

## Part IV: Glimpses of environmental futures

# 5 Impacts on the region's environment: a glimpse of possible futures

### Key messages

A few predictions are available for the Western Balkan environment. These, together with predictions for wider geographic areas in Europe sketch out the expected impacts if current trends continue into the future.

Among these impacts, pollution and health will remain important concerns in the region:

- emissions of some air pollutants should decline over the coming decade, though it is not clear if this will improve local air quality;
- the countries in the region face a major challenge in terms of improving drinking water and waste water treatment services

Greenhouse gas emissions from the Western Balkans are projected to increase. Climate change impacts are expected to become stronger. Moreover, the region's rich ecosystems will face ongoing threats.

Other problems will affect natural resources in the region:

- coastal and urban sprawl threaten to continue, along with depopulation and land abandonment in rural areas, especially in the mountains
- overfishing is likely to remain a threat in local seas
- municipal solid waste is growing, and the management of other waste streams remains a problem.

These trends and their outcomes are not inevitable. Policy choices can play a key role in shaping consumption and production patterns and waste levels. For example, implementation of national plans as a response to EU legislation for waste could lead to reduction in levels of waste if designed in more innovative ways. Countries would also incur bigger implementation costs to manage waste. The previous chapters have shown that many drivers are uncertain and will influence future consumption and production patterns and thereby changing the region's environmental futures. Some of these alternative possible futures could take shape in response to sudden, unexpected changes, such as an energy crisis or new technology. Different scenarios might arise if trends currently projected for the region — such as European integration and ongoing economic growth — are not realised. Or governments, business and other actors in the region might lead the way to a different path.

The information base for the assessment of the possible or expected future environmental situation is very poor. Most of the information is available from international sources, and only for larger geographical areas. Indeed, past and present trends for the Western Balkans are difficult to assess accurately.

This chapter summarises the implications of various drivers for the environment of the Western Balkans and for consumption and production patterns, as described in previous chapters. The chapter briefly reviews recent trends for each of the themes described in Chapter 1 (Part I). This chapter groups environmental issues into four main themes: pollution and health (including air and water pollution); climate change; ecosystems and biodiversity; and resources and waste. The

last category includes land use, marine and coastal zones, water resources, and waste generation.

Where data are available each section presents — predictive indicators for the region or for wider geographic areas that include the Western Balkans, such as Eastern Europe (as yet, few environmental indicators have been prepared for the region). In most cases, these reviews provide a 'reference scenario', based on existing trends.

As we have seen, a series of drivers will influence the future. For each environmental theme, the chapter reviews some of the key consumption and production patterns (based on Chapters 3 and 4) as well as the drivers that may shape environmental futures. Where relevant, scenarios highlighting future alternatives are also presented.

Table 5.1 summarises the links between consumption and production patterns and the environment. These links are described in the following sections of this chapter.

**Table 5.1 Linking production and consumption patterns and environmental futures in the Western Balkans**

Consumption	Production		Environmental pollution <sup>a</sup> and human health	Climate change: greenhouse gas emissions	Ecosystems and biodiversity	Resource use and waste generation <sup>b</sup>
Food consumption	Agriculture and fisheries					
Household energy consumption	Energy production	➔	••	••	•••	•••
Personal mobility	Freight transport		•••	•••	•	••
			•••	•••	••	••

**Notes:** <sup>a</sup> including air and water pollution

<sup>b</sup> including land use, freshwater consumption, marine ecosystems and waste

Strength of the links: • Weak influence; •• Medium influence; ••• Strong influence

The scores are based on the assessment in Chapters 3, 4 and 5 of this report.

## 5.1 Pollution and environmental health: air pollution

### Recent trends

Overall atmospheric emissions of acidifying substances ( $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{NH}_3$  and NMVOC) in the region did not change significantly from 1992 to 2003, though this overview masks a variety of trends in individual countries (see Section 1.1). Motor vehicles have been an important and growing source of air pollution, while industrial emissions did not increase significantly during this period. Poor air quality has been a serious problem, in particular in cities and industrial areas.

### Outlook for the region

Projections of air pollution emissions for European countries prepared by IIASA for EMEP are based on the RAINS model and include the Western Balkans. These projections forecast a decline in the region's emissions of fine particulates,  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$ , between 2000 and 2010, followed by a slight increase in the period to 2020 (Figure 5.1). Trends are forecast to differ among the countries of the Western Balkans, however: for example, Croatia's emissions of both  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  are projected to rise steadily to 2020; those in other countries will see a net decrease (<sup>152</sup>).

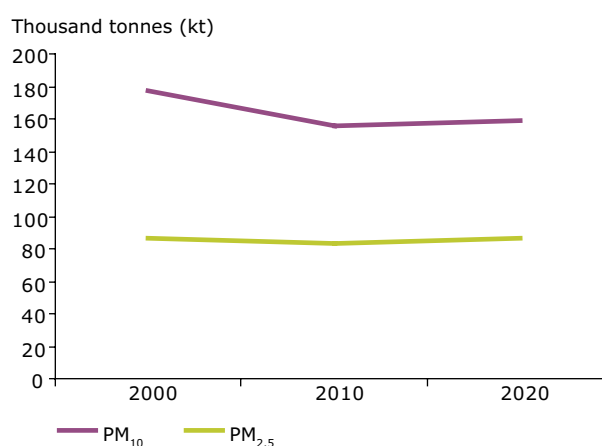
For acidifying substances, EMEP forecasts that the region's high level of  $\text{SO}_2$  emissions will decline steadily from 2000 to 2020, falling by a total of 30 % (Figure 5.2). For  $\text{NH}_3$ , emissions should decline by a total of 21 %, though most of this change is projected to occur between 2000 and 2010, after which emission levels will largely stagnate. In contrast,  $\text{NO}_2$  and NMVOC emissions are forecast to grow by 19 % and 31 % respectively over the period.

### Alternative paths

These forecasts provide a reference scenario based largely on a continuation of trends seen in the early part of this decade: for example, rising incomes and rising motor vehicles numbers and traffic. The forecasts do not take into account fluctuations in economic growth such as the impact of the current credit crisis.

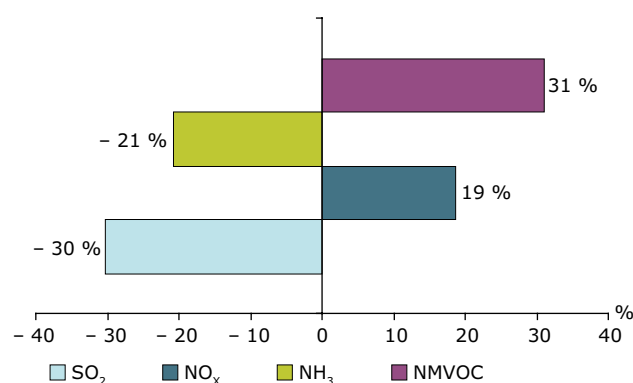
Several key areas of the consumption and production patterns described in the previous

**Figure 5.1** Projected  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  emissions from the Western Balkans until 2020



Source: See Annexes 1 and 2.

**Figure 5.2** Projected change in emissions of acidifying substances in the Western Balkans, 2000–2020



Source: See Annexes 1 and 2.

chapters will play a key role in influencing future levels of air pollution. These include household choices for personal mobility, especially in terms of motor vehicle use; and the level of freight transport on the production side particularly by road. Energy production and consumption will also affect air pollution levels; and in particular decisions regarding the use of coal, lignite and fuel wood for home heating. Other areas will also be important: in agriculture, for example, livestock production influences air pollution, in particular emissions of ammonia from manure.

(<sup>152</sup>) Based on estimates of emissions for recent years and projections to 2020. See Annexes 1 and 2 for further information.

In turn, the drivers forces described in Chapter 2 will shape the future production and consumption patterns in the region. Globalisation and trade will play a key role in determining prices of oil and other fuels, and also the patterns of imports and exports of the countries in the region, thus shaping many sectors, including agriculture. Macroeconomic developments will determine the amount of income people in the region have available to purchase motor vehicles.

Policy decisions will be quite important, including those concerning: vehicle and industrial emissions; public transport; rail, river and marine freight transport; energy investments; and energy efficiency programmes. For example, national government support for public transport and the implementation of stricter vehicle emissions could reduce urban air pollution levels. While European legislation sets many requirements in these areas that are

being adopted in the Western Balkans, it will be governments in the region that implement them.

#### *Existing forward-looking indicators*

Table 5.2 lists the forward-looking indicators prepared by IIASA, as well as one other indicator for air pollution in Europe, prepared by the World Business Council on Sustainable Development (WBCSD) <sup>(153)</sup>.

#### *Selected forward-looking studies from the review*

Cofala, J., *et al* (2005). *Scenarios of World Anthropogenic Emissions of Air Pollutants and Methane up to 2030*, IIASA, Laxenberg (Austria).

Amman, M., *et al*. (2005). *Baseline Scenarios for the Clean Air for Europe (CAFE) Programme*, IIASA, Austria.

**Table 5.2 Forward-looking indicators for air pollution**

Indicator	Geographic coverage	Temporal scale	Sources
Emissions of acidifying substances	Pan-European	2010, 2020, 2030	IIASA
Emissions of ozone Precursors	Pan-European	2010, 2020, 2030	IIASA
	OECD, Former Soviet Union, India, China	2050	WBCSD (NO <sub>x</sub> from transport)
Emissions of primary particles	Pan-European	2010, 2020, 2030	IIASA

**Source:** Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

<sup>(153)</sup> For some countries forward-looking indicators are also available at a national level. For example, projections for SO<sub>x</sub>, NO<sub>x</sub> and NH<sub>3</sub> under current legislation scenario and current reduction plans scenario with the temporal coverage for 2010, 2015 and 2020 are available for Croatia (Eionet data flows, status October 2009).

## 5.2 Pollution and health: water pollution and water services

### *Recent trends*

Urban areas, manufacturing and mining are all important sources of water pollution. Agricultural run-off is a problem in many parts of the Western Balkans (see Section 1.2). Waste water treatment is often poor or nonexistent. Overall, levels of water quality did not change significantly between 2000 and 2006. A large majority of the population throughout the region has access to safe drinking water.

### *Outlook for the region*

Forward-looking indicators of water pollution have not been identified for the region.

Future patterns and practices in agriculture have a major impact on water quality in the region. So will the practices used in energy production, in related mining activities and in other areas of industry. Industrial plants can take a series of actions, including the improvement of pretreatment facilities for their waste water. Households will also influence these patterns, for example by their food consumption choices.

One key question will be the future of drinking water supply and waste water treatment services, which are in poor condition in many parts of the region (see Section 1.2). Here, policy decisions will play a key role in shaping the future. As countries in the region move towards adoption of EU legislation such as the Drinking Water Directive and the Urban Waste water Treatment Directive, they will need to meet higher standards for both drinking water supply and waste water treatment, which will involve costs (Box 5.1).

### **Box 5.1 Estimates of the cost of improving water services**

Many drinking water supply systems in the region are poorly maintained. In some countries, access to safe drinking water remains limited. Waste water treatment systems function badly and many urban areas do not have a system at all. Improving water services will be a major challenge for Western Balkan countries for the future. An important goal will be to achieve the stringent EU standards for drinking water supply and waste water treatment.

The cost of these actions will be high. According to recent estimates made in Albania, for example, about USD 1.7 billion will be needed in the coming decade to establish adequate services<sup>(154)</sup>. In Croatia, the national Water Management Strategy estimates that almost EUR 4.5 billion will be needed to meet EU water standards.

The experience of the 12 new EU Member States provides another indication of the level of costs required. Some of these countries already had an extensive water infrastructure before accession but will need to spend an estimated EUR 35 billion to meet EU requirements for waste water treatment alone<sup>(155)</sup>. While the cost in the Western Balkans has not been determined accurately, it is clear that this work will require major investment in the coming decades.

<sup>(154)</sup> Speck, S. (2006), *Financial aspects of water supply and sanitation in transboundary waters of South-Eastern Europe*, Report for the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (available at: [www.bmu.de/files/pdfs/allgemein/application/pdf/financial\\_aspect\\_water\\_investment.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/financial_aspect_water_investment.pdf)).

<sup>(155)</sup> European Commission (2009), *Integrating Water Policy — Linking all EU Water Legislation within a Single Framework*, Water Note no. 9, Brussels.

### 5.3 Greenhouse gas emissions and climate change

#### Recent trends

Greenhouse gas emissions from south-eastern Europe rose sharply in the first years of this decade.

#### Outlook for the region

Only limited information on greenhouse gas emissions trends and projections is available from this region (see Annex 1 on the status of national communications). Table 5.3 lists available forward-looking indicators for wider geographic areas.

Consumption patterns, in particular those regarding energy use and mobility, will play a key role in determining these emissions in coming decades. So will *energy production* choices (such as those regarding continued use of coal and lignite, as we have seen in Chapter 3), along with the future of other areas of production. In *agriculture*, livestock production is an important source of greenhouse gas emissions.

A series of *driving forces* will influence the consumption and production patterns and their greenhouse gas emissions in the coming decades (Chapter 2). These include the following:

- international politics and legislation, and in particular possible future emission-reduction agreements at national and European levels;

- national legislation to implement these measures in the region;
- macroeconomic developments, which will influence future levels of industrial production, economic restructuring and motor vehicle use;
- technology, including both possible breakthroughs in low-carbon technological as well as the adoption of renewable energy and energy efficiency technologies in the region;
- markets and business, which can adopt new, less polluting technologies.

#### Selected forward-looking studies from the review

Bollen, J. *et al.* (2004). *Four Futures for Energy Markets and Climate Change*, Netherlands Bureau for Economic Policy Analysis (CPB).

Ecologic *et al.* (2006). *Analysis of economic opportunities & challenges of future climate change policies for the Accession and Candidate Countries* (Background paper for Workshop in Sofia, 14 and 15 June 2006 on Future Climate Change Policy in the Accession and Candidate Countries: Looking beyond 2012).

Intergovernmental Panel on Climate Change (2007). *Fourth Assessment Report* (several volumes), Geneva.

Bates, B. C. *et al.* (2008). *Climate change and water*, IPCC Technical Paper.

**Table 5.3 Key forward-looking indicators for greenhouse gas emission**

Indicator	Geographic coverage	Temporal scale	Sources
<b>Greenhouse gas emissions</b>			
	EU, EECCA	2020	EEA based on national communications (UNFCC)
	EU	2030	EEA (PRIMES and other models)
	OECD, Russia, other transition countries, India, China	2030	IEA
	Pan-European	2030	IIASA
	OECD Europe, EECCA, SEE	2050	WBCSD (CO <sub>2</sub> from transport)
<b>Global and European temperature</b>			
Trends	Global	2000 onwards	EEA
Outlook	Global	2100	EEA
<b>Atmospheric greenhouse gas concentrations</b>			
Trends	Global	2000 onwards	EEA
Outlook	Global	2100	EEA

**Source:** Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

## 5.4 Ecosystems and biodiversity

### Recent trends

The Western Balkans has a wealth of animal and plant diversity, including many endemic species and habitats. This biodiversity has faced a series of threats, including a sprawl of built-up areas in urban and coastal zones, mining activities and unregulated hunting and timber cutting. At the same time, governments in the region have taken a series of steps to protect species and habitats, and in particular they have increased the share of their territory designated as protected (see Section 1.3).

### Outlooks

In the near term, it is not likely that the global objective of reducing biodiversity loss by 2010 will be met; moreover, the EU-wide goal of halting biodiversity loss is also in danger of being missed <sup>(156)</sup>.

Predictive indicators for ecosystems and biodiversity in the region are not available, though EEA has prepared an indicator for the impact of climate change in most of its member countries (Table 5.4).

In the future, agriculture and fishing will play a key role in shaping the health of ecosystems and biodiversity. Due in part to declines in rural population and migration to urban areas, and reduced economic prospects, pastures and other extensive agricultural lands may continue to be abandoned, especially in mountain areas. This can

harm biodiversity by shrinking the area of farmland of high natural value and thus the mosaic of habitats for wildlife. At the same time, intensive agriculture is expanding, which also threatens biodiversity.

Food consumption patterns can influence these trends: household choices of local, traditional and organic products could support more small, high natural value farms.

Globalisation and trade may support opposing trends: more open trade may encourage more intensive agriculture that uses higher levels of pesticides and fertilisers; at the same time, the Balkans may find good export markets for organic products, though these are likely to cover only a small part of total farmland.

Another important driving force will be climate change, which will put pressure on existing habitats and species and will provide opportunities for invasive species in the region (see Sections 1.3 and 2.8).

Finally, legislation and policy initiatives could play a key role in managing these threats. Better planning controls could limit urban sprawl in natural and agricultural areas. Conservation programmes can help to protect the region's rich biodiversity and reduce the impacts on biodiversity from farming and fishing.

### Selected forward-looking studies from the review

Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being: Scenarios, Volume 2*.

**Table 5.4 Key forward-looking indicators for the impact of climate change on species diversity**

Indicator	Geographic coverage	Temporal scale	Sources
<b>Change in species diversity as a result of climate change</b>			
Outlook	EU + Liechtenstein, Norway, Switzerland	2100	EEA

**Source:** Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

<sup>(156)</sup> EEA (2007), *The pan-European environment: glimpses into an uncertain future*, EEA Report No 4/2007.



## 5.5 Resource use and waste: land use

### Recent trends

The landscape in the Western Balkans is very diverse and includes mountains, major river valleys and wetlands, large farming areas, Mediterranean coastal zones and urban and industrial areas. In recent years, key trends seen in the Western Balkans include a decline in farmland and growing sprawl in both urban and coastal areas.

In several countries, including the former Yugoslav Republic of Macedonia, Montenegro and Serbia, mining remains a major economic activity. Mines have scarred the landscape and created air and water pollution as well as solid waste. Many mines in the region have closed and at many of these sites, a legacy of accumulated waste, open pits and other environmental problems remains. Despite these closures, minerals and fuels continue to make up the largest share of the region's exports by weight.

### Possible outlooks

Studies of future land use in the Western Balkans are not available for assessment. Box 5.2 presents results from reviews for the EU.

### Alternative paths

Major changes in consumption and production patterns could lead to very different outcomes. The future of agriculture in the region will play a key role — this is the most important use of land in the region but farmland is now being rapidly abandoned. Agriculture will, as we have seen, be influenced by patterns of food consumption, and also by population and migration. Rural populations are expected to age and younger people to move from rural to urban areas, fuelling both land abandonment and urban sprawl. Technology and macroeconomic development could also influence these trends.

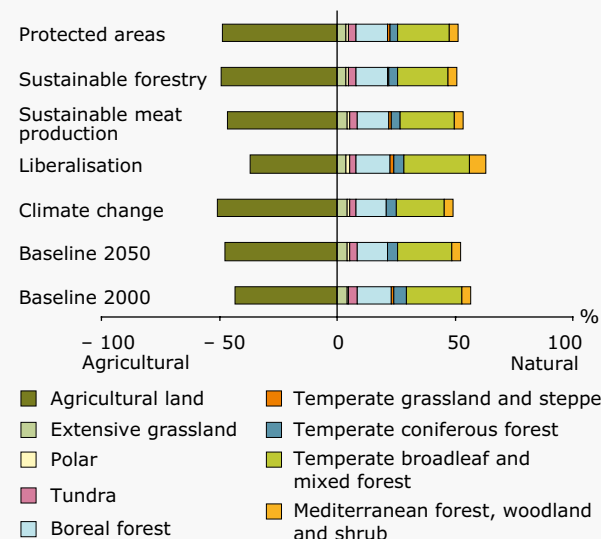
Globalisation and trade could play a key role: in the projections described. For example, in Box 5.2,

### Box 5.2 Future land use patterns: projections

Several recent studies have looked at future changes in land use across the EU. A recent projection of land use and biodiversity prepared by the Netherlands Environmental Assessment Agency for the Convention on Biological Diversity prepared a baseline projection for 2050 together with five alternative scenarios (Figure 5.3). In the baseline projection, agricultural land use will increase slightly in the EU (plus Norway, Switzerland and Liechtenstein). In a scenario where global agricultural markets are liberalised, however, the area of agricultural land in Europe will fall.

By way of contrast, the Scenar 2020 study<sup>(157)</sup> sees a decrease in agriculture land between 2000 and 2020: in its baseline scenario, the area of arable land will fall by 5 % across the EU. Forest land, urban land and recently abandoned land will all increase. This result is not totally at odds with the Netherlands study: rather, the Scenar 2020 foresees significant steps for market liberalisation in coming years and thus is closer to the liberalisation scenario of the Dutch projections.

**Figure 5.3 Land cover distribution in Europe in 2000 and 2050**



**Source:** Netherlands Environmental Assessment Agency, presented in *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

<sup>(157)</sup> European Centre for Nature Conservation et al. (2007), *Scenar 2020 — Scenario study on agriculture and the rural world: Objectives and conclusions of Scenario 2020*, available on: [http://ec.europa.eu/agriculture/publi/reports/scenar2020/index\\_en.htm](http://ec.europa.eu/agriculture/publi/reports/scenar2020/index_en.htm).



the 'liberalisation' scenario leads to the greatest difference in land use patterns.

Major changes in cultural values could change household consumption patterns and thus influence land use. Choices to build new homes or to refurbish existing houses could make a major difference either to the degree of urban sprawl or, in the case of refurbishment, to revitalising rural towns and villages. Policy and legislation will also play an important role, including both EU and national policies for agriculture and forestry. National and local policies for land use planning will affect the extent of urban sprawl.

The outcomes produced by these drivers could yield radically different futures for agricultural land in the Western Balkans. The possible range of outcomes can be seen in the scenarios generated by EEA's PRELUDE project, which investigated possible futures for Europe's rural areas. Box 5.3 describes these scenarios developed by PRELUDE.

#### *Key indicators*

The key forward-looking indicators for land cover and use of arable land are set out in Table 5.5.

#### **Box 5.3 Europe's rural landscapes: are major changes coming?**

The European Environment Agency's PRELUDE project focused on possible changes in rural landscapes over the coming 30 years. The project developed five scenarios for the future. These investigate both structural changes and disruptive events that could shape the future of agriculture and landscapes. Each scenario estimates the changes that will be seen across Europe for land use, which is divided into nine types: dense urban areas; diffuse urban areas; rural crop-land; rural mosaic; rural grasslands; natural mosaic; forest; other natural areas; and abandoned rural land.

- In the *Great escapes* scenario, the future is driven by financial competition. Agriculture becomes yet more intensified and further land is abandoned. Agricultural intensification and urban sprawl change the rural landscape. While some nature reserves are lost, the area of natural mosaic increases.
- *Evolved society*: following an energy crisis, Europeans change their lifestyles and many return to rural living and community involvement. Agriculture is high-tech and at the same time increasingly organic. The proportionality of major land uses does not change greatly — rather, this scenario sees a change in quality.
- In the *Clustered networks* scenario, the forces of globalisation, the needs of an ageing society and policies for strong land-use planning combine. While older rural communities struggle, new urban areas are developed in the countryside. Overall, however, new and old urban areas are dense and sprawl decreases. Agriculture is marginalised and many agriculture areas are abandoned. Natural habitats develop throughout the countryside, but high natural-value farmland largely disappears.
- In *Lettuce surprise U*, a decentralised and high-tech Europe evolves following a major food security crisis. Agriculture is advanced but non-polluting and relatively small-scale. Total crop-land decreases and the rural mosaic of small farms and forests grow. In addition, biodiversity and soil and water quality improve across Europe.
- *Cohesion ('Big crisis')*. Environmental disasters lead to strong, centralised policy responses. Agriculture reduces its surpluses and focuses on environmental stewardship. Europe sees a small decrease in crop-land and a growth in natural mosaic areas. Soil, water and air quality all improve.

**Table 5.5 Key forward-looking indicators for land use**

Indicator	Geographic coverage	Temporal scale	Sources
<b>Land cover distribution and change</b>			
Outlook	Pan-European region	2000–2050	Netherlands Environmental Assessment Agency
<b>Land cover, use of arable land</b>			
Outlook	Most of the EU	2020	EEA

**Source:** Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

*Selected forward-looking studies from the review*

Alterra, Eururalis project, Wageningen University, Netherlands (reports and other information available at: [www.eururalis.eu](http://www.eururalis.eu)).

ESPON (2007). *Scenarios on the territorial future of Europe*.

ESPON (2007). *Territorial futures*.

Knickel, K. and Kok, K. (2003). Future Land Use in Europe (scoping study), International Centre for Integrative Studies, University of Maastricht.

Mitchley, J. *et al.* (2006). 'Integrated futures for Europe's mountain regions: Reconciling biodiversity conservation and human livelihoods', *Journal of Mountain Science*, Vol. 3, No. 4 / Dec. 2006.

Nabuurs, G. *et al.* (2001). 'Sustainable management regimes for Europe's forests: a projection with EFISCEN until 2050', *Forest Policy and Economics*, Vol. 3, pp. 155–173.

UNECE/FAO (2005). *European Forest Sector Outlook Study*, Geneva.

## 5.6 Resource use and waste: solid waste

### Recent trends

The generation of municipal solid waste in the Western Balkans increased sharply from 2003 to 2007, by an estimated 40 % in per capita terms (see Section 1.7). Although data are partially incomplete, levels of waste per capita appear to be on a par with those in the EU-12. The region also has many abandoned waste sites and uncontrolled landfills.

The volume of mining and industrial waste in the region is most likely far greater than that of municipal waste, but data are not available. Accumulated mining and industrial waste is a further problem, including at factories and mines that have been closed.

### Outlook for the future

While outlook data are not available for the Western Balkans, comparisons can be drawn with projections for the EU-12. In a recent assessment prepared for EEA, municipal waste generation in the EU-12 is predicted to increase by about 33 % between 2005 and 2020, if economic growth is strong, and by about 22 % if economic growth remains weak (Figure 5.4).

The OECD has made projections of municipal waste generation in its member countries: in its reference

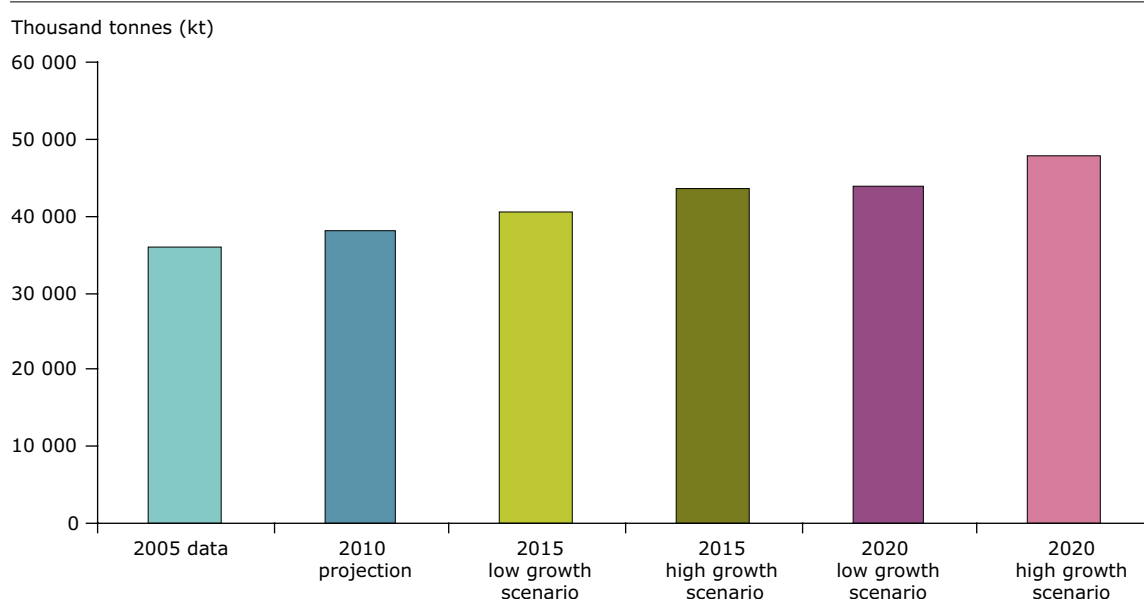
scenario, the level of municipal waste is projected to grow steadily to 2030 unless new policies are put in place.

Household consumption will play a key role in driving municipal waste levels. Food consumption patterns will play a key role in shaping future municipal waste levels. Currently, food waste accounts for at least one-third of municipal waste in the region (Section 4.1). This includes a growing amount of packaging waste used for food. Decisions on domestic house building, in particular choices for new construction instead of refurbishment of existing houses, will determine the amount of construction waste. As the EEA projections indicate, macroeconomic developments will also play a key role in driving future waste levels.

Mining waste from energy production and metal smelters is also an important type of waste in the region, and the future of these areas of production will influence waste levels and actions to clean up accumulated waste.

Policy choices can play a key role in shaping consumption and production patterns and waste levels. The OECD, for example, calls on its member countries to take stronger policy measures that can stem the rising levels of municipal waste in its member countries, such as user charges for waste as well as new initiatives to promote recycling<sup>(158)</sup>.

**Figure 5.4 Generation of municipal waste in the EU-12, 2005, 2010, 2015 and 2020**



**Note:** Cyprus not included in the projections.

**Source:** ETC-RWM.

<sup>(158)</sup> OECD (2008), *OECD Environmental Outlook to 2008*, Paris.

**Table 5.6 Key forward-looking indicators for waste generation and management**

Indicator	Geographic coverage	Temporal scale	Sources
<b>Municipal waste generation</b>			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-25	2000–2020	EEA
	OECD countries	2000–2020	OECD
	Varies	2020	Some national communications under UNFCCC
<b>Progress in management of contaminated sites</b>			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook			
<b>Generation and recycling of packaging waste</b>			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-25	2000–2020	EEA

**Source:** Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

For the countries of the Western Balkans, addressing these issues can play a key role in supporting growth and innovation, and in avoiding future costs. For example, national strategies to implement EU policies and legislation in innovative ways could move countries towards advanced levels of waste reduction and recycling. Such measures may require new and innovative initiatives. On the other hand, if the national and local governments in the region do not seek to stem rising levels of waste, they may need to make major investments in new landfills and other waste management facilities.

For other waste problems, such as mining and construction waste, markets and business can play a key role by changing production patterns and also addressing past problems. For example, new investors in mines and smelters in the Western Balkans can bring resources and technical capacity to address waste problems although in recent privatisations, investors have been exempted from past liabilities, such as accumulated mining waste<sup>(159)</sup>.

### *Key indicators*

The key forward-looking indicators for trends in waste generation and management are set out in Table 5.6.

### *Selected forward-looking studies from the review*

Tukker, A. *et al.* (2003). *Scenarios of household waste generation in 2020*, Institute for Prospective Technological Studies, Joint Research Centre, European Commission.

European Topic Centre on Resources and Waste Management (2008). *Municipal waste management and greenhouse gases*, Copenhagen.

OECD (2008). *OECD Environmental Outlook to 2030*, Paris.

<sup>(159)</sup> GRID/Arendal (2007), *Balkans: Vital Graphics*, Arendal, Norway.

## 5.7 Resource use and waste: water consumption

### Recent trends

Water scarcity is a problem, particularly in the summer and in southern parts of the Western Balkans, as well as in coastal zones and on islands. Countries in the region share many river basins and much of their water resources.

### Outlook for region

The EEA has forecast that demand for irrigation water for agriculture will increase in southern

Europe, as countries in this region experience the impacts of climate change, including water scarcity in summer months (Box 5.4) <sup>(160)</sup>. A similar trend may be seen in many parts of the Western Balkans and especially in Albania and the former Yugoslav Republic of Macedonia, which already depend heavily on irrigation.

These forecasts also see a decline in water use for electricity generation, a trend that may also be seen in the Western Balkans as power stations are modernised. Available projections of water withdrawals for different scenarios are presented in the Box 5.4.

### Box 5.4 Scenarios of water withdrawals in different sectors for the Western Balkans

The table below presents the fast track results for Western Balkans countries obtained based on the WaterGAP model and GEO-4 scenarios in the first phase of the SCENES project 'Water Scenarios for Europe and Neighboring States'. Under the Security first scenario an increase of more than 10 % in the water withdrawals for irrigation is expected all Western Balkans countries. The biggest changes (more than 50 %) are expected in domestic sector for Serbia and Montenegro; and in manufacturing and electricity generation for Bosnia and Herzegovina and the Former Yugoslav Republic of Macedonia. Under the sustainability First Scenario a decrease of water withdrawals for more than 50 % is expected for electricity and domestic purposes and smaller decrease for irrigation and manufacturing.

The new sets of refined projections for 'enriched' scenarios will be available in early 2011 as a result of participatory scenarios process the second phase of the SCENES project.

**Table 5.7 Percentage change in water withdrawals for the Western Balkans countries as compared to the base year (2000), realised with two different scenarios for 2030**

Country	Sector							
	Electricity		Manufacturing		Irrigation		Domestic	
	Security first	Sustainability first	Security first	Sustainability first	Security first	Sustainability first	Security first	Sustainability first
Albania	No or slight changes +/- 10 %	Decrease > 50 %	Increase > 10 %	Decrease > 10 %	Increase > 10 %	No or slight changes +/- 10 %	Increase > 10 %	Decrease > 50 %
Bosnia and Herzegovina	Increase > 50 %	Decrease > 50 %	Increase > 50 %	Increase > 25 %	Increase > 10 %	Increase > 10 %	No or slight changes +/- 10 %	Decrease > 50 %
Croatia	Increase > 10 %	Decrease > 50 %	Increase > 50 %	Increase > 50 %	Increase > 10 %	No or slight changes +/- 10 %	No or slight changes +/- 10 %	Decrease > 50 %
The Former Yugoslav Republic of Macedonia	Increase > 50 %	Decrease > 25 %	Increase > 25 %	Increase > 25 %	Increase > 10 %	No or slight changes +/- 10 %	No or slight changes +/- 10 %	Decrease > 50 %
Serbia and Montenegro	Increase > 25 %	Decrease > 50 %	Decrease > 50 %	Decrease < 50 %	Increase > 10 %	No or slight changes +/- 10 %	Increase > 50 %	Decrease > 50 %

**Source:** CESR (2007), SCENES — Water Scenarios for Europe and for Neighboring States. D 3.1. Fast track modeling results, Kassel.

<sup>(160)</sup> EEA (2005), *European environment outlook*, EEA Report No 4/2005.

**Table 5.8 Key forward-looking indicators for freshwater**

Indicator	Geographic coverage	Temporal scale	Sources
<b>Use of freshwater resources</b>			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-25 + Liechtenstein, Norway, Romania, Switzerland	2000–2030	EEA
<b>Oxygen-consuming substances in rivers</b>			
Trends	Western Balkans	Varies	National sources (see Annex 1)
<b>Nutrients in freshwater</b>			
Trends	Western Balkans	Varies	National sources (see Annex 1)
<b>Urban wastewater treatment</b>			
Trends	Western Balkans	Varies	Some national sources (see Annex 1)
Outlook	EU-15 and selected EU-12 Member States	2005, 2008–2015	EEA
<b>Floods and droughts</b>			
Outlook	EU-25 + Liechtenstein, Norway, Switzerland	1961–1990, 2020, 2070	University of Kassel

**Source:** Annex 1; *Catalogue of forward-looking indicators from selected sources*, EEA Technical report No 8/2008.

### *Other influences on water consumption*

A series of drivers will influence water trends in the region (Chapter 2). As we have seen, climate change will have a major impact on the availability of water in the region.

Future trends in agriculture in the region will also play a key role, along with food consumption patterns. Moreover, households consume water directly, and this will be another important factor for water demand. Energy production will play a key role — a key question is whether power plants in the region will move to greater recycling of their cooling waters, as is expected in other parts of Europe.

European legislation and policy will encourage river basin approaches to water management based on the Water Framework Directive. International frameworks for the Danube and Sava river basins are also promoting this approach. EU and national legislation will establish new requirements for drinking water quality and waste water treatment. Other policy areas will have an important influence. For example, agricultural policy will affect this sector's demand for water. In several countries, energy policies propose an increase in hydropower, and this will affect freshwater systems.

### *Key indicators*

The key forward-looking indicators for freshwater are set out in Table 5.8.

### *Selected forward-looking studies from the review*

Finnish Environment Institute and University of Kassel, Water Scenarios for Europe and for Neighbouring States — SCENES (ongoing research project), [www.environment.fi/syke/scenes](http://www.environment.fi/syke/scenes).

International Water Management Institute (2007). *Water for food, Water for life — A Comprehensive Assessment of Water Management in Agriculture*.

IFPRI (2002). *Global Water Outlook to 2025: Averting an Impending Crisis*, Washington DC.

## 5.8 Resource use and waste: marine and coastal environment

### *Recent trends*

The Adriatic and Ionian seas face a series of pressures, including marine transport of petroleum and natural gas, natural gas extraction and overfishing. While several key fish stocks are depleted data on the status of many others are not available.

Coastal zones also face important pressures, including waste water and solid waste from urban and tourist areas, eutrophication of coastal waters and sprawl in many coastal areas.

### *Outlook*

While no relevant forward-looking information has been identified for the region, studies in other regions, such as the Black Sea, forecast ongoing pressures on fisheries.

A series of drivers will influence the marine and coastal environment of the Western Balkans in the future.

Markets and business will play an important role in terms of tourism pressures in the region. While these are quite developed in most countries there is room for further growth in Albania. European and global markets for fish will shape pressures on fisheries in the Adriatic and the Ionian seas.

Climate change could play an important role, first in affecting marine and coastal biodiversity. In addition, climate change could affect water availability and, more generally, summer tourism – if summer temperatures increase significantly, tourists from northern Europe may prefer to spend their vacations closer to home.

Legislation and policy will play an important role. A new EU directive protects the marine environment, and the EU's efforts for strong fisheries management in the Mediterranean could make a difference in coming years. So will national efforts to manage fishing. National legislation to protect coastal zones and for land use planning will help to determine whether the current coastal sprawl will continue.

Consumption patterns will also influence the future of this environment (Chapter 3). Tastes for food will shape local and national demand for marine fish. Building and construction decisions will influence sprawl in coastal areas. And international mobility will influence the levels of future tourism and its impacts.

### *Selected forward-looking studies from the review*

IFPRI (2002). *Fish as food: projections to 2020 under different scenarios*, Washington DC, [www.ifpri.org/](http://www.ifpri.org/).

IFPRI (2003). *Fish to 2020: Supply and Demand in Changing Global Markets*, Washington DC, [www.ifpri.org/](http://www.ifpri.org/).



## 6 The role of key actors in shaping environmental futures in the Western Balkans

### Key messages

Actors in the Western Balkans, including governments, business, NGOs and others, have a key role to play in shaping the region's environmental future. These actors could explore uncertainties and possibilities through future studies and other predictive analyses. The key step will then be to pursue far-sighted actions.

The previous chapters review environmental trends in the region and the drivers that will shape these trends in the future. They show how these drivers will influence some of the key consumption and production patterns in the region, and in turn how these patterns will affect the environment in the Western Balkans.

Among the drivers influencing the regions environment are actors who can choose their strategies and policies. Key actors are in the region itself: the future of the environment in the Western Balkans is important first for those who live there. Actors in the region, including governments, business and non-governmental organisations, can play a key role in influencing future production and consumption patterns and thus, helping to shape future environmental trends and conditions in the region. Future-oriented and predictive analysis can assist these actors by providing a long-term perspective on environmental problems and by identifying key issues and uncertainties.

### 6.1 Preparing for an uncertain future

The previous chapters reviewed drivers as well as production and consumption patterns that will influence the future of the region's environment. One message is that future developments are not inevitable; indeed, the direction in which many of the drivers identified here will act is uncertain.

Future analysis can help actors in the Western Balkans face these uncertainties. This study provides an initial analysis, drawing on work on futures carried out at regional, European and global scales. As we have seen in the previous chapter, some of these studies have made

quantitative forecasts of future developments. Others explore uncertainties using a set of alternative scenarios.

Both approaches are valuable, and further work focused on the Western Balkans could provide further insights into the region's future, building on studies already prepared. For example, the introduction to this report shows that almost three dozen future-oriented studies across all themes have been carried out in the region.

### 6.2 Taking action

The analysis has shown that many drivers operating at global and European levels will influence environmental futures in the Western Balkans. For example, European policies and legislation will shape environmental laws and actions in the region. In fact, this process is already under way, in particular in Croatia and the former Yugoslav Republic of Macedonia, which are both candidate countries and are adopting many European requirements.

It would be a mistake, however, to see the region's environmental future as dependent on outside forces. The decisions and actions taken by politicians, governments, businesses and individuals in Western Balkan countries will be vital in shaping the future of the region's environment. The assessment of drivers underlines the importance of regional politics, policies and legislation in influencing production and consumption patterns and thus shaping the environment.

It would also be a mistake to focus on the role of government alone in resolving environmental

problems. Enterprises also play a key role in determining production patterns, as well as the goods and services that influence them. Moreover, independent actors, including environmental NGOs, other civil society groups as well as individuals can influence consumption patterns, policy actions and more. Some notes on the roles of these different actors, drawing on the analysis in the previous chapters are developed below.

### *Governments*

National governments in the region can work on policies to address long-term challenges, such as climate change, ageing populations and European integration. In these and other areas, cooperation with EU institutions and Member State governments as well as other countries can support this work.

Governments can also take action to influence consumption patterns. Here, there are few quick fixes: objectives and policies need to look at the long term. For example, policies can encourage lower impact production of food and fish through a variety of instruments, including information and support to farmers as well as labels to inform consumers. Energy policies can support work to improve the energy efficiency of buildings.

Local governments can play an important role. In the area of food consumption, for example, local governments can support local farmers and traditional products by providing space for food markets, improving existing markets, thus helping local products, farmers and sellers compete with supermarkets and imported products. Local governments can also address traffic problems and improve urban transport as an alternative to automobile use. These are only initial examples: here too, the experience of cities in the EU that are tackling these issues may help local authorities in the region.

### *Enterprise and business*

Enterprise and business also can play an important role, mainly by improving production methods. Some

enterprises in the Western Balkans have improved their environmental management, and more can be done.

Far-sighted enterprises may find export markets for environmental goods and services, such as organic foods as well as renewable energy. Here, the Energy Community that links the EU and Western Balkan countries can provide a major opportunity in the future. Enterprises in the region can also use marketing and information to shape local consumption patterns.

### *Individuals, NGOs and civil society*

Environmental groups, far-sighted individuals and other elements of civil society can also play important roles.

As we have seen, many aspects of politics and public governance in the region are at present an obstacle to the effective implementation of new environmental policies. Pressure from civil society is needed to increase the transparency of politics and government in the Western Balkans. Civil society groups can also help to address some of the legacy of the recent conflicts in the region, and some are doing so, for example by promoting greater contacts and exchange among people in different countries and ethnic groups. These efforts, though not focused on environment, can play a key role in setting the stage for more far-sighted and sustainable policies for the region's environment.

Environmental groups, individuals and others can also play a key role in proposing better environmental policies for government, encouraging industry to put in place more efficient production methods and encouraging consumers to adopt new patterns of consumption.

### *Next steps*

This chapter has provided a brief set of thoughts and avenues for action. The next steps to assess and prepare for the region's future need to be taken in the Western Balkans.