



# The Environment In Your Pocket 1 - 2010



CROATIAN  
ENVIRONMENT AGENCY



# THE ENVIRONMENT IN YOUR POCKET



## THE ENVIRONMENT IN YOUR POCKET I - 2010

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# THE ENVIRONMENT IN YOUR POCKET

## Introduction



Dear readers,

**W**elcome to the sixth consecutive edition of our brochure, *The Environment in Your Pocket I – 2010*. Using selected indicators, the brochure offers you an interesting and condensed overview of the state of the environment and the trends of changes in the Republic of Croatia. The progress we have made in collecting and processing environmental data and information and your interest expressed in the public opinion poll have encouraged us to expand this year's brochure with a new area – industry. It is our pleasure to present you a total of 30 indicators covering air, climate change, inland waters, sea and coastal zones, soil and land, biodiversity, forestry, agriculture, waste, energy, industry, tourism, fisheries and aquaculture, transport, health and safety, and public relations.

A significant continuous rise in the number of enquiries we have received is a sign of continuing public interest in envi-

ronmental issues. By providing easy access to reliable and comprehensive environmental data and information, we believe that this brochure will answer some of your questions, encourage you to further cooperation and contribute to the preservation and protection of our environment.

Croatian Environment Agency



# THE ENVIRONMENT IN YOUR POCKET

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# THE ENVIRONMENT IN YOUR POCKET

Croatia - Basic Data



Mainland surface area .....	56 594 km <sup>2</sup>
Territorial sea surface area.....	31 067 km <sup>2</sup>
Coastline length .....	5 835,3 km
Islands, rocks, reefs .....	1 185
Highest mountain summit.....	Mt. Dinara 1 831 m
Counties .....	21
Cities and municipalities .....	550 (124 i 426)
Population .....	4 437 460
Population density per km <sup>2</sup> .....	78,5
Populated islands .....	47
Language .....	Croatian
Alphabet.....	Latin
Political system .....	Parliamentary democracy
GDP per capita in 2009.....	10 245 EUR



# AIR

## Particulate matter PM<sub>10</sub> Emissions

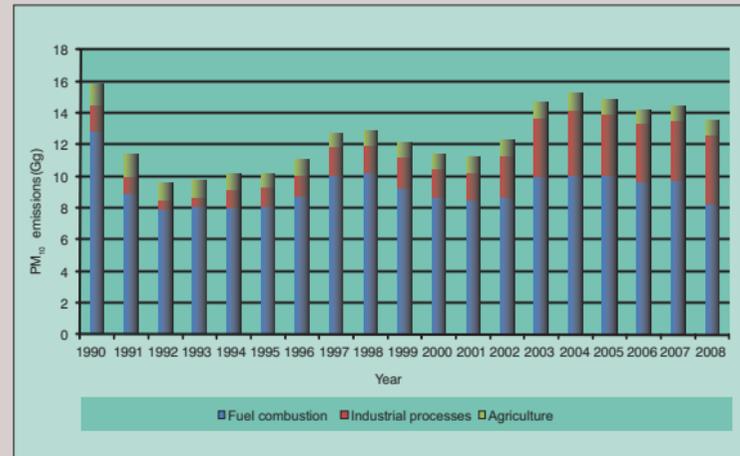
Particulate matter PM<sub>10</sub> is a mixture of organic and inorganic substances that penetrate and reside in the respiratory tract, cause inflammatory processes, and reduce human resistance to allergies and infections. Due to its significant impact on human health, suspended particulate matter PM<sub>10</sub> is one of the most important air pollution indicators. Particulate matter emissions result mostly from the combustion of solid and liquid fuels in stationary and mobile sources. The PM<sub>10</sub> emission inventory is included in the *LRTAP Convention*<sup>1</sup>.

### Trend and Current State

Total PM<sub>10</sub> emissions in 2008 amounted to 13.5 Gg, with fuel combustion causing about 61%, industrial processes about 33% and agriculture about 6% of total emissions. Compared to 1990, total PM<sub>10</sub> emissions in 2008 are approximately 14.8% lower. Although the altered structure of fuel (less coal and firewood, more fuel oil and natural gas) resulted in a considerable reduction (36%) in emissions from the fuel combustion sector, the industrial processes sector recorded a considerable increase in PM<sub>10</sub> emissions (by 168%), which is attributable to increased activities in the sector of clinker, cement and lime production, in the sector of asphalt and bitumen materials used for roofing and in the sector of stone extraction and surfaces of buildings constructed and pulled down.

<sup>1</sup> Convention on Long-range Transboundary Air Pollution (LRTAP) (OG-IT 12/93)

### PM<sub>10</sub> emissions in Croatia, 1990 - 2008



Year	1990	1995	2000	2005	2008
Gg	15.8	10.2	11.4	14.8	13.5

Source: CEA



# AIR

## Ozone precursors Emission and SO<sub>2</sub> Emission

Ground-level ozone is a constituent part of urban smog that causes respiratory tract problems in humans and damages plants. SO<sub>2</sub> also contributes to the generation of urban smog, thus affecting human health. Ozone precursors are NO<sub>x</sub>, NMVOCs and CO that form ground-level ozone by photochemical reactions.

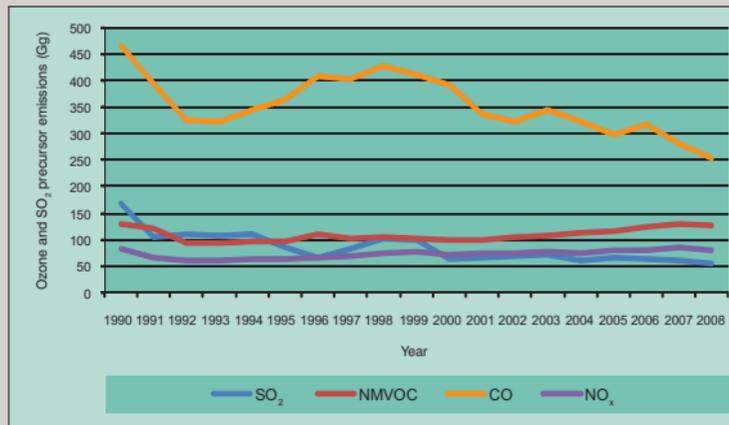
### Trend and Current State

The energy sector is the major source of NO<sub>x</sub> emissions in the Republic of Croatia. This is a consequence of fuel combustion, with transport<sup>1</sup> accounting for 40% and combustion in stationary sources for 50% of total emissions. The 2008 level of CO emission has fallen by 45.2% compared to 1990 and is produced primarily by transport and fuel combustion in households. The predominant source of emissions of non-methane volatile organic compounds (NMVOCs) is the use of organic solvents and other solvent-based products. In 2008, anthropogenic NMVOC emissions were 2.1% lower than in 1990. SO<sub>2</sub> emissions result from combustion in stationary sources (thermal power plants and oil refineries). According to inventory results, SO<sub>2</sub> emissions totaled 55.4 Gg in 2008, which is less than the 70 Gg required by the MPME Protocol<sup>2</sup>. Compared to the base year of 1990, SO<sub>2</sub> emissions have fallen threefold, because of the combustion of low sulphur fuel.

<sup>1</sup> In line with the UNFCCC and the LRTAP Convention, and according to guidelines on air pollutant emissions reporting and methodologies described in the EMEP/EEA Guidebook – 2009 and the EMEP/CORINAIR Guidebook – 2007, the fuel combustion sector (as a segment of energy sector) includes, among other things, the transport too.

<sup>2</sup> Protocol to the Convention on Long-range Transboundary Air Pollution Abate Acidification, Eutrophication and Ground-level Ozone ratified in 2008.

### Ozone and SO<sub>2</sub> precursor emissions, 1990 - 2008



Source: CEA

Emission (Gg)	1990	1995	2000	2005	2008
SO <sub>2</sub>	168.9	84.0	63.9	64.8	55.4
NMHOS	130.2	97.3	100.0	116.0	127.4
CO	464.8	364.4	391.9	296.6	254.5
NO <sub>x</sub>	82.5	62.8	72.8	78.5	78.6



# CLIMATE CHANGE

## Ozone Depleting Substances

A group of compounds known as ozone depleting substances (ODS), although once appreciated for its stability in general use, today has been almost completely replaced by other substances.

### Trend and Current State

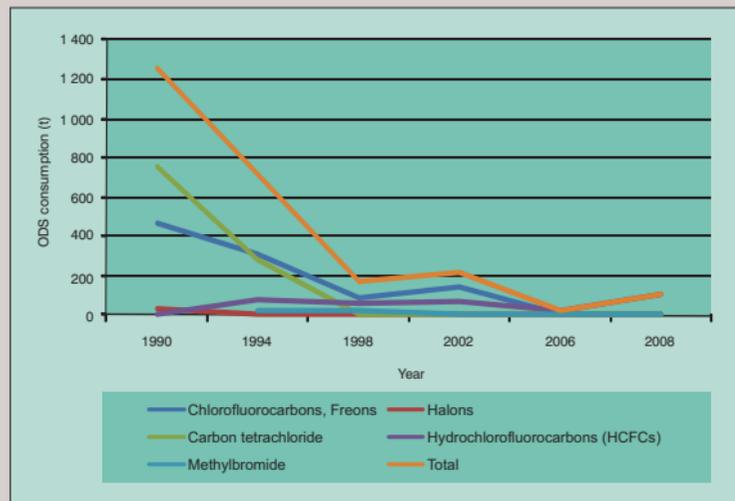
Because of the implementation of international<sup>1</sup> and national<sup>2</sup> regulations and numerous projects, ODS consumption in the Republic of Croatia continues to show a downward tendency. The use of chlorofluorocarbons, freons, halons, carbon tetrachlorides and methylchloroforms was prohibited from 1 January 2010. Bromofluorocarbons (HBFCs) and methylbromide were prohibited in 2006. The use of hydrochlorofluorocarbons (HCFCs) is permitted until 31 December 2015.

Replacement substances (HCFCs) used in refrigeration and air-conditioning account for the largest share in the use of ODSs, i.e. 99.7% of total ODSs consumption in 2008.

<sup>1</sup> Vienna Convention for the Protection of the Ozone Layer (OG-IT 12/93) and Montreal Protocol on Substances that Deplete the Ozone Layer (OG-IT 12/93, 11/93, 8/96, 10/00, 12/01)

<sup>2</sup> Regulation on Substances that Deplete the Ozone Layer (OG 120/05)

Consumption of ozone depleting substances,  
1990 - 2008



Source: MEPPPC



# CLIMATE CHANGE

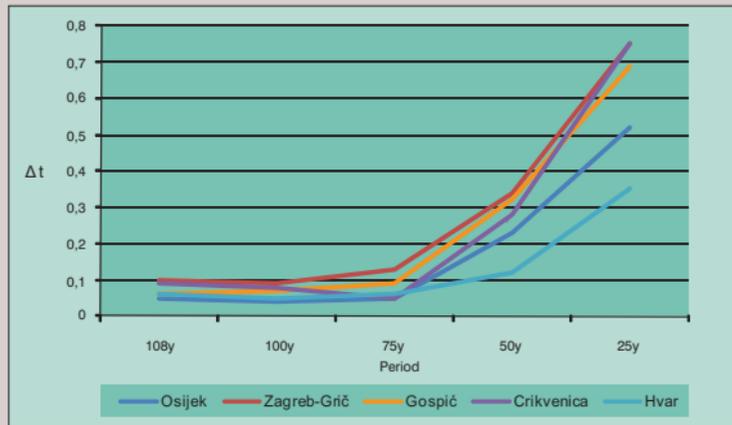
## Mean Annual Air Temperatures

Climate change caused by elevated greenhouse gas levels in the atmosphere represents one of the major challenges that we are presently facing. Three climate change factors that have had a direct impact on the present and especially the future life of the population of the Republic of Croatia and on social development in general are the mean annual air temperature rise (MAAT), reduced precipitation, and a considerable increase in extreme weather conditions (storms, heat waves, droughts).

### Trend and Current State

In the Republic of Croatia meteorological measurements at stations located in different climatic regions began in the 19th century. In order to observe MAAT variations, trends were analyzed in periods from 25 to 108 years. A positive MAAT trend was recorded in all time periods, but especially in the last 50 years. In the continental part of the country the greatest changes were recorded in winter (+0.13°C in Zagreb and Gospić) and in the Adriatic area in summer (+0.13°C in Crikvenica). The analysis of the 10 warmest years since the beginning of the 20th century carried out at each meteorological station showed a considerable number of the warmest years in the period 2000 – 2008 (7 in Zagreb, 6 in Gospić and Crikvenica, 5 in Hvar and 4 in Osijek).

Trends of mean annual air temperatures for a 108-year, 100-year, 75-year, 50-year and 25-year period



	Osijek	Zagreb-Grič	Gospić	Crikvenica	Hvar
1901-2008 (108y)	+0.05	+0.10	+0.06	+0.09	+0.06
1909-2008 (100y)	+0.04	+0.09	+0.07	+0.08	+0.05
1934-2008 (75y)	+0.05	+0.13	+0.09	+0.05	+0.06
1959-2008 (50y)	+0.23	+0.34	+0.32	+0.28	+0.12
1984-2008 (25y)	+0.52	+0.75	+0.69	+0.75	+0.35



# INLAND WATER

## Inland Surface Water Quality

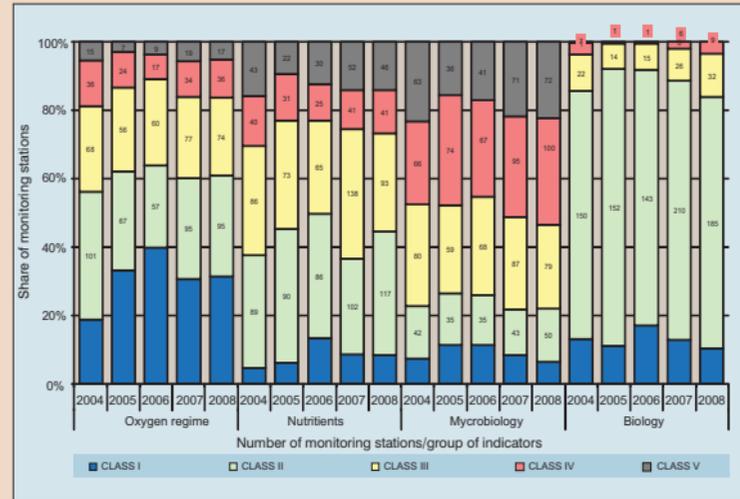
Water quality is affected by various loads: the discharge of untreated wastewater, agricultural land run-off, deposition from the atmosphere, run-off waters from roads or highway runoff, landfill leachate, etc. The quality of inland surface water is evaluated according to criteria for inland surface water set by the Regulation<sup>1</sup>. The results are graphically presented using the colours blue, green, yellow, red and black to indicate classes from the highest (I) to the lowest (V) based on indicator groups. The quality of inland surface water is monitored at about 330 monitoring stations.

### Trend and Current State

In the period 2004-2008 according to biological indicators, water quality was mostly categorized in class II, class II and III according to oxygen regime and nutrients, and class III and IV according to microbiological indicators. A slight downward tendency of BOD<sub>5</sub> and ammonium concentrations in rivers and lakes, i.e. organic pollution, is a result of the construction of discharge systems and putting new municipal wastewater treatment plants into operation.

<sup>1</sup> Regulation on Water Classification (OG 77/98)

Evaluation of inland surface water quality,  
2004 - 2008



Source: Hrvatske vode



# INLAND WATER

## Groundwater Quality

Groundwater quality is evaluated according to the Regulation<sup>1</sup> and classified into one of five specified quality categories. The results are graphically presented using the colours blue, green, yellow, red and black to indicate classes from the highest (I) to the lowest (V). The groundwater quality monitoring is carried out at about 200 piezometric drill holes and wells in the alluvial aquifer, and at about 20 springs and wells in the karst aquifer.

### Trend and Current State

Almost 90% of the total quantity of water used to supply the population is extracted from underground, which particularly emphasizes the importance of protecting groundwater. Considering the indicator groups tested, groundwater quality tested in the period 2004-2008 at most stations generally corresponded to class I. Deviations from the planned water quality class were related mainly to nutrients and microbiological indicators. Since 2007, the continuous monitoring of groundwater quality has been extended to monitoring stations located in the Drava and Danube river basins.

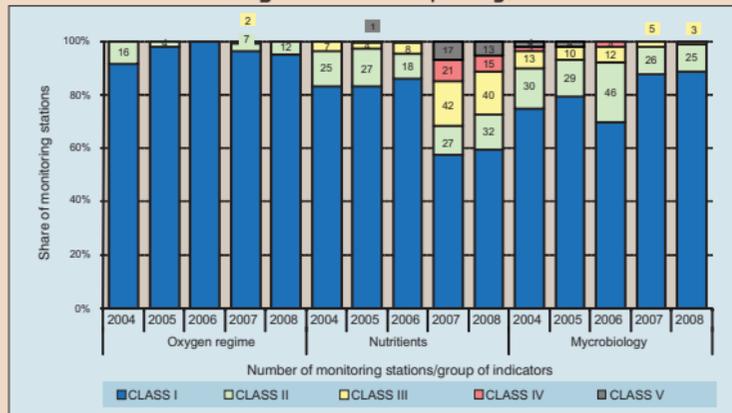
<sup>1</sup> Regulation on Water Classification (OG 77/98)

### Number of groundwater monitoring stations, 2004 - 2008

Area		2004.	2005.	2006.	2007.	2008.
Danube river basin district	Sava river basin	185	193	205	191	187
	Sava river basin*	2	3	4	4	4
	Drava and Danube river basins	-	-	-	41	40
Adriatic Sea river basin district	Primorje-Istria river basins*	11	11	11	11	11
	Dalmatian river basins*	-	-	4	5	5
Republic of Croatia		198	207	205	252	247

\* Captured springs

### Evaluation of groundwater quality, 2004 - 2008





# SEA AND COASTAL AREA

## Riverine Loads of Nutrients (N,P) into the Croatian Adriatic



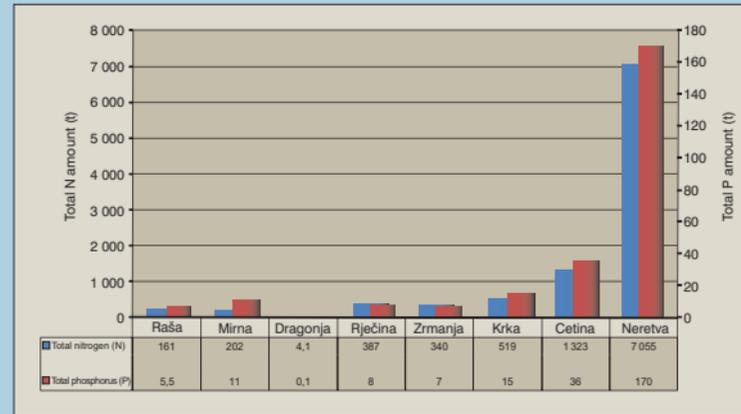
Nitrogen (N) and phosphorus (P) naturally occur in small concentrations in waters. Moreover, rivers collect pollution from their surroundings (surplus fertilizer wash-off from agricultural land, wastewater discharge, etc.) along their entire course. Although a portion of organic pollution in rivers is decomposed and eliminated by a natural process of “self-cleaning of water”, most pollution is nevertheless taken by the rivers into the sea. Riverine input loads have a strong impact on the quality of the coastal waters and, among other things, cause an increased concentration of nutrients in the sea, which may result in eutrophication and algal bloom.

### Trend and Current State

Springs and a section of the river basin areas of major Croatian rivers that drain into the Croatian Adriatic (the Neretva and Cetina) are situated in neighbouring countries or a section of their course forms a national border (the Dragonja). The riverine input of nutrients (N, P) into the Croatian Adriatic should therefore be considered in that context. In proportion to its size most of the phosphorus and nitrogen inputs into the Croatian Adriatic come from the Neretva (its mean annual flow rate is 269 m<sup>3</sup>/s, while the Rječina, the largest Croatian river in the northern Adriatic, has a mean annual flow rate of 12.9 m<sup>3</sup>/s)<sup>1</sup>. The status of the northern part of the Adriatic, which also means its Croatian part, is highly affected by the Po River in neighbouring Italy. Its input is proportional to its size

(1 350 m<sup>3</sup>/s)<sup>2</sup>. The control and reduction of the riverine inputs into the Adriatic is only possible through transboundary cooperation with countries sharing the rivers and the sea with Croatia. Since phosphate is a limiting factor of eutrophication, any ban on the use of phosphate in detergents would be a significant contribution to the reduction of phosphorus input.

Amounts of total N and total P riverine inputs into the coastal waters of the Croatian Adriatic in 2008



Source: Hrvatske vode

<sup>1</sup> J.Margeta, I. Fističić, Gospodarenje sustavom i monitoring bazena rijeke Neretve, Građevinar 52 (2000) 6

<sup>2</sup> S.Artina, Water resources planning of the River Po basin: a surface and groundwater hydrology study, IHAS Publ. no 197 (1990)



# SEA AND COASTAL AREA

## Biological Quality of Transitional Waters - Fish



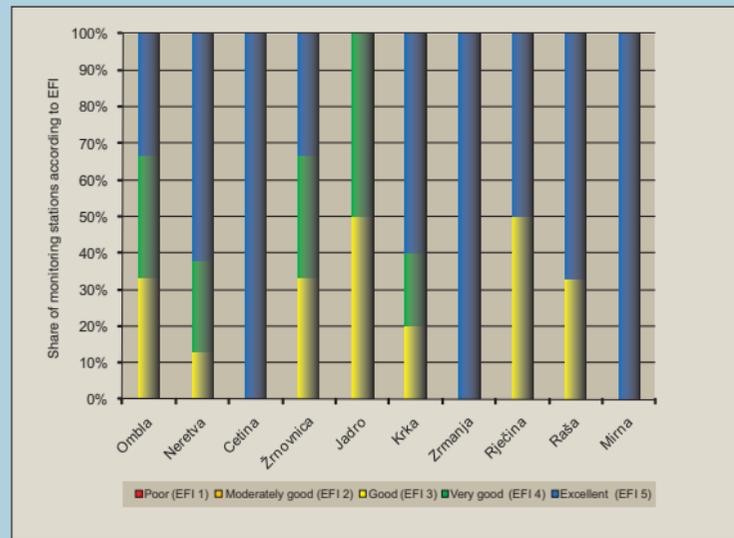
The composition and abundance of aquatic flora, benthic invertebrate and fish fauna are biological elements that are, in addition to other quality elements, used for water classification according to its ecological status<sup>1</sup>. The number and composition of fish fauna in transitional waters represent the so-called *Estuarine Fish Index (EFI)* applied to classify waters into categories of ecological status. River regulation, construction of hydroelectric power plants and industrial pollution are the major causes of the threat to fish communities.

### Trend and Current State

The biological quality of the transitional waters of the Adriatic in regard to fish fauna has been monitored since 2007, but unsystematically, because both a legislative framework and a monitoring programme are lacking. The data collected show that the biological quality of the transitional waters of the rivers of the Adriatic Sea river basin district<sup>2</sup> with respect to fish communities is satisfactory. In particular, the areas of the Mirna, Zrmanja and Cetina Rivers are characterized by a high biodiversity. Unlike the Zrmanja, the area of the Cetina is highly populated and exposed to a marked anthropogenic influence. However, they both provide a number of different microhabitats with many ecological niches (coverage by meadows of marine flowering plants and brown algae) which offer shelter and food to a number of fish species. The Adriatic Sea river basin district is inhabited by 64 freshwater fish species, 5% of which are

native while the others have been introduced. Out of 40 Mediterranean endemics, 11 appear in Croatia only.

### Classification of transitional waters by the composition of fish communities in 2008



<sup>1</sup> Per Directive 2000/60/EC of the European Parliament and Council establishing a framework for the Community action in the field of water policy (shorter: Water Framework Directive)

<sup>2</sup> The Mirna, Raša, Rječina, Zrmanja, Krka, Jadrlo, Žrnovnica, Cetina, Neretva and Ombla Rivers.



## SOIL AND LAND

### Status of Saline Soils and Salinization in the Neretva River Valley

Salinization is the accumulation of soluble salts (Na, Ca, Cl, etc.) that may adversely affect soil fertility. It also allows an increase in the bioaccessibility of metals in the soil, especially cadmium, thus facilitating the inclusion of this toxic metal into the food chain. The majority of saline soils may be found in the Neretva River valley, in the Vransko Basin and at the Lower Mirna and Raša Rivers in Istria. The salinization of soils in these regions is generally attributable to the penetration of seawater into the hinterland and its use for irrigation purposes.

#### Trend and Current State

During 2006 and 2007, a number of research works were undertaken in the Lower Neretva area. The results show a 64% rise in the average values of electrical conductivity (EC) in 2007 compared to 2006, and a connection between the total concentration of salts expressed in EC values and Cl<sup>-</sup> and Na<sup>+</sup> concentrations. Under the influence of the sea, the concentrations of salts in open watercourses fluctuate during the year, which is associated with the hydrological regime. Maximum concentrations of salts were recorded in the summer months, when they tended to exceed the value of 10 dS/m. According to the criteria for irrigation water quality, the

waters were therefore ranked among those with high limitations or even unusable for irrigation. The use of salinized water results in lower crop yields and land degradation. The salinization problem is to be addressed systematically. Some possible solutions studied include supplying sufficient quantities of fresh water and the construction of mobile partition walls to prevent penetration of seawater into the hinterland.

#### Analysis of results for surface soil sampling in 2006 and 2007 in the Lower Neretva area (N = 152)

Parameter	pH	EC (dS/m)	Cl (mg/L)	Na <sup>+</sup> (mg/L)
2006.				
Minimum	7.1	0.4	4.6	1.1
Maximum	8.4	8.4	1 878.9	1 156.0
Arithmetic mean	7.8	1.1	78.4	44.8
2007.				
Minimum	7.5	0.4	6.7	3.8
Maximum	8.5	11.9	3 367.8	1 460.0
Arithmetic mean	8.1	1.7	191.7	75.00

Source: Romić et al. 2007, Salopek 2008



# BIODIVERSITY

The Ecological Network of the Republic of Croatia

An ecological network is a system of interconnected or spatially close ecologically important sites that through their well-balanced geographical distribution contribute substantially to the preservation of natural balance and biodiversity.

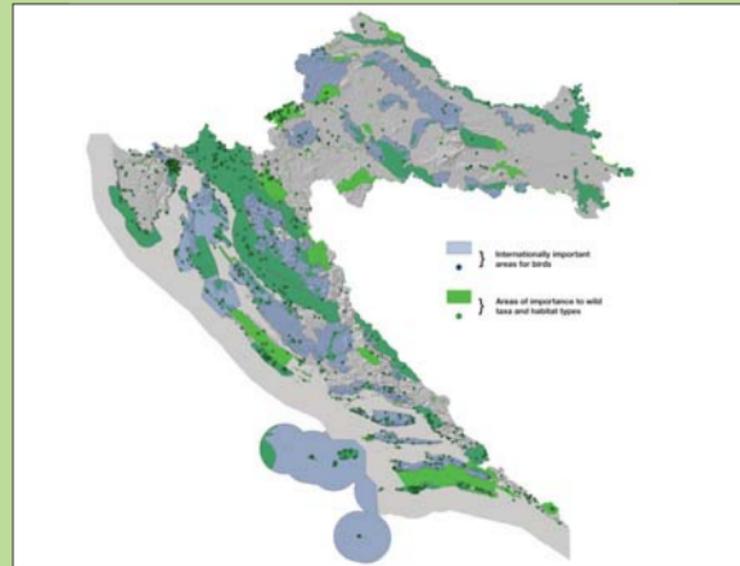
## Trend and Current State

An ecological network consists of sites of importance to species and habitat types threatened on a European and national scale. Preservation of ecological network sites is ensured by implementing the prescribed nature protection measures and requirements and/or management plans and by evaluating the admissibility of plans, programmes and projects likely to have a significant impact on target features of ecological network sites. The national ecological network represents a foundation for the EU ecological network NATURA 2000 that consists of sites of importance for species and habitat types as provided for in the Birds Directive<sup>1</sup> and the Habitats Directive<sup>2</sup>. The development of the NATURA 2000 network is the most important nature protection obligation of the Republic of Croatia in the EU accession process. Ecological network areas in Croatia are divided according to the NATURA 2000 network in internationally important areas for birds and areas of importance to other wild taxa and habitat types. They cover 47% of the territory and 39% of the territorial sea as well as two ecological corridors: a corridor for marine turtles and the Palagruža-Lastovo-Pelješac corridor, an area important for bird migration.

<sup>1</sup> Council Directive 2009/147/EZ of 30 November 2009 on conservation of wild birds

<sup>2</sup> Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

## Ecological network of the Republic of Croatia





# BIODIVERSITY

## Alien Fish Species in the Croatian Adriatic

Alien species are non-native species introduced accidentally or deliberately into a place where they are not normally found. They are considered invasive if their spread threatens the survival of native species. These species pose a threat to biodiversity of the ecosystem in question and may adversely affect human life and health and cause severe damage to economical development.

### Trend and Current State

The last decade has seen a considerable increase in the incidence of “exotic” fish species in the Croatian Adriatic. Most of these species, originating from the Red Sea (so-called Lessepsian migrants), have first migrated to the Eastern Mediterranean through the Suez Canal and have then reached the Adriatic. *Fistularia commersonii* has been recorded several times at separate locations, which might indicate the establishment of the population of this species showing a potentially invasive character. The increased number of thermophilic species (organisms) in the Adriatic is an indication of a possible rise in the seawater temperature, which may be attributed to climate change. Some grouper species such as *Mycteroperca rubra* and *Epinephelus aeneus* have been recently reported in the Adriatic for the first time. On the other hand, the presence of certain fish species such as *Cyclopterus lumpus*, *Pagrus major* and the invasive crab species *Clavinetes sapidus* is not attributable to climate change, because it is likely that they reached the Adriatic through anthropogenic activities.

### Overview of alien fish species found in the Croatian Adriatic

Species	English name	Year of find	Find location	Origin
<i>Caranx crysos</i>	Blue runner	2008	West coast of Istria	Mediterranean
<i>Cyclopterus lumpus</i>	Lumpfish	2004	South Adriatic - Molunat	North Sea
<i>Epinephelus aeneus</i> *	White grouper*	1998	South Adriatic - Dubrovnik	Mediterranean
<i>Epinephelus coioides</i>	Orange-spotted grouper	1998	North Adriatic - Trieste	Red Sea
<i>Fistularia commersonii</i> *	Bluespotted cornetfish*	2006	South Adriatic - Sveti Andrija	Red Sea
<i>L. lagocephalus</i>	Oceanic puffer	2004	South Adriatic	Mediterranean
<i>Leiognathus klunzingeri</i>	Silverbelly	2002	South Adriatic	Red Sea
<i>Mycteroperca rubrum</i> *	Mottled grouper*	2001	South Adriatic - Dubrovnik	Mediterranean
<i>Pagrus major</i>	Red seabream	2004	Zadar archipelago	Aquaculture (Pacific)
<i>Saurida undosquamis</i> *	Brushtooth lizardfish*	1996	Albanian coast	Red Sea
<i>Siganus rivulatus</i> *	Marbled spinefoot*	2002	South Adriatic - Cavtat	Red Sea
<i>Sphyrana chrysotaenia</i> *	Yellowstripe barracuda*	2000	South Adriatic	Red Sea
<i>Sphyrana viridensis</i> *	Yellowmouth barracuda*	2003	South Adriatic	Mediterranean
<i>Stephanolepis diaspros</i> *	Reticulated leatherjacket*	2002	South Adriatic - coast of Montenegro	Red Sea
<i>Terapon theraps</i>	Largescaled therapon	2008	North Adriatic	Red Sea

\* Invasive species

Source: CEA/IOF



# FORESTRY

## Forests Based on Use in the Republic of Croatia

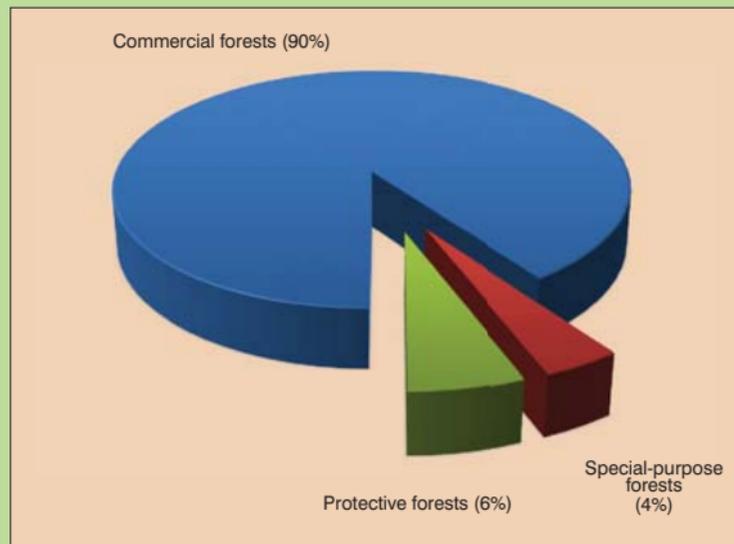


Forests are particularly important to the conservation of the environment because they regulate local, regional and global climate conditions and mitigate the greenhouse effect, protect the soil against erosion, positively influence the hydrological cycle and contribute to air and water quality. Forest ecosystems play an important role in the preservation of biodiversity and landscape beauty and provide a place for rest, entertainment and recreational activities. Forest management methods have a significant effect on the quality of the environment and human health and welfare.

### Trend and Current State

Diverse climatic, relief, geological and other conditions result in a wide variety of forest communities. Croatia is one of the few European countries whose forests show a predominantly natural structure (95%). According to the law<sup>1</sup>, forests are divided by their planned use into commercial, protective and special-purpose forests. Commercial forests are primarily used for timber production. Protective forests serve in the first line to protect land, water, settlements, buildings and other assets. Special-purpose forests are those located within protected areas or natural assets, forests and forest parts registered for the production of forest seed, and forests intended for scientific research, education, and defence of the RC, etc. According to the data contained in the *Forest Management Background Document of the Area for the Period 2006-2015*, commercial forests cover 2 416 100 ha or 90% of the total area of forests and forest land, protective forests 154 500 ha (6%), and special-purpose forests 118 000 ha (4%).

### Forests based on use



<sup>1</sup> Forests Act (OG 140/05, 82/06)



# FORESTRY

## Protection against Forest Fires in the Republic of Croatia

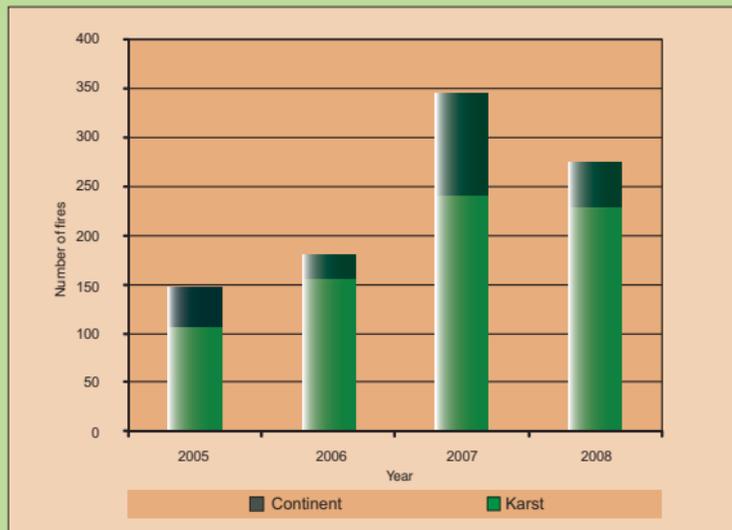


Forest fires pose a threat to human life and health and have a number of negative effects on the environment, such as the disappearance and degradation of habitats, erosion, increased CO<sub>2</sub> emissions and the disappearance of plant and animal species. Moreover, fires adversely affect the economy and tourism.

### Trend and Current State

In the period 2005-2007 the number of forest fires increased, but in 2008 it dropped significantly. In the same period a total of 35 248 ha of forests and forest land were affected by fires. The most effective measures to protect against forest fires include the construction of fire lines, the organization of forest fire observation and reporting systems, forest conservation and the implementation of cultivation measures intended to protect forests against fires. In the period 2005-2007 an average of 241 km of fire lines with elements of forest roads were constructed yearly. Fire observation and reporting take place at 85 fire observation stations and 45 fire observation points supplemented by 130 patrol teams. In Istria forest fire observation and reporting activities are based on a video surveillance system. The first telemetric station equipped with an infrared and video surveillance system for early detection of forest fires was installed at Crni Vrh on Mt. Velebit in the Paklenica National Park in 2006. The Republic of Croatia makes every effort and considerable investments in forest fire prevention and protection.

Number of forest fires, 2005 - 2008



Source: MRDFWM



# AGRICULTURE

## Livestock Production



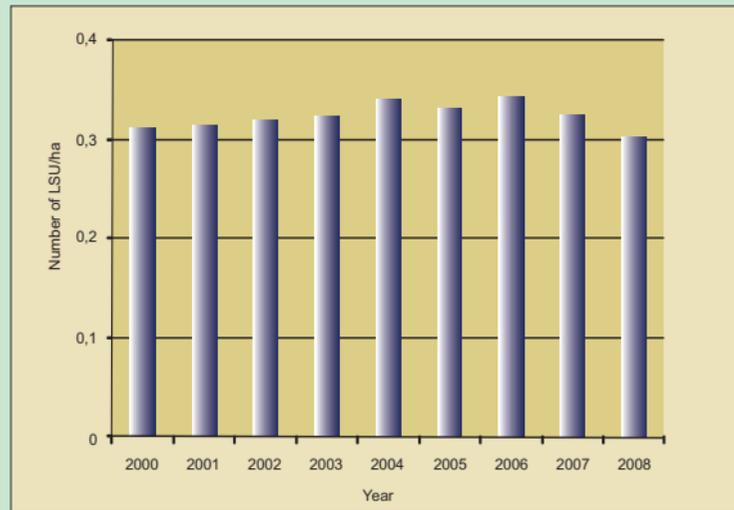
The share of livestock production in total agricultural production is an indicator of the development level of agriculture in both an economic and ecological sense. The circulation of organic matter in the soil is directly dependent on the use of organic manure as a livestock breeding product. Any decrease or increase in the number of livestock units per hectare of arable land is manifested in an increase or decrease in the amount of organic matter in the soil. A change in the method of livestock breeding (abandoning traditional outdoor livestock breeding) contributes to a degradation of biodiversity and landscape heterogeneity and especially to the reduction in the amount of organic matter in the soil.

### Trend and Current State

Livestock breeding accounts for about 30% of the gross agricultural revenue of Croatia, which ranks it among underdeveloped countries. According to a methodology agreed at the European level, which uses 1 livestock unit = 500 kg as a reference unit, it is possible to calculate the number of livestock units for each type of domestic animals. The comparable data thus obtained make it possible to monitor the coverage of arable land with livestock units. The number of livestock units in Croatia is lower than in the surrounding countries (in Italy it is 0.75 LSU/ha, in Slovenia 1.0 LSU/ha, in Hungary 0.75 LSU/ha, in Austria 0.80 LSU/ha). In view of the fact that 1.0 LSU/ha is considered the optimum number for the covera-

ge of arable land with livestock units, the data relating to Croatia point to the critical level of livestock units for an ecologically acceptable *circulation* of organic matter in the agricultural land.

Number of LSU/ha in the Republic of Croatia according to CLC, 2000-2008





# AGRICULTURE

## Mineral and Organic Fertilizers

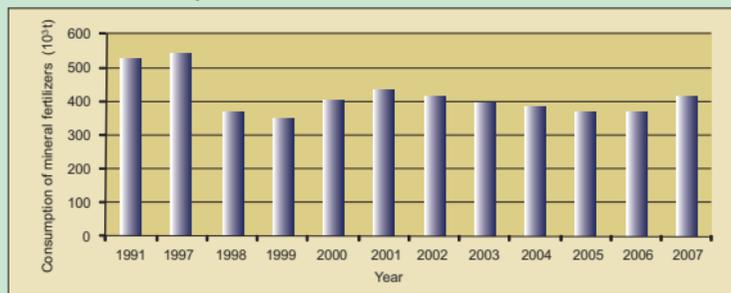


The consumption of mineral fertilizers per unit of area is one of the basic indicators of agricultural intensity in a region. The trend in the consumption of mineral and organic fertilizers is monitored with the aim to identify environmental load by nitrogen and phosphorus nutrients.

### Trend and Current State

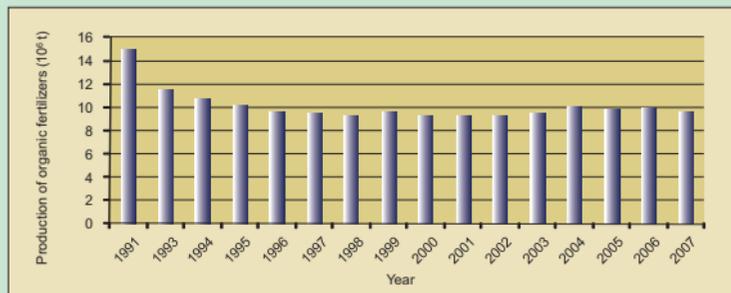
The annual consumption of mineral fertilizers in Croatia averages 400 000 t. In view of 2.2 Mha of agricultural land (according to the CLC methodology), the consumption of mineral fertilizers in Croatia totals 180 kg/ha of agricultural land yearly. The consumption of organic fertilizers is estimated according to the number and type of livestock, taking into account the nutrient losses that appear in stables, in dung heaps, during transport, application in the fields, etc. Organic fertilizer production volume kept changing in line with changes in the number of livestock bred in Croatia, and has reached some 10 million tonnes a year at present.

### Consumption of mineral fertilizers, 1991-2007



Source: CBS

### Production of organic fertilizers, 1991-2007



Source: UZFA



# AGRICULTURE

## Organic Farming

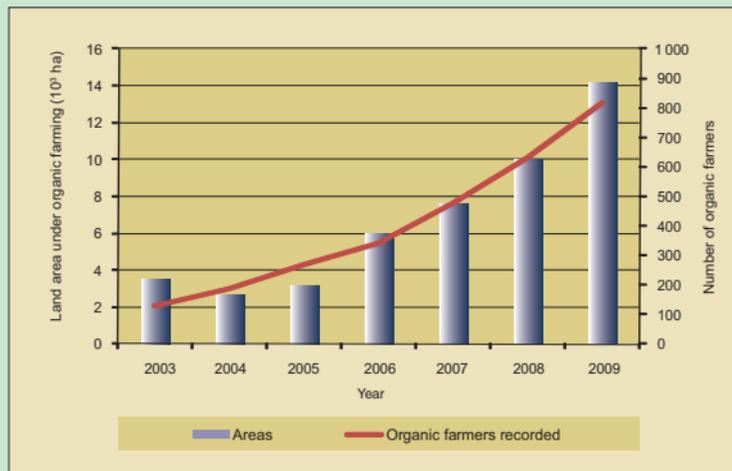


The aim of organic farming is to help to reduce environmental pressures of agricultural production through the implementation of a number of measures defined by the Strategy<sup>1</sup>. The objective of the Strategy is to increase the share of areas used for organic farming (including pasture land and forests) by at least 5% of the total cultivated agricultural land by 2013, and to support the development of a market for organic products. By having adopted the Act<sup>2</sup> and enforcement regulations, the Republic of Croatia has clearly regulated its organic farming system.

### Trend and Current State

According to the data contained in the MAFRD Register<sup>3</sup>, the area and number of organic farms increased markedly in the period 2003-2009. 0.65% of the total cultivated agricultural land in Croatia is used for organic production which means that 0.43 % of farms are active in organic farming. Although in the period observed the areas under organic farming increased to 10 687 ha, the achievement of the objective set out by the Strategy requires higher investments in this form of agricultural production. According to the law<sup>4</sup>, since 2006 organic farming subsidies have been 30% higher compared to those granted to conventional agriculture.

Areas under organic farming and the number of organic farmers, 2003-2009



Source: MAFRD

<sup>1</sup> Sustainable Development Strategy of the Republic of Croatia (OG 30/09)

<sup>2</sup> Act on Organic Production of Agricultural Products and Foodstuffs (OG 12/01, 14/01, 79/07)

<sup>3</sup> Register of Organic Farmers and Foodstuffs Manufacturers

<sup>4</sup> Act Amending the Act on Government Subsidies to Agriculture, Fisheries and Forestry (OG 141/06)

\* agricultural areas according to CLC



# WASTE

## Packaging Waste

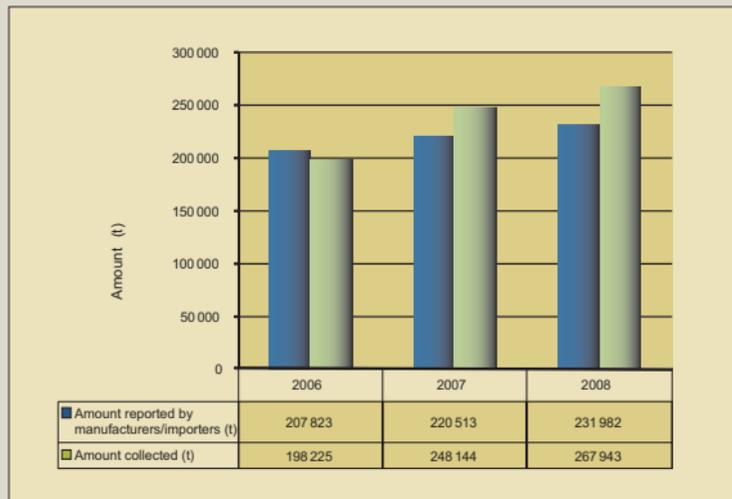
The growth of production and consumption is accompanied by increased amounts of various types of packaging and, consequently, of packaging waste, especially plastic waste. When the Ordinance<sup>1</sup> came into force in 2005, it meant the start of establishing a waste collection and recovery system, which achieved notable progress in reducing the quantities of packaging waste generated and recovered. The system also contributed to a reduction of environmental pressure and to the rational use of the landfill space

### Trend and Current State

The amount of packaging reported by packaging manufacturers/importers in 2008 was 12% higher than in 2006 and totaled 231 982 t, of which 139 388 t were produced in Croatia and 92 594 t were imported. The period 2006-2008 has seen a considerable rise in the amount of packaging waste collected (35.2%) and subsequently recovered. Despite the positive effects of the application of the Ordinance, certain discrepancies between the reported amounts of generated and collected packaging waste were noted in the period observed, indicating the need to analyse the data processing and interpretation methods applied. It should be emphasized that the new PET packaging collection system particularly contributed to a more rational use of landfill space and to the prevention of uncontrolled discarding of this type of packaging into the environment.

<sup>1</sup> Ordinance on Packaging and Packaging Waste (OG 97/05, 115/05, 81/08)

Amounts of packaging placed on the market and amounts of packaging waste collected, 2006-2008



Source: EPEEF



# WASTE

## Municipal Waste



Municipal waste is household and similar waste. Various measures have been taken to reduce the amount of municipal waste generated, to increase the share of waste treated and recovered, and to reduce its deposition, especially its biodegradable portion.

### Trend and Current State

Despite all of these measures, the amount of municipal waste continues to grow. In the Republic of Croatia 1 788 311 t of municipal waste were generated in 2008, which is 428 kg/inh/year or 1.17 kg per capita daily. The number of inhabitants with organized collection of municipal waste is constantly rising. In the period 2004-2008 it increased from 86% to 93%, which means that the quantitative goal set for 2015 has been reached. In 2008, 207 companies were involved in collecting mixed municipal waste. In the same year only two municipalities in the Republic of Croatia did not have organized municipal waste collection and transport, compared to 35 in 2004. Municipal waste is mostly deposited untreated in landfills. In 2008, a total of 1 730 671 t were delivered to landfills. Measures to reduce the share of biodegradable municipal waste deposited in landfills have been poorly implemented, as seen from the small amount (32 211 t) of waste composted. The amount of waste collected separately from municipal waste increased from 27 000 t in 2004 to 247 252 t in 2008. However, a large portion of waste collected in this way still ends up at landfills and only a part is recovered. Municipal waste composition is not monitored systematically and the proce-

cedure for determining waste composition is carried out only by a small number of towns/municipalities.

Amounts of municipal waste generated, 1995-2008





# ENERGY

## Primary Energy Production and Share of Renewable Energy Sources in Primary Energy Production

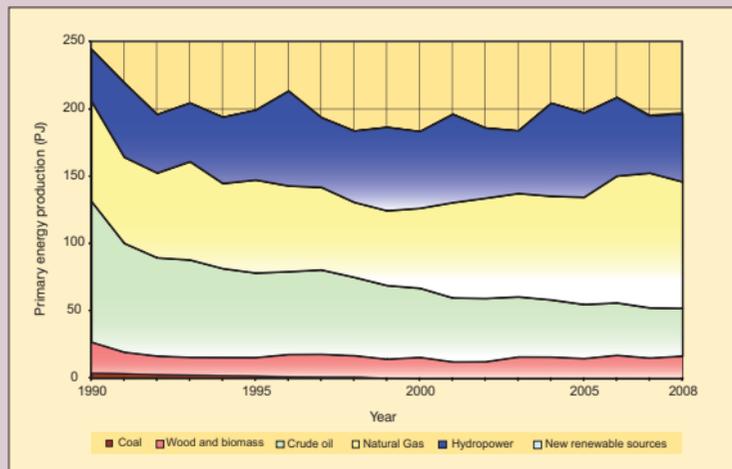
Fossil fuels used in the Republic of Croatia include crude oil and natural gas, and renewable energy sources used are firewood and other biomass, hydropower, wind and solar energy, biogas, biodiesel and geothermal energy.

### Trend and Current State

The period 2000-2008 has seen a rise in primary energy production in Croatia at an average annual rate of 0.9%. The growth of energy production from renewable sources was very rapid too – the average annual growth rate in the period 2005-2008 reached as much as 73.5%.

Despite this constant growth, the share of traditional renewable energy sources, such as biomass and large hydropower plants, in total primary energy production in 2008 was 33.8%, but the share of new renewable energy sources such as solar, wind, geothermal and biogas energy, energy from landfill gas, biodiesel, etc. was only 0.52%.

Primary energy production, 1990 - 2008



Source: EHP



# ENERGY

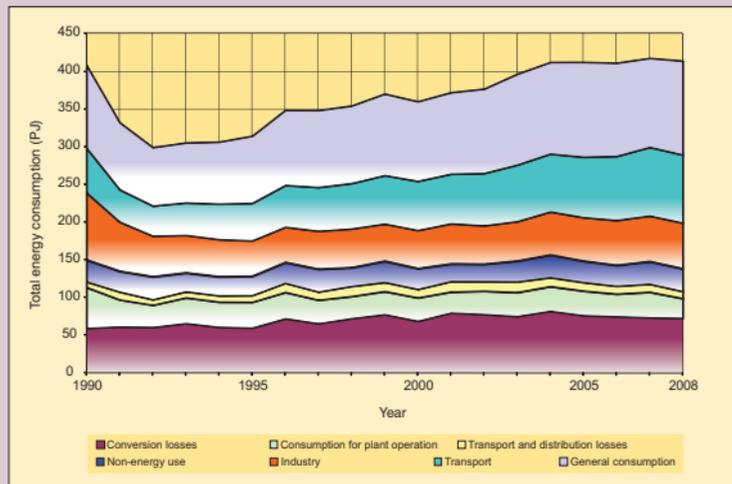
## Structure of Total Energy Consumption by Planned Use

A modern way of life implies ever increasing energy use. All energy needs within an energy system, such as energy conversion losses, energy for power plant operation, losses suffered in energy transport and distribution, non-energetic use of energy and immediate consumption of energy in industry, transport and general consumption are met by the total energy consumption.

### Trend and Current State

In 2008, total energy consumption was reduced by 0.9% compared to the previous year. Energy conversion losses decreased by 1%, consumption of energy for operation of power plants by 22.3% and losses due to energy transport and distribution by 12.6%. General consumption accounts for the highest share, or approximately 30%, while the share of transport totals some 22%. The share of energy consumption by industry gradually decreased to 14.7% in 2008 and the share of energy transformation losses to 17.5%. In 2008, the non-energetic use of energy totaled some 7% and losses due to energy transport and distribution were 2.3%.

Structure of total energy consumption by planned use, 1990-2008





# INDUSTRY

## Industrial Accidents

Industrial accidents caused by uncontrolled activities or influences may have harmful effects on the environment and endanger human health and life. In this regard the industrial sector (operators) and all persons involved in the control and protection against accidents must create the conditions for minimizing the possibility of accidents and they must be prepared to take action in case of accidents.

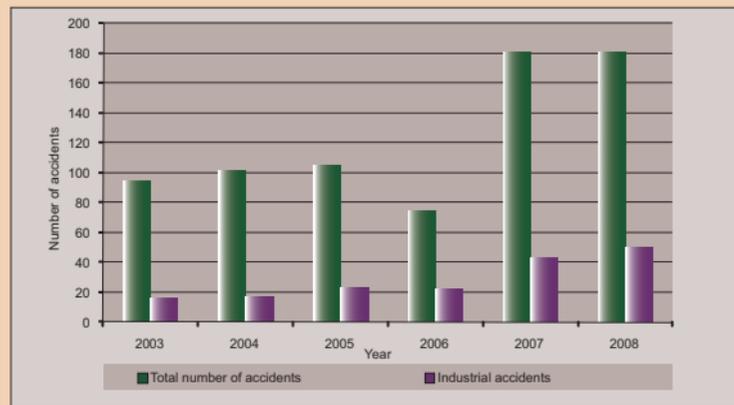
### Trend and Current State

In the period 2003-2006 the number of industrial accidents did not change substantially, but the year 2007 saw a considerable rise (a 95% increase). This upward tendency in the number of accidents has also continued in 2008. The cause of such accidents can be attributed relatively easily to poor maintenance and the worn-out state of warehouses, equipment and installations, which is often the case with small and medium-scale firms whose business operations do not include the production of harmful substances. Looking at the accidents by their type, it may be concluded that they most often involve tank and pipeline leaks (oil derivatives, ammonia, etc.), indicating that the risk is highest in refineries and petrochemical product storage facilities.

Following the Regulation<sup>1</sup> and the Ordinance<sup>2</sup>, the Croatian Envi-

ronment Agency prepared a database, i.e. a register (RIDS<sup>3</sup>), containing data for 26 operators collected at 86 sites where the presence of hazardous substances is likely to cause major accidents or a major accident has been detected. Moreover, persons liable to submission of data must submit data on reported major accidents to the RRMA<sup>4</sup> database too. The adoption of the *best available techniques (BAT)* concept is expected to minimize the possibility of industrial accidents occurring in the future.

Number of industrial accidents, 2003-2008



<sup>1</sup> Regulation on the prevention of major accidents involving dangerous substances (OG 114/08)

<sup>2</sup> Ordinance on the registry of installations in which dangerous substances are present and on the register of reported major accidents (OG 113/08)

<sup>3</sup> Registry of installations in which dangerous substances are present

<sup>4</sup> Register of reported major accidents



## INDUSTRY

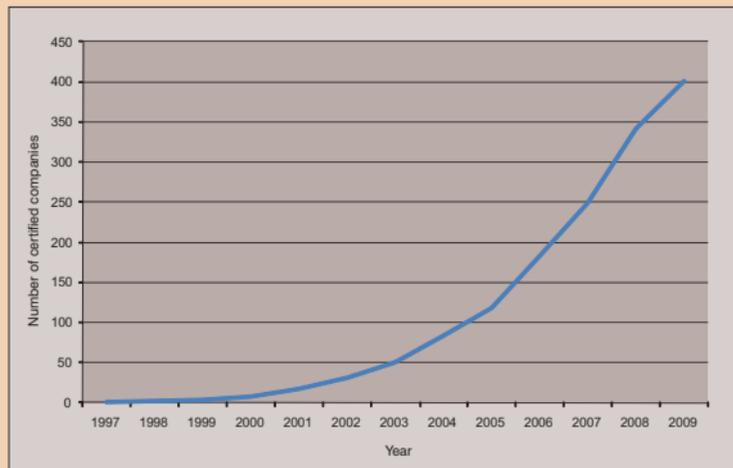
### Number of HRN ISO 14001 Certified Companies

The HRN ISO 14001 standard sets down the requirements for the environmental management system with regard to environmental aspects to be controlled and influenced by an organization. The scope of application depends on factors such as the organization environment management policy, type of business, products and services, location and the operating conditions of the organization.

#### Trend and Current State

After only one company was awarded the ISO 14001 certificate in 1997, the number of HRN ISO 14001 certified companies has increased considerably between 2000 and today. According to available data, the number of companies certified by this standard reached 401 by the end of 2009. Considering the unavailability of consolidated data on the supervision of certified companies and the unavailability of data on recertification procedures undertaken by the companies to renew the certificates in force, the total number of certified companies possessing a valid certificate is open to question. The increase in the number of companies certified in the period from 1997 until today is a result of intensified market promotion activities in terms of environmental efficiency, which is also a precondition for entering more demanding markets.

Number of HRN ISO 14001 certified companies, 1997-2009





# TOURISM

## Overnight Stays in Marinas

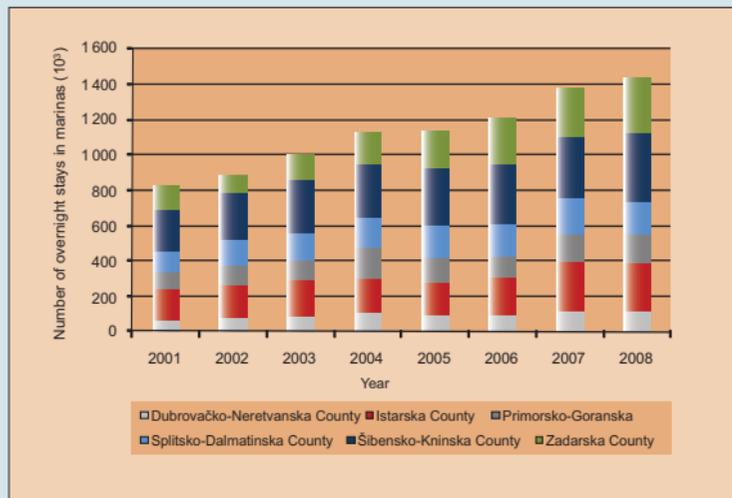


The development of nautical tourism, although economically desirable, has potentially negative effects on the environment, such as pollution by vessels (oils, feces, biocides, wastewater, etc.), inappropriate waste disposal, uncontrolled use of naturally designed space and natural resources, etc.

### Trend and Current State

The number of overnight stays in marinas continues to rise. In the period 2005-2008 the average annual growth rate was 8%. Of the total number of overnight stays in marinas recorded in 2008 (1.4 million), the highest number of the boaters visited Šibensko-Kninska County (27%), Zadarska County (22%) and Istarska County (19%), accounting for two-thirds of the tourist traffic relating to boaters. This is due to a concentrated offer of accommodation capacities for boaters and the number of moorings. The majority of the 18 000 moorings in Croatian marinas are located in the Zadarska County (25%), Istarska County (24%) and Šibensko-Kninska County (18%); the only littoral county with no marinas is Ličko-Senjska County. *The Nautical Tourism Development Strategy of the Republic of Croatia for the Period 2009-2019* adopted in 2008 established the basic principle of managing nautical tourism development based on sustainable development, which implies a compromise between the need to preserve natural resources and the need for economic development.

Trends of tourist traffic relating to boaters by counties, 2001 - 2008



Source: CBS, BIST – Institute for Tourism



# TOURISM

## Number of Blue Flags Awarded to Beaches and Marinas



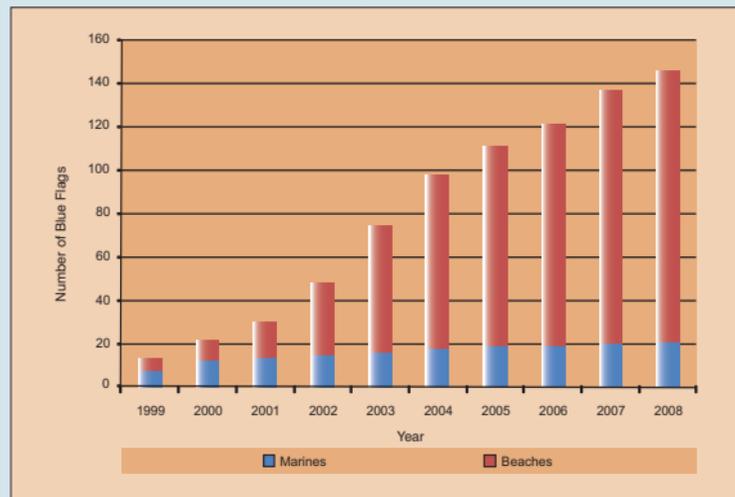
The Blue Flag programme for beaches and marinas is an international ecological award scheme for the protection of the marine environment and coastal areas based on the principles of sustainable development and environmental management, environmental education and public information about the coastal zone, i.e. about beaches and marinas subject to loads. The Blue Flag is therefore an international ecological award given to well-equipped and safe beaches and marinas with the aim of protecting the natural environment of the coastal area. It is run by the Foundation for Environmental Education (FEE) from Denmark; the Blue Flag project implementing agency in the Republic of Croatia is the *Lijepa naša* association.

### Trend and Current State

Year-by-year more Croatian beaches and marinas are becoming eligible for the Blue Flag. In 2008, beaches and marinas were awarded a total of 146 Blue Flags, which is a 31.5% increase compared to 2005. In the period observed 125 Blue Flags (a 36% increase) were awarded to beaches and the number of Blue Flags awarded to marinas increased by some 10% compared to the 19 awarded in 2005. This upward tendency in the number of Blue Flags indicates enhanced awareness of the need to preserve and protect the marine environment. However, mention should be made of their uneven spatial distribution, because this ecological award has been mainly awarded to beaches and marinas in the northern Adriatic. Beaches

and marinas in standing waters (freshwaters) may also be holders of the international Blue Flag.

Number of Blue Flags awarded to Croatian marinas and beaches, 1999-2008





# FISHERIES AND AQUACULTURE

## Sea Fishing Catch



By monitoring the annual catch of fish and other marine organisms, it is possible to assess the impact of fishing on the marine ecosystem and to develop a framework for the rational management of bioresources. The protection of fishery resources is primarily based on the implementation of technical measures, including a minimum permissible catch size, technical characteristics of fishing equipment, spatial and temporal limitations of fishing, etc. Catch quotas have only been set for the bluefin tuna (ICCAT).

### Trend and Current State

At present, about 3 500 individuals are licensed for commercial fishing in Croatia. In 2008, the total catch of sea fish and other marine organisms was 49 011 t, 85% of which was blue or oily fish, 10% of which was white fish, and 5% of which was all other kinds of marine organisms (cephalopods – musk octopuses, squids, todarodes squids, cuttlefish and crabs). In the period 2005-2008 the total annual catch of marine organisms had an upward tendency, the result of an increase in the catch of small oily fish (pilchard and anchovy) and fishery initiative, and particularly of an improved catch data collection system<sup>1</sup> (through Register and reports prescribed). The growth in the oily fish catch in this period may be attributed to tuna farming, because tuna feed on these fish. The drop in the annual tuna catch in the period 2005-2008 is a consequence of catch quotas set for tuna. Over the last four years the white fish

catch (about 5 000 t/yr) remained stable and low compared to the total annual catch. Since 2002, the crab catch has had an upward tendency, reaching 460 t in 2008, mostly as a result of an increased catch of shrimps rather than scampi.

Catch of sea fish and other marine organisms in Croatia, 1999-2008



<sup>1</sup> Ordinance on the Register, Catch Reporting and Submission of Data on Commercial Sea Fishing (OG 138/05)



# TRANSPORT

## Public Passenger Transport



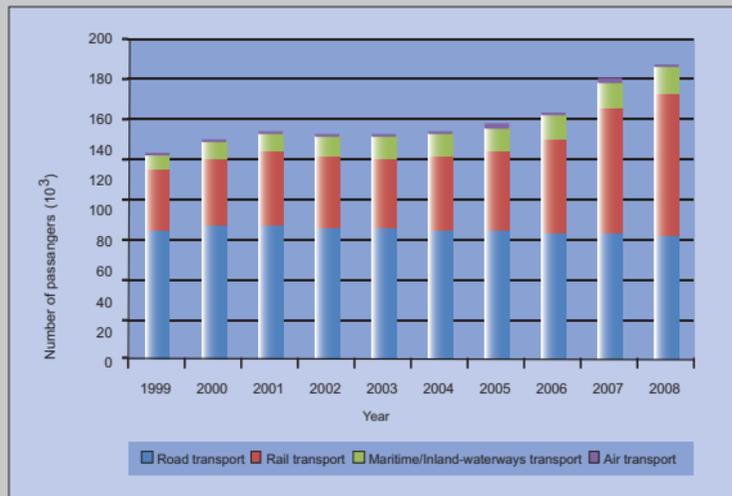
The essential indicator of the impact of transport as an environmental load is monitoring the number of passengers transported by public transport (road, rail, maritime/inland-waterway and air transport) that differ in their ecological, economic and social efficiency.

### Trend and Current State

In 2008, the total number of passengers transported by public transportation increased by 44.2% compared to 1999 and by 23.3% compared to 2005. Although in 2005 most of the passengers (54.8%) were transported by public road transport, in 2008 they chiefly used the railway (47.9%). The crucial year was 2007, when the number of passengers in road and rail public transport became almost equal because of the inclusion of rail transport in public passenger transport in major towns, especially in Zagreb. Despite a growing number of passengers using maritime and air transport, their 2008 share in the total passenger transport was slightly lower than in 2005. In comparison to 2005, the number of passengers in 2008 increased most in rail (78.1%)<sup>1</sup>, air (25.3%) and maritime/inland-waterways transport (11.0%), while the number of passengers in road public transport dropped by 4.3%. The number of passenger kilometers increased by 20.3% in road and by 43.0% in rail transport, but decreased by 38.5% in maritime/inland-waterway and by 2.2% in air transport in 2008 compared to 2005.

<sup>1</sup> Since the third quarter of 2006, total passenger transport has included passengers using free tickets (pupils, students, pensioners, holders of social welfare cards) according to the Contract on Subsidizing the Costs with the Aim to Include the Railway into the City Transport System of Zagreb

Total annual passenger transport by public means of transportation, 1999-2008





# TRANSPORT

## Traffic Emergencies



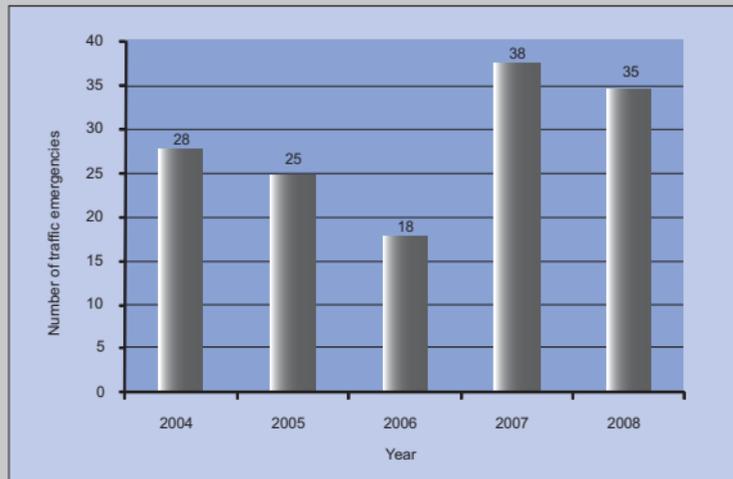
Traffic emergencies are only one type of the emergencies that pose a threat to human life and health and pollute the environment.

### Trend and Current State

In 2008, the National Protection and Rescue Directorate (NPRD) received 184 legitimate calls to its Emergency Call Centre 112 reporting emergencies related to environmental pollution. Thirty-five of these calls were directly associated with traffic. The number of traffic emergencies is lower by 7.9% compared to the previous year. The majority of cases related to soil pollution were caused by fuel leaking onto a roadway and the adjacent ground from traffic accidents. The inspection of locations of marine and inland water pollution revealed that in most cases oil slicks floating on the water surface were usually discharged by unknown polluters or as a result of ship damage. The inspection of the locations is carried out by the Environmental Inspectorate.

The increase in the number of traffic emergencies in recent years may be attributed both to the intensification of hazardous substances transport and to improved practices of monitoring and recording such events.

Number of traffic emergencies,  
2004-2008



Source: CBS/MEPPC



# HEALTH AND SAFETY

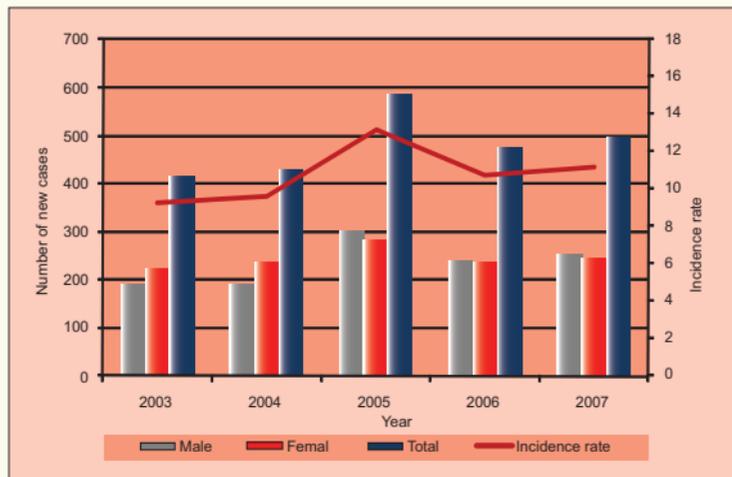
## UVB Radiation and Malignant Melanoma

In the Republic of Croatia the measurement of UV radiation is carried out at the stations in Umag, Opatija and Crikvenica. Former measurements represent an estimate of partial distribution of UVB radiation exposure and a basis for estimating the potential risks of skin and eye damage and a weakening of the immune system caused by increased UVB radiation levels.

### Trend and Current State

In the period 2004-2008 all monthly UVB radiation levels were lower than  $100\ 000\ \text{J/m}^2$ , with the exception of 2004 and 2005 when the values measured in June and July exceeded  $120\ 000\ \text{J/m}^2$ . Similarly, the radiation levels measured in July 2007 totaled about  $105\ 000\ \text{J/m}^2$ . Measurements of total ozone, which plays an important role in preventing UV radiation from reaching the ground, are not carried out in Croatia. However, insight into the status of total ozone above the country's area is provided by a satellite launched by the *World Ozone and Ultraviolet Radiation Data Centre (WOUDC)*. Zonally averaged total ozone values in the period 1979-2007 show a downward trend of  $-3.1\%$  per decade. In estimating the increased risk of UVB radiation for humans, the value of  $500\ \text{J/m}^2$  was used, which corresponds roughly to UV index 5. It is well known that an excessive exposure to high UVB radiation levels represents a risk factor for skin cancer or cataracts and melanoma. The incidence of malignant skin melanoma is monitored by entering cases in the Croatian National Cancer Registry. According to available data, the incidence of malignant melanoma is increasing.

Number of new cases of malignant melanoma and total incidence rate of malignant melanoma, 2003-2007





# HEALTH AND SAFETY

## Road Traffic Accident Fatalities in the Republic of Croatia

Although traffic accident fatalities is not a characteristic environmental status indicator, traffic accidents, including noise and air pollution caused by road traffic, have an adverse impact on human health, the quality of life and safety. To monitor and compare data at the international level<sup>\*</sup>, this indicator, expressed as a mortality rate, represents a reliable measure in assessing the degree of road safety, and shows the number of persons killed on roads per hundred thousand inhabitants of a country.

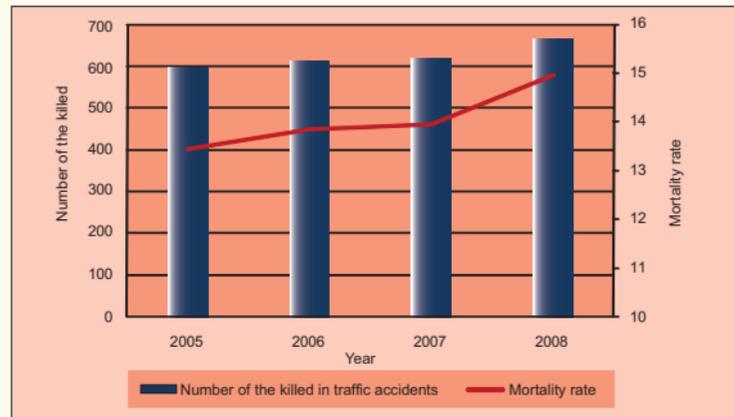
### Trend and Current State

In the period 2005-2008 a total of 2 494 persons were killed in road accidents in the Republic of Croatia. According to data provided by the MI, about 60% of road accidents were recorded in the jurisdictions of the Zagreb, Splitsko-Dalmatinska, Primorsko-Goranska, Osječko-Baranjska and Istarska police departments. About 50% of the total killed on Croatian roads were victims of road accidents that occurred in those areas. The total mortality rate for the period 2005-2008 ranges from 13.5 to 14.9 and points to the need for implementing measures to improve road safety in order to reach the rates of the developed EU countries, which are below 10. This is one of the main objectives of the National Road Safety Programme of the Republic of Croatia, which has been in effect for a number of years. Since a contributing factor to road accidents is related to humans in 95% of cases, the strategic activities of the *National Programme* are primarily focused on decreasing vehicle speed and respecting the speed limits, on the protection of children, young

<sup>\*</sup> World Health Organization (WHO) – European health for all data

people and the most vulnerable participants in traffic, on preventing driving under the influence of alcohol and narcotics, and the reconstruction of dangerous areas. Supplementary activities include increasing the mechanical soundness of vehicles, the improvement of traffic statistics and analyses, the use of safety belts and daytime running lights, and respecting traffic lights.

Road traffic accident fatalities in the Republic of Croatia, 2005-2008



Source: CBS/CNIPH/MI



## PUBLIC RELATIONS

### Number and Breakdown of Public Inquiries Addressed to the Croatian Environment Agency, 2006-2009

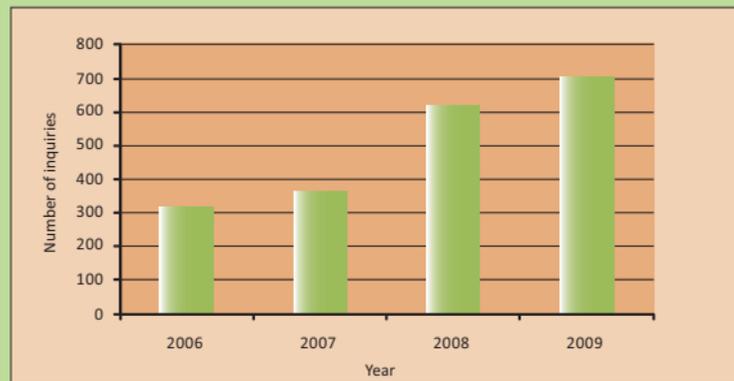
A dynamic communication with the general public with the aim to provide easily accessible and understandable information to experts and the general public is one of the tasks of the Croatian Environment Agency.

#### Trend and Current State

During the last four years, the Agency has received by electronic mail, fax and phone 1 510 requests for a total of 2 009 pieces of information. Most of the inquiries related to waste issues (56.6%) as a result of well-defined obligations and financial benefits in the framework of an organized waste management system and a growth of public interest in issues associated with this significant environmental load. An almost equal number of inquiries were recorded in the following three environmental topics: air (5.8%), water/sea (5.6%) and soil (0.8%). Public interest in the areas of biodiversity (1%) and sectoral pressures (0.8%) was the lowest. General environmental data were the subject of 3% and databases of 20% of inquiries. In this four-year period 2.9% of inquiries related to issues falling within the competence of other institutions. It should be noted that in 2009 the business sector showed outstanding interest in the Pollutant Emission Register (PER). These types of inquiries accounted for 31.5% of the total number of inquiries, which may be attributed to the newly introduced obligation of a direct submission of data to the PER. In the period observed the structure of applicants has not changed substantially. More than half of all inquiries (51%) were submitted by private companies and the general public

showed great interest in environmental issues (17%). Foreign institutions and companies sent 8% of inquiries received by the Agency and the scientific community and local government units 7% each. In four years 6% of inquiries were received from the government and public institutions, and it is interesting to note that in the applicant structure non-governmental organizations, which are highly involved in environmental protection issues, account for only 3% of inquiries. The smallest number of inquiries was submitted to the Agency by participants in various projects (1%).

Number of inquiries submitted to the CEA, 2006-2009





# THE ENVIRONMENT IN YOUR POCKET

## Acronyms and Abbreviations



**BAT** - Best available techniques

**BIST** - Business Intelligence System for Tourism

**BOD<sub>5</sub>** - 5-day biological oxygen demand

**CBS** - Central Bureau of Statistics

**CEA** - Croatian Environment Agency

**CLC** - Corine Land Cover

**CNIPH** - Croatian National Institute of Public Health

**CO** - Carbon monoxide

**CO<sub>2</sub>** - Carbon dioxide

**dS** - Decisiemens

**EC** - Electrical conductivity

**EFI** - Estuarine Fish Index

**EIHP** - Energy Institute Hrvoje Požar

**EPEEF** - Environmental Protection and Energy Efficiency Fund

**EU** - European Union

**FEE** - Foundation for Environmental Education

**Gg** - Gigagram (10<sup>9</sup> g)

**GIS** - Geographical Information System

**HRN EN ISO 14001** – Croatian standard for environmental management system

**ICCAT** - International Commissions for the Conservation of Atlantic Tuna

**IOF** - Institute of Oceanography and Fisheries

**J** - Joule

**LRTAP** - Long-Range Transboundary Air Pollution

**LSU** - Livestock unit



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## Acronyms and Abbreviations



**MAAT** - Mean annual air temperatures

**MAFRD** - Ministry of Agriculture, Fisheries and Rural Development

**MANR** - Major accident notification records

**MEPPPC** - Ministry of Environmental Protection, Physical Planning and Construction

**Mha** - Million hectares

**MI** - Ministry of Interior

**MPME Protocol** - Multi-pollutant Multi-effect Protocol Abate Acidification, Eutrophication and Ground-level Ozone

**MRDFWM** - Ministry of Regional Development, Forestry and Water Management

**N** - Number of samples

**NATURA 2000** - European Union Ecological Network

**NMVOC** - Non-methane Volatile Organic Compounds

**NO<sub>x</sub>** - Nitrogen oxides

**NP** - National park

**NPRD** - National Protection and Rescue Directorate

**ODS** - Ozone depleting substances

**OG** - Official Gazette

**PER** - Pollutant Emission Register

**PM<sub>10</sub>** - Particulate matter less than 10 µm in diameter

**RC** - Republic of Croatia

**RIDS** - Register of installations in which dangerous substances are present

**SINP** - State Institute for Nature Protection

**SO<sub>2</sub>** - Sulphur dioxide

**UV-B radiation** – B type ultraviolet radiation

**UZFA** – University of Zagreb Faculty of Agriculture



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**Aquifer** – A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater.

**Benthic invertebrates** – Organisms/invertebrates living on the bottom of the sea. We distinguish sessile (immovable) and vagile (movable) benthos.

**Best available techniques (BAT)** – All techniques, including the technology, design, construction, maintenance, operation and decommissioning of installations and indicating the practical suitability under economically and technically viable conditions, which are the most effective in achieving the highest level of protection of the environment as a whole.

**Bioaccessibility of metal** – Form of metal which is accessible for the plant and depends on the water solubility of the metal itself and the pH value.

**Biocides** – Agents or preparations that contain one or more active substances and are intended to destroy, deter, render non-hazardous, prevent from affecting or control any harmful organism in a chemical or biological manner.

**Biological reserve** – Implies specimens of the same species

inhabiting a specific geographical area and not mixing with specimens of other areas..

**Captured springs** – Public springs used for water supply (underground flow, spring, watercourse, reservoir and lake).

**Coastal waters** – Surface water on the landward side of a line which is at a distance of one nautical mile from the nearest point of the baseline from which the breadth of territorial waters is measured, extending up to the outer limit of transitional waters.

**Composting** – A biological process of anaerobic or aerobic decomposition of biodegradable waste to form a new product – compost.

**Corine Land Cover Methodology** – Approach to creation of a land cover database standardized at the EU level and based on visual interpretation of satellite imagery resulting in a vector database presented at a scale of 1:100 000, with a minimum polygon width of 100 m and a minimum mapping area of 25 hectares for the land cover database and 5 hectares for the database of changes.

**Demersal species** – Organisms that inhabit, feed and live on or in close proximity to the bottom of the aquatic ecosystem.



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**Diadromous fish species** – Species that travel between salt and freshwater and are divided into anadromous fish spending most of their life cycle in the sea and breeding in freshwater, catadromous fish living most of their life cycle in freshwater and breeding in the sea, and amophidromous fish moving between fresh and salt water at a specific stage of development.

**Ecological corridor** – An ecological component or a series of such components allowing movement of populations of living organism between two areas and makes a part of the ecological network.

**Ecological niche** – Functional position of an organism in its environment or the role played by that organism in relation to the community.

**Ecological status** – An expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters.

**Ecologically important sites** – Sites that contribute substantially to biodiversity conservation in the Republic of Croatia.

**Ecosystem** – A complex of biotic and abiotic communities and their interacting in a specific area. Ecosystems may be protected by implementing biodiversity conservation me-

asures in natural resources exploitation and space development, and by protecting habitat types.

**Electrical conductivity** – Ability of a material to conduct electricity.

**Emission** – A discharge of liquid, gaseous or solid substances into the environment from a polluting source.

**Energy transformation** – A process of changing any kind of energy into another (e.g. solar into electrical energy).

**Erosion** – A natural process whereby the materials (soil, mud, rock, etc.) are moved from one place to another by natural agencies which include wind, water or movements caused by the force of gravity.

**Estuarine Fish Index (EFI)** –represents a spatial and temporal distribution of the composition of fish communities with respect to the number of species, presence of dominant families, their trophic integrity, residential status and indicators of habitat changes, such as the number of diadromous, new and indicator fish species, and is used for assessing the ecological status of transitional waters.

**Eutrophication** – A process by which water is enriched with nitrates, phosphates and other nutrients which favour the



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growth of algae and higher forms of plant species, causing imbalance of aquatic ecosystems and changes in the status of waters.

**Fire line** – An area of forest cut in form of a stripe, cleared from trees and underbrush, having no elements of a forest road.

**Fishing quota** – A total allowable catch of a specific kind of fish or other marine organisms determined by law and/or other regulations.

**Forest management background document of the area** – A basic forest resources management document prepared for the period of 10 years, specifying ecological conditions for forest protection, allowed scope of felling and a number of other parameters of relevance to sustainable forest management.

**Fossil fuels** – Fuels formed from organic remains of plants and/or animals (oil, natural gas, coal and peat). Presently they represent the major source of energy on the Earth.

**Habitat** – A unique functional unit of the ecosystem characterized by geographical and abiotic features.

**Habitat type** – All habitats of the same kind.

**Hydrologic regime** – Spatial and temporal variations affecting a water body and the level of completeness of the water system, including the quantity and quality of water in a specific area and at a specific time.

**Incidence rate** – The number of new patients per population occurring in a given time period while observing the incidence of a specific illness.

**Inland waters** – All standing or flowing water on the surface of the land and all groundwater on the landward side from the baseline of the low-water mark closest to the shore.

**Lessepsian migrants** – Fish species that migrated from the Red Sea.

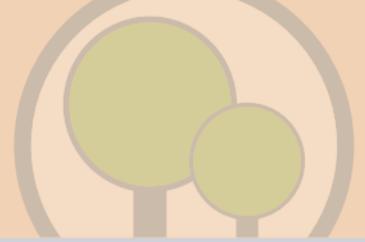
**Livestock unit (LSU)** – A product of multiplying the head number and the associated coefficient, where 1 LSU = 500 kg of the weight of an animal or a group of identical animals.

**Major accident** – An event or an uncontrolled occurrence caused by a large emission, fire or explosion and similar, appearing as a result of uncontrolled development of events during activities in an installation involving hazardous substances and one or more those hazardous substances and/or their compounds resulting from the event or the uncontrolled



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occurrence, which cause serious momentary or delayed – subsequent threat to human health and life, material assets and/or the environment, inside and/or outside the installation.

**Malignant melanoma** – A malignant tumor of skin cells (melanocytes) normally present in basal layers of epidermis (surface layer) and mucous membranes close to skin.

**Microhabitats** – A small localized habitat within a larger ecosystem where an individual species is normally found.

**Native species** – Autochthonous, indigenous species that occur naturally in and inhabit a given area and have not been introduced by human activities, either deliberate or accidental.

**Natura 2000** – A European Union network of sites covering protected areas of importance to species and habitat types defined under the Birds Directive and the Habitat Directive.

**Nautical tourism** – A form of tourism combining the living on board of entertainment, sport and recreational vessels in marinas and associated activities.

**Non-energetic use of energy** – Use of an energy form for other purposes (e.g. use of natural gas in the fertilizer production).

**Organic production** – A special system of sustainable management in agriculture and forestry that covers growing of crops and breeding of animals, production of food, raw materials and natural fibre, and processing of primary products. It includes all most favourable ecologically, economically and socially justified production and technological methods, activities and systems by using the fertility of soil and available water, natural features of plants, animals and landscapes, thus achieving increased plant yield and resistance by means of natural forces and laws, at the same time applying fertilizers, pesticides and animal health care products in conformity with internationally approved standards and principles.

**Passenger kilometre (pkm)** – A unit of measure indicating transport of a passenger across a distance of one kilometre.

**pH (lat. potentia hydrogeni)** – A negative algorithm of the concentration of positive hydrogen ions indicating the acidity or alkalinity of a substance.

**Piezometric drill holes** – Specially equipped drill holes used for determination of the groundwater levels and the study of their movement.

**Population** – A group of individuals of a particular species occupying a specific area, which has an actual or potential possibility of inter-breeding.



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**Primary energy** – Energy embodied in natural resources that has not undergone any conversion, no matter whether it is a chemical potential of fossil fuels, wood or biomass, nuclear energy, kinetic energy of wind, potential energy of watercourses or thermal energy of geothermal springs.

**Renewable energy sources** – Energy sources that come from nature and may be renewed. They are presently used because they are environmentally friendly and are divided into traditional sources that include biomass and large hydro-power plants and new sources such as solar, wind and geothermal energy sources.

**River basin** – The area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea or lake usually at a river mouth.

**Salinization** – Accumulation of soluble salts near the surface of soil to the extent that soil fertility is severely affected.

**Surface water** – All waters on the surface of the Earth, except the groundwater, and transitional waters; the term “surface water” includes also coastal waters, if explicitly determined by the *Waters Act*, and territorial waters, if explicitly determined by the said law.

**Sustainable management** – A management method by which a balance is achieved between economy and ecology resulting in preservation of the Earth’s assets for future generations.

**Thermophilic species (organisms)** – Species (organisms) characterized by high cardinal points in relation to temperature.

**Transitional water** – Inland waters in the vicinity of river mouths, partly saline as a result of their proximity to coastal waters, but substantially influenced by freshwater flows.

**Waste recycling** – A method of recovering wastes involving the treatment of waste products for use as a raw material or energy production.

The background of the entire page is a repeating pattern of various environmental icons. These icons are contained within circular frames and include symbols for water (waves), air (flame), land (trees, hills), and industry (factory). Some icons also feature a plus sign, suggesting a positive or 'green' theme. The icons are arranged in a grid-like fashion across the dark blue background.

# THE ENVIRONMENT IN YOUR POCKET I - 2010

The logo for the Croatian Environment Agency, featuring a stylized green tree with a white trunk and a white circle behind it.

CROATIAN  
ENVIRONMENT AGENCY