Red Cross and Red Crescent organizations (as part of disaster preparedness and response)
- Local community representatives
- Traditional populations.

These stakeholders represent groups that were identified as being directly or indirectly involved in the climate change adaptation regimes of the respective countries, being either responsible for or influenced by the implementation of climate change adaptation measures. It is important, however, to draw attention to other stakeholder groups that are not currently involved in the adaptation regime, but who nevertheless have a stake in adaptation, including the general public, vulnerable groups (e.g. the poor, elderly, children, single parents, and people with disabilities), and private business owners and educational workers.



Jezerca Massif, Albania



Key responsible actors

The leading trends in decision-making for adaptation in the seven countries of the Western Balkans were determined by examining the key responsible actors in the relevant policy documents. Policy documents express the highest level of power in decision-making on climate adaptation. For this reason, it is necessary to analyse the level of involvement of different stakeholders in the drafting of these documents, their interests, mission and capacities.

In most of the countries, the key responsible actors in drafting documents relevant to climate change adaptation were ministries for environment. Serbia and Bosnia and Herzegovina appear to have neither an office nor an assigned staff member that regularly works on climate change issues. Only Montenegro has a separate Department for Climate Change, while Albania and Kosovo¹ have (sub)sectors for climate change. However, none of these departments or sectors have clearly indicated mandates in relation to climate change. Only in Croatia was the key responsible actor an institution other than the ministry: namely, two civil society organizations, which could contribute the interests of a wider audience, including non-experts and the general public, to policy design. Civil society organizations in other countries do not seem provide direct contribution to the design of the most relevant climate change documents. In

these countries, where the ministries play the key roles in drafting relevant documents, influence on the policies is kept somewhat centralized within the hands of government bodies, where the same institutions contribute to both the creation and implementation of policies.

Vulnerability assessments

Decision-making on the distribution of resources for adaptation depends on the vulnerability assessment, in the sense that it will determine who or what is eligible for resource allocations for future adaptation measures (Sova *et al.*, 2013). This applies in the Balkans, where populations identified as “vulnerable” have a chance to be included in the adaptation measures.

According to the analysis of documents pertaining to climate change in the Balkans, adaptation measures refer mostly to policy changes from a technical aspect, rather than referring to any action directed towards vulnerable groups. Public involvement is generally limited to awareness-raising activities. In Albania, Bosnia and Herzegovina, Serbia, Kosovo,¹ Montenegro and FYR Macedonia, communication strategies are mostly aimed at educating the public on the facts of climate change rather than at participation in or decision-making on adaptation measures. Even for vulnerable groups such as agricultural producers and farmers, participation is passive and focused

primarily on receiving information. They are not considered in the action plans.

In Croatia, the adaptation regime recognizes the need for a multilevel approach to this issue: “multilevel governance is defined as decision-making through a dynamic inter-relationship within and between different levels of governance, steered not only by the public, but also by private and other interests” (Keskitalo 2010; Hooghe and Marks, 2001). A timely execution of this approach in other Balkan countries – and to some extent even in Croatia – could bring forward the mutual interests of all actors and offer effective adaptation. If the vulnerable groups were included in the action plans, their later involvement could be increased and secured.

Politics of adaptation

In recent years there has been a trend towards only engaging experts in adaptation (Sova *et al.*, 2013), which is mostly reflected in the adaptation actions of the Balkan countries analysed for this Outlook. In relation to the analysis from the vulnerability assessment above, it is clear that “non-experts” are only given a passive role and not included in decision-making with respect to the implementation of adaptation actions (with the exception of Croatia to some extent).

Gender issues

According to the publication “UNFCCC Decisions and Conclusions” (Burns and Patouris, 2014), climate change – especially droughts, floods and other extreme weather events – together with food and water insecurity impact men and women differently. Due to high unemployment rates, a high percentage of women in the Balkans tend to stay at home, where they are responsible for the household’s food production and its water and energy supply (Goldstein, 2014). These are the resources most affected by the impacts of climate change (Burns and Patouris, 2014), making women in the Balkans more vulnerable than men to climate change. For this reason, it has become increasingly important in the Balkan countries to involve women and men equally in decision-making processes (ibid). According to the analysis of the available documents, however, the question of gender mainstreaming in policy and strategic documents tends to remain superficial.

In order to ensure that both men and women have equal opportunities to participate in the adaptation regime, women need to be proactively engaged in the planning and implementation of adaptation measures. They should be involved in both consultative and decision-making stages, with the aim of facilitating their safety and productivity. For this reason, strategic documents must identify women as a special stakeholder group and include them in action planning.



Woman threshing cereal, Lin, Albania

The role of indigenous communities

When discussing the indigenous communities in the Balkan region, a more appropriate term is “autochthonous”, which bears the similar meaning of pure and native (Stojkov, 2002). These autochthonous communities still exist in the mountain ranges of East Serbia, North-western Montenegro, Northern Albania and North-western FYR Macedonia, where people exhibit traditional social behaviour and rituals (ibid). Similar communities also inhabit areas of Eastern Bosnia (high mountains) and Herzegovina. These

communities usually rely on local natural resources. According to Stojkov (2002), these communities are still marginalized. Their livelihoods are mostly maintained through seasonal small-scale farming and agriculture, their only source of income (Quave and Pieroni, 2015). However, studies show that these traditional communities inhabiting isolated rural areas tend to develop resilience, which is founded on their complex knowledge of the surrounding natural environment (ibid). This is very important for the

Balkans, especially due to their deep ethnobotanical knowledge that has proven to be crucial for local food security and health strategies (ibid).

The autochthonous communities in the Balkans have been decreasing in recent decades. While some members of these communities reside on high mountain plains during the summer months (Aljazeera Balkans, 2012), there are increasingly fewer year-round settlers, as much of the population has moved to more urban areas in recent decades in search of better living conditions (ibid). It has been argued that the “[traditional communities] are among the first to face the direct consequences of climate change, owing to their dependence upon, and close relationship with the environment and its resources” (UNEP, 2004).²² In the analysis of policy documents for the Western Balkan countries, the direct participation of these communities in the adaptation regime was not considered in detail.

Apart from representing reservoirs of traditional knowledge relating to the changing environments – such as the use of plants that may resist the changes in climate – these communities are the cultural and traditional heritage of the Balkan countries, hence they should be preserved and cherished. They represent a very distinct stakeholder group that requires a tailored approach. To preserve them, their voices need to be heard in decision-making processes and in the design of adaptation measures, where their way of life should be afforded special attention.



Prokletije mountains in the Dinaric Alps, Albania



WESTERN BALKAN MOUNTAINS

Gap analysis

Bay of Kotor, Montenegro

Policy gaps to address climate risks

This policy gap analysis aims to assess the effectiveness of the mix of climate adaptation instruments and policies that are in place to address key climate risks in the West Balkan region.

Ultimately, the success of existing policies is determined by the extent to which they address the most pressing climate change-related risks, and whether they generate positive effects for the socioeconomic system and local communities. Policies that cause inter-sectoral conflicts or that do not consider long-term vulnerability and/or adaptive capacity to climate change are intrinsically ineffective. When current information on the implementation and effects of policies is not available, the policies are evaluated on the basis of their potential.

Economic and livelihood losses

Risk of significant economic losses to assets and disruptions to livelihoods at the individual, local and national levels and/or high rehabilitation costs related to wildfires.

Measures for protecting forests from wildfires are usually included in national legislation related to forest management and (agricultural) land resources of most countries in the Western Balkans, although climate change and adaptation issues are not mentioned specifically.

In terms of national policies, measures to protect or restore forests from wildfires are considered a priority

in only a few countries (BiH, Serbia and Croatia). Measures favouring adaptation towards an increased risk of losses from forest fires are being implemented, including governance actions (regulations) as well as infrastructural measures. Significant financial instruments, such as the Croatian “Green Tax” managed by the state forests management company, are in place to support the fire prevention community and its measures.

Key Policy gaps:

- Inadequate national/regional policy coverage for adaptation and prevention of economic losses related to wildfires
- Limited budget for early warning and rehabilitation measures
- Possible lack of institutional coordination to protect forests from fires

Risk of significant economic and livelihood losses at the individual, local and national levels due to flooding.

Some internationally-funded initiatives address the risk of disasters (including flooding) in terms of socioeconomic and financial losses in the Western Balkans. Examples include the joint World Bank/UNISDR South-Eastern Europe Disaster Risk Mitigation and Adaptation Programme, which supports the development of national disaster risk management and adaptation strategies, risk



Massive flood in Obrenovac, Serbia

financing of disaster loss reconstruction and recovery, and risk transfer. All countries also actively cooperate on the transboundary management of floods on the Sava River Basin (BiH, Croatia and Serbia) and the Drin River Basin (Albania, Kosovo,¹ Montenegro and FYR Macedonia), with programmes aimed at developing adaptation measures and risk management mechanisms.

Flood protection measures are generally regulated through water sector legislation at the state level in all countries, or at the subnational level in BiH.



Croatia seems to be more advanced due to direct implementation of the key EU directives (Floods Directive and Water Directive). Impacts due to climate change in mountain regions are not explicitly considered in existing water regulations in the West Balkans. At the national level, only BiH and FYR Macedonia seem to have set relevant policy goals that include climate change and extreme events. They call for prevention measures in case of failure or flooding of dams and the construction of reservoirs. Most countries, however, lack the basic infrastructure for data collection, flood forecasting and flood

GOOD PRACTICES

Water and flood management: Adaptation to climate change in the Drin River Basin

(The United Nations Economic Commission for Europe – UNECE; Global Water Partnership Mediterranean – GWP-Med; Swedish EPA)

Background

The expected changes in surface air temperature and humidity will lead to increases in the heat index and may lead to deforestation and intensive or extreme rain events, heatwaves, floods and droughts. Climate change will very likely reduce the availability of water and affect the water level of the lakes inside the Basin (Prespa, Ohrid and Skadar). Since the Drin Basin is exploited for its hydro-energy (five dams), climate change will affect energy supply in the region.

Objectives

Improving adaptation to climate-change-related effects, in particular concerning floods and drought, in the Drin River Basin. The activities will be mainly implemented in 2013–2016. The intervention area is the Drin River Basin, including all connected water bodies in Albania, Montenegro, Kosovo¹ and FYR Macedonia. The project focuses on adapting the risk management mechanisms to the increased risks of floods and drought. The activities will focus on drought in Kosovo¹ and FYR Macedonia, and on floods in Albania and Montenegro.

Results

As an initial result, the governments of the respective countries have taken initiatives to improve the legal and regulatory framework in line with EU legislation, as well as to develop management tools and mechanisms for some parts or some aspects of the Drin River Basin. According to the National Communications to UNFCCC from Albania, Montenegro and FYR Macedonia, as well as the report ‘The state of water in Kosovo’,¹ climate change will have serious impacts in the Drin River Basin. An MOU signed in November 2011 under the Drin Dialogue Process includes a goal on climate change risks and cooperation on flood prevention.

Outcomes

- Regional monitoring and alert platform
- Strategic framework for climate change adaptation
- Concepts, instruments and procedures for climate change adaptation at the municipal level

Source: Core group on pilot projects, third meeting Global Network of basins working on climate change adaptation, first meeting – Geneva, 20-21 February 2013

For further information, visit <http://www.unece.org/env/water/seeurope.html>

GOOD PRACTICES

Climate change adaptation in the Western Balkans: approach to flood risk management (Deutsche Gesellschaft für Internationale Zusammenarbeit; German Federal Ministry for Economic Cooperation and Development (BMZ))

Background

The recurrent floods of recent years have resulted in high economic and environmental losses, from which the affected populations struggle to recover. The capacities of the Western Balkan countries to manage and respond to flooding are very limited both in terms of infrastructure and governance. Hydro-meteorological data collection and flood forecasting is hampered by the absence of adequate gauging networks and limited resources to operate and maintain them. A comprehensive regional flood early warning system does not exist. At the national and municipal levels, the responsibility for flood risk management (FRM) – such as flood defense infrastructure development, data collection, early warning and disaster management – is spread across multiple authorities. The lack of clear leadership for FRM, and limited understanding of how flood risk can be locally managed, pose significant obstacles for effective FRM.

Objectives

The EU Floods Directive (2007) provides the comprehensive framework for the project's activities. Taking a multilevel approach to FRM, the project engages on the regional (basin), national and local levels. It focuses on establishing prevention and protection measures that cover the entire FRM cycle, from preparation and disaster management to the recovery phase. The main objective is to improve flood management, particularly through non-infrastructure measures such as early warning, preparedness, spatial planning, and awareness-raising. Further measures are aimed at reducing damage to human health, the

environment, cultural heritage, and the local economy. FRM plans are developed in a participatory process involving the responsible administrations as well as other relevant stakeholders. The milestones towards a fully-fledged FRM Plan have been identified as follows:

- hazard and flood risk maps based on flood extent mapping and satellite images
- regional and communal risk assessments in a standard catalogue of measures
- identification of priority measures and responsible actors.

Results

Through its multilevel approach, the project has contributed to a more integrated and transboundary FRM in the Drin River Basin, which involves all stakeholders. Once operational, the regional early warning system will enable the respective national hydro-meteorological services to issue warnings to their relevant authorities and affected municipalities, based on catchment-wide information. By assisting municipalities and cities to develop and implement FRM Plans in line with EU requirements, their vulnerability to flooding has been significantly reduced. Flood risk managers, in particular at the local level, have reported that they consider themselves better prepared to provide more effective FRM to protect the local population.

Source: GIZ, Flood Risk Management an increasing challenge in international cooperation.
For further information, visit <https://www.giz.de/en/worldwide/29000.html>

management, even though legislation may require this. The cost of such interventions are usually prohibitive. In terms of non-structural interventions, the capacities are also very limited. While national and municipal authorities have poor understanding of their responsibilities in disaster risk management and recovery, a comprehensive flood early warning system is still lacking in the region.

At the national level, risk-sharing and risk-transfer mechanisms (e.g. weather-indexed insurance) which could help to reduce overall economic losses due to flooding, improve resiliency and contribute to prompt recovery do not appear to be in place in the Western Balkans.

Key Policy gaps:

- Lack of risk-sharing and risk-transfer mechanisms for flood damage
- Low financial resources available, especially for infrastructural adaptation measures
- Lack of/limited institutional capacity and coordination for flood management regionally, nationally and locally

Risk of lower productivity and economic losses in the agricultural sector due to rising temperatures. Risk of loss of crop yields and livestock due to water scarcity and droughts.

Subregional initiatives are in place, including the Drought Management Centre for South-Eastern Europe (DMCSEE), which monitors and assesses drought conditions in addition to the general risks and vulnerabilities connected to drought. All Western Balkan countries have adopted legislation regulating a sustainable approach to agriculture,

but so far this does not integrate climate change adaptation or reflect on mountain areas. The only exception to this is Croatia, which is transposing the relevant EU directive, paying attention to adaptation aspects important for rural development.

On the policy side, there is some consideration of mountain issues and climate change in most countries. Several financial mechanisms at the national level are in place to cover losses and support production in the agricultural sector. These include financial support to farmers in mountain areas, incentives for the conservation and sustainable use of endangered autochthonous and local livestock breeds and plant species, and incentives for diversification. Infrastructural adaptation measures have also been undertaken in some countries (e.g. Serbia and BiH). Some of these are for agriculture (e.g. irrigation systems, dams and accumulation reservoirs), while other purposes include hydropower generation, drinking water, tourism and fish-farming.

However, the budgetary support for agricultural development is very low compared to the EU budget. Allocations in 2012 were 25 euros/ha of agricultural land in Albania; 50 euros/ha in BiH;²³ 70 euros/ha in Montenegro, Serbia and Kosovo;¹ and 150 euros/ha in FYR Macedonia. The EU-27 support amounts to 470 euros/ha for its members. Croatia spends 370 euros/ha on its agriculture (FAO, 2014). This indicates the limited potential of the Western Balkan countries to address challenges in this sector, including implementing adaptation measures.

According to an analysis of the Agricultural Policy and European Integration in South-Eastern Europe (2014), the climate change policy-making arena in this region is relatively weak, which results in very few mitigation and adaptation activities on the ground.

Adaptation action in this sector involves complementarities with forest management and safeguarding of biodiversity. Potential co-benefits between adaptation and reduction of greenhouse gases from agricultural production are being sought in Serbia. Certain adaptation measures may, however, result in higher emissions. For example, a shift towards a more fertilizer- and energy-intensive agriculture to address food security concerns may result in higher emissions.

Key Policy gaps:

- Low budget for agriculture development and adaptation
- Lack of political awareness and institutional capacity to implement adaptation on the ground

Risk of economic and livelihood losses for mountain communities reliant on ski tourism, due to reduced snow cover.

There are few national or subnational tourism sector strategies that include climate change considerations in the region (Montenegro and the Republika Srpska entity of BiH are the exceptions). However, existing tourism development strategies recognize the importance of mountain tourism, especially ski tourism, and the negative consequences of a shortened skiing season.

These strategies put forward artificial snow-making as an adaptation measure. However, the production of artificial snow, as currently practiced, is not believed to be a sustainable solution. In fact, such interventions could generate inter-sectoral conflicts (due to high consumption of energy and water resources), and should be considered examples of maladaptation.

Snow-making systems also imply high costs for installation and maintenance, which could prove a clear economic obstacle in the Western Balkans.

Currently, policymakers do not seem to be considering other possible adaptation options – such as economic incentives for behavioural changes to diversify tourism opportunities, and risk-sharing tools such as insurance schemes – to tackle the risk of economic losses in the winter tourism industry.

The tourism sector should have a relatively high capacity for climate adaptation. However, there appears to be low awareness in the region about the impacts of climate change on the sector and its related businesses.

Key Policy gaps:

- Inadequate regional/national policy coverage for adaptation to reduced snow cover in winter tourism
- Measures foreseen to address the risk are not sustainable and carry other risks such as inter-sectoral and resource-use conflicts, and economic bottlenecks
- Lack of awareness of the problem and adaptation needs in the tourism sector

Risk of economic and livelihood losses related to loss of livestock, due to heavy snow precipitation and cold extremes.

Existing national legislation on agriculture and rural development also regulates livestock production in almost all Western Balkan countries. However, these laws do not seem to take into consideration climate change adaptation (with the exception of Croatia),

and there is no specific policy addressing the risk of livestock losses related to extreme weather events during winter including through insurance schemes.

Key Policy gaps:

- Risk not addressed by existing policies

GOOD PRACTICES

Monitoring and prediction: The South-East European Virtual Climate Change Center (SEEVCCC)

Following the adoption of the Belgrade Initiative, the South East European Virtual Climate Change Centre (SEEVCCC) was established and hosted by the National Hydrometeorological Service of Serbia. It provides monitoring and prediction of climate and weather conditions for the whole West Balkan region. Its operational products include monthly and seasonal forecasts (over seven months) of basic parameters (such as maximum and minimum temperatures, and precipitation). These can be used by decision-makers to integrate climate concerns into sectoral policies such as agriculture, tourism and health, thus contributing to minimizing economic and livelihood losses as well as other adverse impacts on society.

For further information, visit <http://www.seevccc.rs>

Increased mortality and morbidity

Risk of death or injury due to flooding. Risk of outbreaks of existing or novel diseases among displaced populations after flooding events.

At the EU-level there are institutional initiatives, such as the EU Civil Protection Mechanism (Croatia, Montenegro, FYR Macedonia and Serbia) that provide at least partial coverage of the risk of human losses during various types of disasters. The Disaster Preparedness and Prevention Initiative for South-Eastern Europe also develops programmes and projects aimed at strengthening the capacity to prevent and respond to natural and man-made disasters, including floods. However, neither climate change nor mountain issues seem to be taken explicitly into consideration.

Likewise, in national health sector legislation, the issues of climate change and adaptation to it are not adequately integrated. However, in some countries there are wide-ranging activities that are beneficial to adaptation purposes. These can, for example, be aimed at minimizing the health-related effects of extreme events, including through early warning systems.

Only a few countries have adopted public health strategies which specifically address climate change adaptation. Examples of good practice include Albania and FYR Macedonia, which have adopted Climate Change Health Adaptation Strategies. These also cover the integration of health systems into the national emergency structures responsible for floods and other natural disasters related to climate change. The Red Cross in Croatia, in cooperation with the Ministry of Health and regional public health institutes, works on building capacities of workers in the health sector to cope with the effects of climate change. However, none of the above measures take into account mountain areas.

Key Policy gaps:

- Lack of/limited adequate inter-sectoral cooperation on health-related climate impacts due to floods
- Lack of/limited adequate vertical integration from EU to local administrations

Risk of death or injury due to wildfires.

Both the EU Civil Protection Mechanism and the Disaster Preparedness and Prevention Initiative for South-Eastern Europe contribute to addressing the consequences of wildfires on human populations in the Western Balkans. Just as for health-related issues due to flooding, the risk of increased casualties linked to wildfires is dealt with mostly through multi-risk preventive activities addressing extreme events and its impacts on human health. This is especially the case within Albania, FYR Macedonia and Serbia.

Key Policy gaps:

- Lack of/limited adequate inter-sectoral cooperation on health-related climate impacts due to wildfires
- Lack of/limited adequate vertical integration from EU to local administrations

Risk of death from cardiovascular diseases in vulnerable populations (especially the elderly); increased morbidity in the form of lung inflammation or asthma due to heatwaves.

Only a few countries in the Western Balkans adequately address the increased risk of mortality

due to heatwaves at the national level (e.g. FYR Macedonia, Albania and Croatia). Other countries are in the process of developing their own strategy for public health integrating the risk of heatwaves (e.g. Montenegro). However, these countries' policies do not take into account mountain areas.

One effective way to reduce heat-related health risks is through the systematic development of heatwave early warning systems (HEWS). These can provide meteorological and/or climate-prediction-based information on the chance of imminent hot weather that may have a negative effect on health. This information serves to alert and activate decision-makers, health services and the general public, and ultimately to moderate the effects of hot-weather extremes on health. FYR Macedonia offers one example of good practice, having implemented a national Heat-Health Action Plan.

Key Policy gaps:

- Poor regional/national policy coverage for adaptation to health impacts of heatwaves
- Lack of/limited adequate inter-sectoral cooperation

Risk of cold-related mortality and morbidity, especially among vulnerable sectors of the population.

Very few Western Balkan countries (e.g. FYR Macedonia and Croatia) explicitly address the health consequences connected with cold weather during winter. Measures, where they exist, include monitoring, early warning measures and advisory services directed to elderly people. However, mountain areas are not considered as a special case.

Key Policy gaps:

- Inadequate policy coverage for adaptation to health impacts of cold spells
- Potential lack of adequate inter-sectoral cooperation

Decreased public safety

Risk of decreased public safety due to flooding in landmine sites.

Landmines are not only a significant impediment to settlements, sustainable forest management and agriculture, but also become a matter of public safety in the event of flooding.

So far this issue has been treated separately from climate change and flood-related policies. In Croatia, demining activities are limited due to a lack of funds. These activities are focused on areas which are urbanized, infrastructural or have agricultural purposes, while the demining of forests has so far mostly been the financial obligation of the state forest management company.

Key Policy gaps:

- Risk not addressed by existing policies

Risk of polluted water courses and related health issues due to flooding in industrial hotspots.

The EU Directive SEVESO II aims to prevent major accidents involving dangerous substances, and has been

implemented into the national legislation of Croatia. This includes the establishment of a mechanism to protect and restore regulatory ecosystem services. In accordance with spatial plans, every building under construction has to undergo an environmental impact study. However, the integration of climate change impacts as risk factors is rather slow.

The Framework Agreement on the Sava River Basin (FASRB) covers BiH, Croatia, Slovenia and Serbia. While it does not mention climate change, it does account for measures to prevent or limit hazards, and reduce or eliminate their adverse consequences, including the release of hazardous substances into water by flooding events. It states that the Parties shall establish a coordinated or joint system of measures, activities, warnings and alarms in the Sava River Basin for extraordinary impacts on the water regime. This includes from sudden and accidental pollution, discharge of artificial accumulations and retentions caused by collapsing or inappropriate handling, flood, ice, drought, water shortage, and obstruction of navigation.

Other countries in the Western Balkans are active on this front, with an improved monitoring and forecasting system for flood and water pollution control in Albania and cadastre of water resources to identify areas of potential danger in Montenegro.

Key Policy gaps:

- Lack of/limited funding to finance adaptation and flood management
- Lack of awareness of pollution as public safety issues triggered by climate change
- Lack of/limited adequate vertical integration from the EU to local administrations

Risk of epidemics due to appearance of new vector-borne diseases.

Only Albania and FYR Macedonia are integrating surveillance and protection systems for climate change-related communicable diseases that represent a threat to public health.

Key Policy gaps:

- Inadequate regional/national policy coverage for adaptation to new diseases
- Lack of/limited institutional coordination across sectors
- Lack of awareness of new diseases as public safety issues triggered by climate change

Risk of water shortages, and water supply outages in major urban areas due to reduced river run-off.

Water scarcity and outages in cities can turn into a public safety issue and cause health-related consequences. Several cities within BiH, Croatia, FYR Macedonia, Montenegro, and Serbia are improving their water resources management practices (including water recycling and water-efficient appliances), and engaging in grey adaptation actions (modernizing networks, building dams and reservoirs, and wastewater treatment plants for residential areas) to reduce losses and secure water supply. Soft actions involve establishing information exchange mechanisms among the various institutions dealing with water resources. In the case of water scarcity, conflicts over the use of this resource may arise among different sectors such as hydropower generation, agriculture, drinking water, tourism, fish-farming, etc.

Key Policy gaps:

- Potential inter-sectoral conflicts to manage the risk of water shortages and the use of water
- Lack of awareness of water scarcity in urban areas as a public safety issue triggered by climate change

Displacement of population

Risk of displacement of populations following flooding events.

In the event of major disasters, the EU Civil Protection Mechanism (covering Croatia, Montenegro, FYR Macedonia, and Serbia) helps the population of the Western Balkans to deal with possible displacement. However, there is no specific integration of climate change adaptation in the provisions of post-disaster recovery.

Nor do cities seem to have post-disaster reconstruction plans. However, several urban areas such as Dubrovnik (Croatia) can take advantage of a programme that provides shelters for the use of civil society associations, who are expected to join emergency operations during times of crisis.

Key Policy gaps:

- Inadequate regional/national/local policy coverage for adaptation and post-flood recovery
- Lack of/limited institutional coordination across sectors
- Potential lack of adequate vertical integration from EU to local administrations

GOOD PRACTICES

Urban adaptation – Mayors Adapt Initiative

Mayor's Adapt (the Covenant of Mayors Initiative on Adaptation to Climate Change) informs, mobilizes and supports local authorities to take action on adapting to climate impacts. Cities signing up to the initiative commit to:

- contribute to a more climate-resilient Europe
- develop local adaptation strategies within the first two years of signing, and
- review the outcomes every six months.

By joining, local/regional authorities can benefit from the Mayors Adapt Helpdesk, from the Urban Adaptation technical Support Tool, from the exchange of best practices with other European cities as well as from information about funding opportunities. Currently, Daruvar in Croatia is part of this initiative.

For more information, please visit <http://mayors-adapt.eu>



Obrenovac, Serbia

Risk of displacement of people and communities due to wildfires.

Some cities, such as Dubrovnik (Croatia) and Pristina (Kosovo¹), are reported to have Emergency Response, Fire Protection and Evacuation Plans in place.

Key Policy gaps:

- Scarce regional/national/local policy coverage for adaptation to forest fires causing displacement of population
- Lack of/limited institutional coordination across sectors
- Lack of/limited adequate vertical integration from EU to local administrations

Land degradation

Risk of progressive decline in soil moisture leading to increased fire risk, reduced agricultural productivity, economic losses, and ecosystem functioning due to rising temperatures. Risk of land degradation due to wildfires.

EU-funded regional initiatives such as the Drought Management Centre for South-Eastern Europe (DMCSEE), the Adriatic Ionian Program 2014–2020, the Danube Transnational Programme 2014–2020 and the Balkan-Mediterranean Transnational Programme 2014–2020 contribute to addressing the risks of land degradation.

At the national level, legislation for land protection is generally poor. Only a few policy documents regard land resources as a distinct sector; it is usually treated as part of the agriculture, forest or

water management sectors. However, national plans containing specific initiatives on climate change adaptation that are related to land resources have been implemented.

Key Policy gaps:

- Lack of/limited institutional coordination across sectors
- Lack of/limited adequate vertical integration from EU to local administrations

Impaired ecosystem functioning and loss of species

Risk of loss of valuable species and habitats due to rising temperatures. Risk of changes and disruption to ecosystems leading to loss of ecosystem services and change of ecosystems distribution and diversity (e.g. migration of species to higher altitudes), due to rising temperatures.

Besides national efforts to implement the CBD,²⁴ Western Balkans participate in the Bern Convention and the Emerald Network. At the EU-level, the Habitats Directive and the Birds Directive form the legal basis of the largest network of protected areas in the world called Natura 2000, to which all Western Balkan countries tend to harmonize their legislation. Subregional activities include the Dinaric Arc Initiative (DAI) and the proposed Framework Convention on the Protection and Sustainable Development of South-Eastern Europe Mountain Regions, aiming to preserve the wealth and integrity of the Dinaric Arc and other mountain regions in South-Eastern Europe.



Mountain landscape in Bosnia and Herzegovina

All Western Balkan countries are active in terms of legislation on biodiversity and nature protection at the national level. Forest legislation deals with water protection, climate, biodiversity and other social values of forests through establishing a framework of forest areas conserved and managed for such purposes. Synergies are therefore possible between adaptation and mitigation in this sector. Programmes focusing upon resilient forestry management and the development of ecosystem services might diversify livelihoods away from high emitting activities such as coal production, while at the same time sequestering carbon through reforestation activities.

Key Policy gaps:

- Lack of/limited institutional coordination mechanisms across sectors
- Lack of proper infrastructure and tools
- Lack of/limited adequate vertical integration from EU to local administrations

GOOD PRACTICES

Transboundary cooperation in the Carpathian mountain region

Integrated management of biological and landscape diversity for sustainable regional development and ecological connectivity in the Carpathians

BioREGIO Carpathians was a transnational project (2011–2013), which aimed to show how the integrated management of the Carpathians' natural assets could boost both sustainable development and ecological connectivity in the region. The project involved 16 partners from 9 different South European, Central and Eastern European countries. The seven Carpathian Ministries of Environment were observers to the project.

One of the main goals of the BioREGIO project was to develop management approaches that could facilitate coordination and cooperation between the institutions, regional and local authorities, and other stakeholders of protected areas and natural assets. A special focus was placed on the development of a methodology for integrated forest management and integrated wetland management.

Key activities of the project included the identification of regional development opportunities; the development of financial mechanisms and innovative economic tools for protected areas, and common integrated management measures. The project included three pilot sites which together covered all five

Carpathian countries. Each pilot site consisted of two bordering protected areas:

- Duna-Ipoly National Park (Hungary) and Poipole (Slovakia)
- Iron Gates Nature Park (Romania) and Djerdap National Park (Serbia), and
- Maramures Mountains Nature Park (Romania) and Carpathian Biosphere Reserve (Ukraine).

The project resulted in the enhanced management of the Carpathian protected areas and natural assets while maintaining the biological and landscape diversity as well as the ecological connectivity of its mountains. The joint pilot actions involving a multitude of local and regional stakeholders resulted in transboundary agreements for long-term cooperation. Throughout the project, the development of a joint biodiversity geo-referenced web-based information system provided a solid information basis for the decision-makers at the national and transnational levels. The Carpathian Integrated Biodiversity Information System (CCIBIS) can be accessed at <http://www.ccibis.org/> and the BioREGIO Carpathians WebGIS at <http://webgis.eurac.edu/bioregio/>

For further general information, please visit: www.bioregio-carpathians.eu

Risk of impaired ecosystem functioning and loss of biodiversity due to wildfires.

Conservation of forest biodiversity and sustainable forest management are considered in most national legislation related to forestry and agriculture. These do not, however, integrate climate change and adaptation issues yet. Some countries pay particular attention to forest fires as one of the biggest threats to biodiversity and explicitly address this risk in their national policies (BiH, Serbia and Croatia).

Key Policy gaps:

- Limited regional/national policy coverage for adaptation and biodiversity conservation related to damage from wildfires
- Limited budget for specific adaptation measures related to wildfires
- Lack of/limited institutional coordination across sectors

Risk of loss of habitats and ecosystem services due to flooding. Risk of loss of riparian habitats and agricultural land due to flooding in industrial hotspots.

The Framework Agreement on the Sava River Basin (FASRB) between BiH, Croatia, Slovenia and Serbia governs the coordination of activities on conservation, protection, and improvement of aquatic ecosystems of the Basin, as well as the management of emergency situations. The Neretva and Trebišnjica Management Project (NTMP) (2008–2015) implemented in BiH and Croatia aimed to improve transboundary water resource management. Among its activities were enhancing

GOOD PRACTICES

Opportunities for transboundary cooperation in the Western Balkans

Feasibility Study on Establishing a Transboundary Protected Area in Sharr/Šar Planina-Korab- Dešat/ Deshat region (Albania, Kosovo¹ and FYR Macedonia)

One of the major threats to habitats and species and a main cause of the decline in biological diversity in Europe is the fragmentation and isolation of habitats. Migration, dispersal and genetic exchange of wild species depend on the existence of transboundary linkages (ecological corridors) between the protected area networks of neighbouring countries.

The Convention on Biological Diversity (CBD) has been promoting the establishment and strengthening of transboundary protected areas (TBPAs) and their many benefits. Through implementing an ecosystem approach, TBPAs can enhance the conservation of biological diversity, improve international cooperation between adjacent countries, and strengthen ecological networks. Within the Western Balkans, there is great potential for the establishment of TBPAs. One such area exists within the Sharr/Šar Planina-Korab-Dešat/Deshat region lying between Albania, Kosovo¹ and FYR Macedonia.

The objectives of the UNEP-Vienna Feasibility Study on the Potential for Establishing a Transboundary Protected Area in the “Sharr/Šar Planina-Korab-Dešat/Deshat” region were to:

- achieve a better understanding of the transboundary situation in the region, and to identify possible added values of transboundary cooperation

- analyse and evaluate the current status of transboundary initiatives, identify current shortcomings and impediments for cooperation, and recommend actions aimed at facilitating transboundary cooperation
- assess the potential for success under the local conditions
- indicate the type of external support that would be indispensable for the success of this initiative.

The feasibility study concluded that all countries involved could derive significant added value and possible benefits from the proposed transboundary protected area, which would be largely facilitated by the trilateral transboundary cooperation in this region. These benefits included:

- Achievement of their nature protection and biodiversity conservation objectives
- Mitigation of the present threats to the environment and nature of the shared region
- Promotion and implementation of sustainable development at local and regional level
- Establishment of a long-term transboundary cooperation mechanism serving the local stakeholders.

The full feasibility study report can be found at http://www.unep.at/documents_unep/Balkan_Feasibility_Studies/Sharr_25-10-2010.pdf or visit www.unep.at; www.envsec.org

management and use of wetlands ecosystems and biodiversity; reducing the impacts of saline water intrusion; and implementing high-priority investments for water pollution control.

Following the EU directives, Croatia foresees a mechanism to protect and restore regulatory ecosystem services. In accordance with spatial plans, every building under construction has to undergo an environmental impact study. The EU Directive SEVESO II is also implemented into national legislation.

Key Policy gaps:

- Inadequate national policy coverage for adaptation related to water-ecosystems biodiversity and flood management
- Lack of/limited adequate vertical integration from EU to local administrations

Impaired ecosystem functioning and loss of species

Risk of landslides due to flooding. Risk of inaccessibility of essential services and disrupted communication due to heavy snow precipitation and cold extremes.

Adaptation measures in the transport, infrastructure and communication sector in the Western Balkan countries are not explicitly indicated as such, and no adaptation measures or strategic goals are mentioned for specific mountainous areas.

Good practices of urban risk reduction related to inaccessibility of transport infrastructure do

GOOD PRACTICES

Urban adaptation in Montenegro and Serbia

Expert training on risk and vulnerability assessment and adaptation planning: urban planning and development sectors (Environment and Climate Regional Accession Network [ECRAN], European Commission – EC; European Union – EU)

Climate change can affect urban areas and spaces just as much as rural areas, with increasingly adverse impacts on energy supply and health. They furthermore affect social cohesion and call for intensive disaster risk management.

The goal of the ECRAN Adaptation Programme is to enhance understanding about climate adaptation action in the urban planning and development sector among a core group of beneficiary countries' representatives, supporting the creation of national climate adaptation policies and planning as a basis for action.

The ECRAN Adaptation Programme includes a series of workshops that will guide the National ECRAN Adaptation Teams through the different stages towards developing national climate

adaptation policies and legislation. This will be combined with regional technical training sessions that support beneficiary countries' experts from selected technical areas in carrying out risk and vulnerability assessments and adaptation planning. The programme envisages three regional technical training workshops, each lasting for up to two days. The three priority fields that have been selected by the beneficiary countries for the training are:

- Water Management
- Urban Planning and Development, and
- Energy.

The training will incorporate options for reducing disaster risks related to climate change.

ECRAN is financed by the EU and managed by the European Commission. For further information, visit <http://www.ecranetwork.org>

exist in some cities (e.g. Pristina). However, in general national governments provide funds only for emergency situations, which makes it difficult for municipalities to carry out any major urban risk-reduction and resilience-building activities. Local authorities can only undertake such activities as part of other routine activities, such as land-use planning, using the respective departmental budgets.

Key Policy gaps:

- Low financial capacity to address extreme events causing inaccessibility of services and disrupted communication at the local level
- Low technical capacity to address extreme events causing inaccessibility of services and disrupted communication at the local level



Sarajevo, Bosnia and Herzegovina



Decreased energy security

Risk of decreased security in terms of energy supply, with inability/strain to meet energy demand during peak summer months when demand is at its highest and output is at its lowest.

The 2020 Energy Strategy aims to reduce the EU's greenhouse gas emissions by at least 20 per cent, increase the share of renewable energy to at least 20 per cent of consumption, and achieve energy savings of 20 per cent or more. All EU countries must also achieve a 10 per cent share of renewable energy in their transport sector. At the subregional level, the Energy Strategy of the Energy Community represents the first step in creating and streamlining a cost-efficient plan for energy infrastructure within the Western Balkans, and has set a minimum target of 9 per cent energy saving by 2018. The Strategy takes into consideration the impacts of climate change and aims to adapt energy production and consumption patterns to new climate conditions. At the national level, almost all countries have adopted energy

efficiency legislation, as well as having developed National Energy Efficiency Action Plans.

These policies have great potential to entail synergies (and trade-offs) between mitigation and adaptation. While the introduction of renewable sources of energy is considered more of a climate change mitigation measure, energy efficiency can also be regarded as a climate change adaptation measure, since it contributes to the reduction of energy demand and energy consumption.

The main inter-sectoral complementarities concern the industry, building and transport sectors. There are no specific adaptation measures for mountainous areas related to energy security and efficiency.
















Key Policy gaps:

- Lack of/limited adequate vertical integration from the EU to local administrations
- Lack of/limited institutional coordination across sectors



Coal-fired power station, Croatia
















Evaluation of the existing adaptation policy mix to address identified key risks in the Western Balkans

Key risks	Hazards	Key vulnerable sectors	Adaptation policies				Overall effectiveness
			Policy coverage	Complementarities or conflicts	Impacts on local community resilience	Bottlenecks	
Economic and livelihood losses	Wildfires	Forest and biodiversity Land	 National	 Complementarities with forest management and biodiversity protection, demining activities, disaster risk-reduction policies	 Potentially increasing resilience of local communities	 Limited budget Lack of/limited institutional coordination	
	Flooding	Water (DRM)	 EU Subregional Transnational National	 Complementarities with transport and communication policies	 Potentially increasing resilience of local communities	 Lack of risk sharing and transfer measures for flood damages Low financial resources available for grey adaptation measures Lack of/limited institutional coordination	
	Rising temperatures Water scarcity, droughts	Food (Agriculture/Livestock)	 EU Subregional National	 Complementarities with forest management and biodiversity protection, disaster risk management Potential conflicts with other sectors (energy, tourism, water management)	 Potentially increasing resilience of local communities	 Low dedicated budget Lack of political awareness and institutional capacity	























LEGEND  good performance  partially positive/negative or incomplete performance  poor performance **n/a** data or information not available

Evaluation of the existing adaptation policy mix to address identified key risks in the Western Balkans *(continued)*

Key risks	Hazards	Key vulnerable sectors	Adaptation policies				Overall effectiveness
			Policy coverage	Complementarities or conflicts	Impacts on local community resilience	Bottlenecks	
Economic and livelihood losses <i>(continued)</i>	Reduced snow cover	Tourism (Winter)	 National Subnational	 Conflicts in the use of resources with water and energy sector (e.g. artificial snow-making)	 Decreasing resilience of local communities	 Unsustainable measures carrying other risks Economic bottlenecks Lack of awareness of the problem and adaptation needs	
	Cold spells, heavy snow precipitation	Food (Agriculture/ Livestock)	n/a	n/a	n/a	n/a	n/a
Increased mortality and morbidity	Flooding (during and post-event)	Human health	 EU Subregional National	 Potential complementarities with disaster risk-reduction policies	 Potentially increasing resilience of local communities	 Lack of/limited adequate inter-sectoral cooperation Lack of/limited adequate vertical integration EU-local	
	Wildfires	Human health	 EU Subregional National	 Potential complementarities with disaster risk-reduction policies	 Potentially increasing resilience of local communities	 Lack of/limited adequate inter-sectoral cooperation Lack of/limited adequate vertical integration EU-local	























Evaluation of the existing adaptation policy mix to address identified key risks in the Western Balkans *(continued)*

Key risks	Hazards	Key vulnerable sectors	Adaptation policies				Overall effectiveness
			Policy coverage	Complementarities or conflicts	Impacts on local community resilience	Bottlenecks	
Increased mortality and morbidity <i>(continued)</i>	Heatwaves	Human health	 National	 Potential complementarities with disaster risk-reduction policies	 Potentially increasing resilience of local communities	 Lack of/limited adequate inter-sectoral cooperation	
	Cold spells	Human health	 National	 Potential complementarities with disaster risk-reduction policies	 Potentially increasing resilience of local communities	 Lack of/limited adequate inter-sectoral cooperation	
Decreased public safety	Flooding (in industrial hotspots)	Human health Food (Agriculture, Fishing) Forest and biodiversity	 EU Subregional National	 Potential complementarities with disaster risk-reduction policies, forest and biodiversity	 Potentially increasing resilience of local communities	 Lack of/limited funding Lack of awareness Lack of/limited adequate vertical integration EU-local	
	Flooding (in landmine sites)	Human health Food (Agriculture) Forest and biodiversity	n/a	n/a	n/a	n/a	
	New vector-borne diseases	Health	 National	 Potential complementarities with disaster risk-reduction policies	 Potentially increasing resilience of local communities	 Lack of/limited horizontal institutional coordination Lack of awareness	


















Evaluation of the existing adaptation policy mix to address identified key risks in the Western Balkans *(continued)*

Key risks	Hazards	Key vulnerable sectors	Adaptation policies				Overall effectiveness
			Policy coverage	Complementarities or conflicts	Impacts on local community resilience	Bottlenecks	
Decreased public safety <i>(continued)</i>	Water scarcity (urban areas)	Health	 National	 Potential conflicts with other energy, agriculture	 Potentially increasing resilience of local communities	 Lack of/limited horizontal institutional coordination Lack of awareness	
Displacement of population	Flooding	Transport infrastructure and communication Health	 EU Local	 Potential complementarities with disaster risk-reduction policies	 Potentially decreasing resilience of local communities	 Lack of/limited institutional coordination Lack of/limited adequate vertical integration EU-local	
	Wildfires	Transport infrastructure and communication Health	 EU Local	 Potential complementarities with disaster risk-reduction policies	 Potentially decreasing resilience of local communities	 Lack of/limited institutional coordination Lack of/limited adequate vertical integration EU-local	
Land degradation	Rising temperatures Wildfires	Land	 EU National	 Potential complementarities with agriculture, forest and biodiversity, water management	 Potentially increasing resilience of local communities	 Lack of/limited institutional coordination Lack of/limited adequate vertical integration EU-local	













Evaluation of the existing adaptation policy mix to address identified key risks in the Western Balkans (continued)

Key risks	Hazards	Key vulnerable sectors	Adaptation policies				Overall effectiveness
			Policy coverage	Complementarities or conflicts	Impacts on local community resilience	Bottlenecks	
Impaired ecosystem services and changes to/loss of species and habitats	Rising temperatures	Forest and biodiversity Water	 International EU Transnational National	 Potential complementarities	 Potentially increasing resilience of local communities	 Lack of/limited institutional coordination mechanisms Lack of/limited adequate vertical integration EU-local Lack of proper infrastructure and tool	
	Wildfires	Forest and biodiversity	 National	 Complementarities with agriculture	 Potentially increasing resilience of local communities	 Limited budget for specific adaptation measures Lack of/limited institutional coordination across sectors	
	Flooding Flooding (in industrial hotspots)	Water Food (Agriculture, Fishing) Forest and biodiversity	 EU Transnational	 Potential complementarities with water management	 Potentially increasing resilience of local communities	 Lack of/limited institutional coordination across sectors Lack of/limited adequate vertical integration EU-local	



Evaluation of the existing adaptation policy mix to address identified key risks in the Western Balkans *(continued)*

Key risks	Hazards	Key vulnerable sectors	Adaptation policies				Overall effectiveness
			Policy coverage	Complementarities or conflicts	Impacts on local community resilience	Bottlenecks	
Inaccessibility of services and disrupted communication	Cold spells, heavy snow precipitation Flooding (landslides)	Transport infrastructure and communication Health	 National Local	 Potential complementarities with disaster risk reduction	 Potentially increasing resilience of local communities	 Low financial and technical capacities at the local level	
Reduced energy security	Water scarcity	Energy	 EU Subregional National	 Potential complementarities with industry, building, transport	 Potentially increasing resilience of local communities	 Lack of/limited institutional coordination across sectors Lack of/limited adequate vertical integration EU-local	

Are policy responses forward-looking?

Despite future scenarios indicating that climate change impacts will become increasingly severe in this region, existing legislation, policies and instruments rarely consider climate change issues and the inherent variability and uncertainty of climatic and socioeconomic variables. This means they are better suited to addressing current conditions than preparing for the future changes. Generally, neither adaptation nor mountain-specific considerations are integrated.

Although the situation varies greatly between countries, some sectors represent positive exceptions, with policies that contain forward-looking elements for adaptation. Policies pertaining to water and flood management, forests and biodiversity, and energy appear to be the most effective in this regard.

Moving forward, there are two key steps that should be taken to address the policy gaps identified in this analysis. Firstly, in the view of progressive integration into the EU, national legislation should be further improved and harmonized with relevant directives, such as the EU Floods Directive, that take into account future climate impacts and provisions of regular methodological updates and revisions according to the latest scientific information on climate change. Secondly, subregional coordination and transnational synergies should be strongly promoted. Policymakers should consider a subregional approach to investments in prevention and preparedness in various sectors to avoid duplications and improve coordination. Subregional adaptation strategies and plans would thus further ensure sustainability at the national level.



Hiking in Durmitor National Park, Montenegro

Further policy gaps

Existing policies in the Western Balkans fail to address mountains as a climate change hotspot, with the exception of policies relating to winter tourism and ecosystem services. Given the strategic importance of mountains in the Western Balkans, there should be a stronger mountain focus in adaptation actions.

Furthermore, two significant current risks appear to be disregarded and need to be included in future policies:

- the risk of economic losses related to heavy snowfall and extreme cold temperatures and
- the risk of decreased public safety due to flooding in landmine sites.

It is essential that all present and emerging risks are adequately addressed at the most appropriate level.

Bottlenecks affecting policies related to adaptation often concern a lack of institutional coordination both horizontally (across sectors that are remits of different ministries) and vertically (across administrative levels within the same sector), and a lack of financial resources to implement the policies. Furthermore, limitations and difficulties related to the ongoing EU integration process often miss vertical mechanisms to coordinate actions between regional and local stakeholders. A clear example of where the lack of coordination may result in maladaptation is found in the winter tourism industry. Here, the use of snow-making systems to address the risk of economic losses due to reduced snow cover is not sustainable, and may in fact increase losses.

It is imperative that any action towards a more resilient Western Balkans region adopts an approach that avoids maladaptation and embraces no-regret measures, especially when budget and capacities are limited. In particular, adaptation initiatives must not increase GhG emissions; must be economically and socially equitable; should not involve high costs; should increase incentive to adapt; and contain a great degree of flexibility (Magnan, 2014). Win-win measures, for instance, include improving climate-change awareness among local communities and stakeholders in charge of the most pressing policies such as disaster risk management/disaster risk reduction, as well as adopting innovative means such as insurance schemes and financial tools.



Plitvice Lakes National Park, Croatia



Durmitor National Park, Montenegro

Information, data and institutional gaps

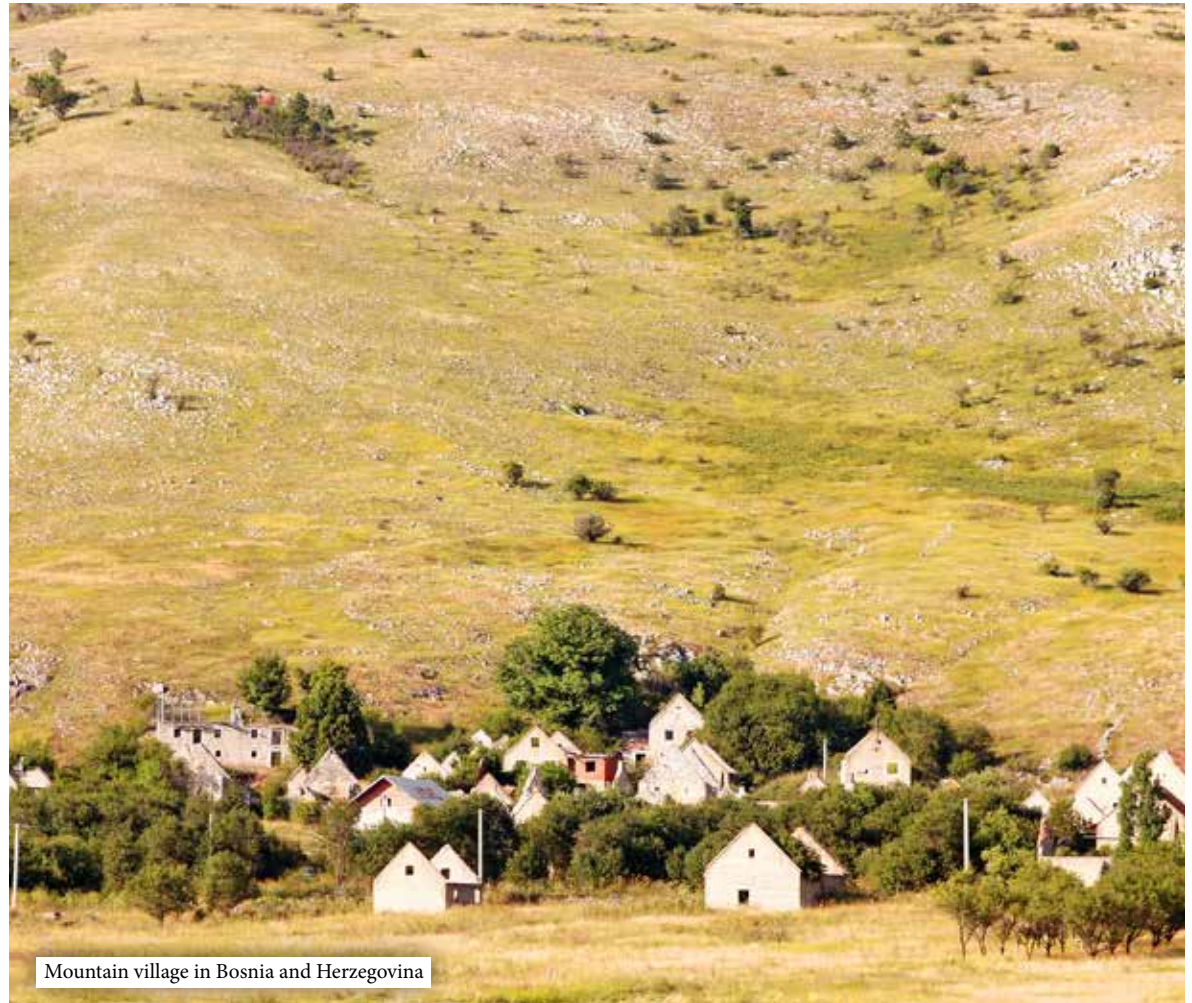
A comprehensive review of the available literature was complemented by the systematic involvement of governmental experts. Through their direct participation and continuous feedback, including via questionnaires and review mechanisms, data and information was collected on sectoral and adaptation policies in the Western Balkans.

Information, data and institutional gaps preventing a proper policy assessment have been identified, including:

- Lack of (accessible) data and information on actual implementation, outcomes and bottlenecks of existing policies
- Limited institutional capacities to provide specific data and information at the national or subnational level
- Poor monitoring and evaluation of existing policies.

In fact, information on policies is sparse. Even when it is available, adaptation considerations are often still inexistent or very basic. With respect to integrating adaptation into policies, there is a need to improve policy performance evaluation, and to agree on expected outcomes from policy focus areas by defining quantitative indicators to monitor progress against the objectives.

In only a very few cases were assessments of national performances available, such as the National Capacity Self-Assessment for Global Environment Management – providing an overview of challenges and opportunities in relation to the three Rio conventions – which was developed by all Western Balkan countries except Kosovo.¹



Mountain village in Bosnia and Herzegovina

Improving the quality of information on adaptation and access to information remains essential. As a first step, Western Balkan countries should start sharing their progress in terms of adaptation on the European Climate

Adaptation Platform, Climate-ADAPT, and make full use of the resources available online, including an Adaptation Support Tool and Case Study Search tool designed to improve the knowledge base of policymakers.

Acronyms

BiH	Bosnia and Herzegovina		Zusammenarbeit	NEAP	National Environmental Action Plan
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit	ha	hectare	NEEAP	National Energy Efficiency Action Plan
CAP	Common Agricultural Policy	HCVF	High Conservation Value Forests	NFP	National Focal Point
CBD	Convention on Biological Diversity	HEWS	Heatwave early warning systems	NGO	Non-governmental organization
CCS	Climate Change Strategy	ICI	International Climate Initiative	NSDI	National Strategy for Development and Integration
CDM	Clean Development Mechanism	ICID	International Commission on Irrigation and Drainage	NTMP	Neretva and Trebišnjica Management Project
CEIS	Croatian Environment Information System	ICJ	International Court of Justice	PECI	Projects of Energy Community Interest
CIC	International Council for Game and Wildlife Conservation	ICP Forests	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests	PJ	Petajoule
CO ₂	Carbon dioxide			REC	Regional Environmental Center
COP	Conference of Parties	ICZM	Integrated coastal zone management	RS	Republika Srpska
DABEO	Dinaric Arc and Balkans Environment Outlook	INC	Initial National Communication	SCCF	Special Climate Change Fund
DAI	Dinaric Arc Initiative	INDCs	Intended Nationally Determined Contributions	SDGs	Sustainable Development Goals
DIVA	Dynamic Interactive Vulnerability Assessment	IPA	Instrument for Pre-Accession Assistance	SEETO	South-East Europe Transport Observatory
DMCSEE	Drought Management Centre for South-Eastern Europe	IPCC	Intergovernmental Panel on Climate Change	SMEs	Small and medium-sized enterprises
DRM	Disaster Risk Management	IUCN	International Union for Conservation of Nature	SNV	Netherlands Development Organisation
EbA	Ecosystem-based adaptation	IWRM	Integrated Water Resource Management	TFEC	Total final energy consumption
EBRD	European Bank for Reconstruction and Development	KEPA	Kosovo ¹ Environmental Protection Agency	toe	Tons of oil equivalent
EC	European Community	KES	Kosovo ¹ Environmental Strategy	TPES	Total primary energy supply
ECNC	European Centre for Nature Conservation (European Expertise Centre for Biodiversity and Sustainability)	KfW	Kreditanstalt für Wiederaufbau	TWh	Terawatt hour
ECRAN	Environment and Climate Regional Accession Network	ktOE	Kilotonne of oil equivalent	UK	United Kingdom
EE	Energy Efficiency	LDCF	Least Developed Countries Fund	UNCCD	United Nations Convention to Combat Desertification
EEA	European Environment Agency	LDCs	Least Developed Countries	UNDP	United Nations Development Programme
EIB	European Investment Bank	LEDS	Low Emission Development Strategy	UNECE	United Nations Economic Commission for Europe
ENVSEC	Environment and Security Initiative	LEG	Least Developed Countries Expert Group	UNEP	United Nations Environment Programme
ESD	Energy Services Directive	MADA	Mountain Area Development Agency	UNESCO-BRESCE	United Nations Educational, Scientific and Cultural Organization – Regional Bureau for Science and Culture in Europe
EU	European Union	MAP	Mediterranean Action Plan	UNFCCC	United Nations Framework Convention on Climate Change
EU-27	European Union of 27 member states	MEAs	Multilateral Environment Agreements	UNMIK	United Nations Interim Administration Mission in Kosovo ¹
EuroNatur	Experten für Naturschutz in Europa	MESP	Ministry of Environment and Spatial Planning	UNSCR 1244	United Nations Security Council Resolution 1244
FAO	Food and Agriculture Organization of the United Nations	MoEFWA	Ministry of Environment, Forest and Water Administration (in Albania)	USAID	United States Agency for International Development
FASRB	Framework Agreement on the Sava River Basin	MoFTER	Ministry of Foreign Trade and Economic Relations (in BiH)	US\$	United States Dollar
FBiH	Federation of Bosnia and Herzegovina	Mtoe	Million tonnes of oil equivalent	WB	The World Bank
FYR	Former Yugoslav Republic	NAC	National Adaptation Component	WFD	EU Water Framework Directive
GCF	Green Climate Fund	NAP	National Action Program	WIM	Warsaw International Mechanism for Loss and Damage
GDP	Gross Domestic Product	NAPAs	National Adaptation Programmes of Action	WMO	World Meteorological Organization
GEF	Global Environment Facility	NAPs	National Adaptation Plans	WWF	World Wildlife Fund
GHG	Greenhouse gas	NBSAP	National Biodiversity Strategies and Action Plan		
GIZ	Gesellschaft für Internationale Zusammenarbeit	NC	National Communication		
		NCB	National Coordination Body		
		NCSA	National Capacity Self-Assessment for Global Environment Management		

Notes

1. This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.
2. Albania, Bosnia and Herzegovina, and FYR Macedonia are among the top 20 most mountainous countries on Earth, according to the Food and Agriculture Organization (FAO). Significant portions of the territory of the other countries in the region are mountainous.
3. On average, the regional dependency ratio is 66 per cent. For example, Croatia, Serbia and Montenegro receive about 50 per cent or more of their water resources from transboundary rivers.
4. The contribution of agriculture to GDP ranges from 22 per cent in Albania to just 4.3 per cent in Croatia. The agricultural sector employs between 42 per cent of the total population in Albania and 14 per cent in Croatia (World Bank Open Data: Agriculture and Rural Development).
5. This indicator is the ratio between the total primary energy supply (TPES) and the gross domestic product (GDP) for a given calendar year. It measures the energy consumption of an economy and its overall energy efficiency. The energy intensity ratio is determined by dividing TPES by GDP. Since TPES is measured in toe (Tons of Oil Equivalent) and GDP in US\$ 1,000, this ratio is measured in toe per US\$ 1,000.
6. Defined as “final energy consumption”
7. Bosnia and Herzegovina borders Adriatic Sea with negligible area (21 kilometres).
8. The majority of key risks were identified during the stakeholder consultations that took place in July 2015. Other key risks have been identified from existing literature.
9. Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks (Text with EEA relevance).
10. Entered into force on 29 December 2004
11. Entered into force on 12 February 1978, revised in Barcelona, Spain, on June 10 1995 as the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean
12. Entered into force on 24 March 2011
13. Action Plan for the Implementation of the ICZM Protocol for the Mediterranean 2012–2019, 2008
14. Law no. 7501 on the Land, Law no. 8053 on Transfer of Ownership of Agriculture Land without Compensation, Law no. 8337 on the Transfer of Agriculture Land, Meadows and Pastures, Law no. 8752 on the Creation and Function of Structures on Land Management and Protection and Law no. 9244 on Land Protection.
15. Albania, BiH and FYROM – completed four national reports; Republic of Croatia – two; Kosovo – none; Republic of Montenegro – one; Republic of Serbia – three
16. (Albania and Serbia – in development stage; BiH, Republic of Montenegro and FYR Macedonia – in final stage; Republic of Croatia – unknown; Kosovo – not developed).
17. Information received through the questionnaire from the Ministry of Environment and Spatial Planning of Kosovo
18. There is no Law on Forests in force in FBiH. The Association of Municipalities and Cities in FBiH requested the Constitution Court to decide whether the Law on Forests (Official Gazette of the Federation of Bosnia and Herzegovina, no. 20/02) is harmonized with the European Charter of Local Self-Government. The court identified serious discrepancies between the law and the charter and ordered necessary alignments in terms of respecting the rights and vital interests of local communities. Since such alignments were not realized on time, the Law on Forests was proclaimed invalid. Although various institutions have proposed several drafts of a new Law on Forests, there is as yet no political agreement on this.
19. Kosovo has developed a Strategy and Action Plan for Biodiversity 2011–2020. See http://www.ammk-rks.net/repository/docs/Strategy_and_Action_Plan_for_Biodiversity_2011-2020.pdf
20. In 2013, Croatia changed from being a Contracting Party to an EU Member State.
21. Under the SCR 1244 resolution of the UN Security Council
22. United Nations Environment Program, “Environment and cultural diversity” <http://www.unep.org/GC/GC23/documents/GC23-INF23.pdf> November 2004
23. In Bosnia and Herzegovina, the entities are practically independent in implementing agricultural policies.
24. Kosovo has not ratified the CBD but has adopted a NBSAP.

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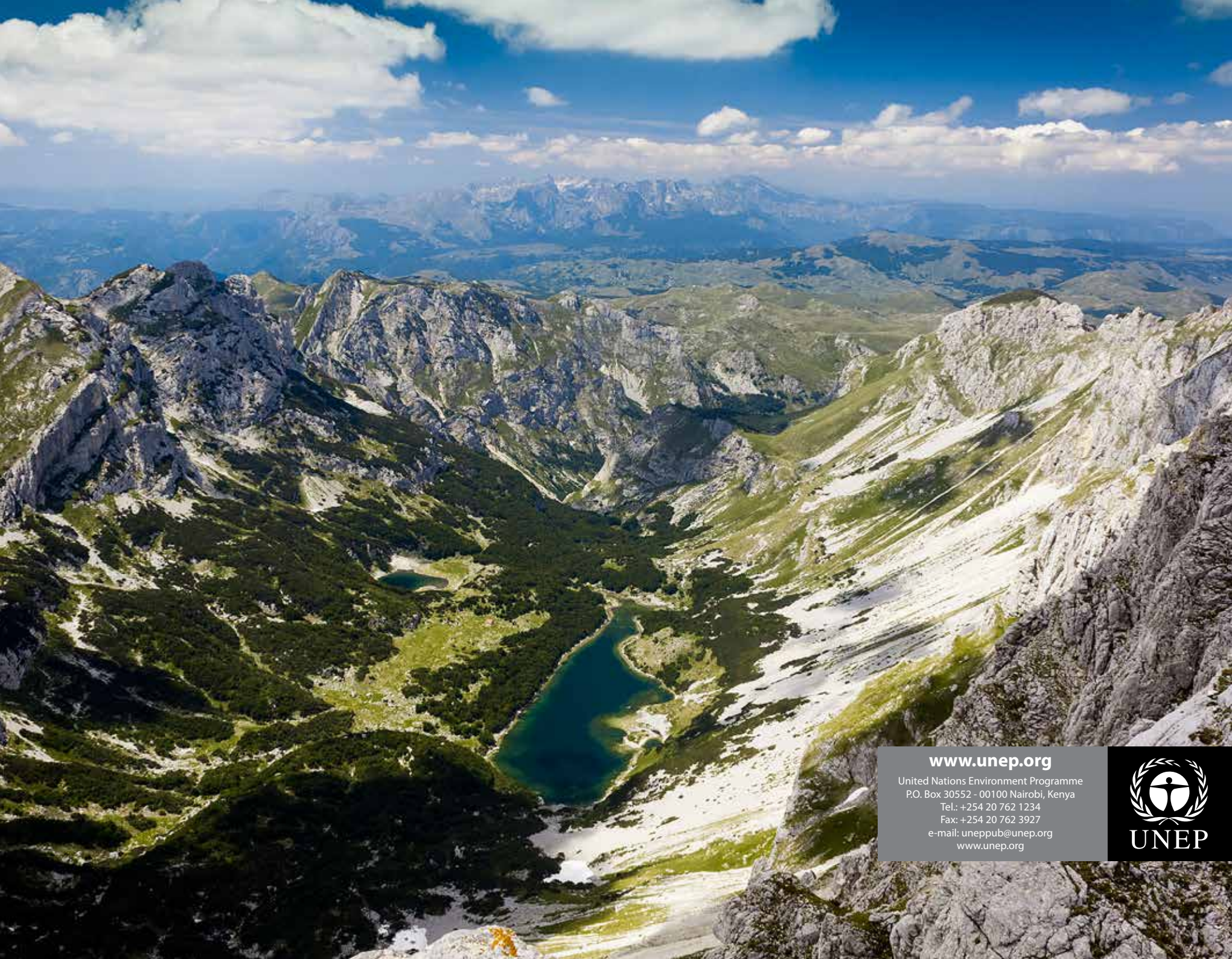
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Back cover photo:
Lake Škrčko as seen from Durmitor summit,
Durmitor National Park, Montenegro



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