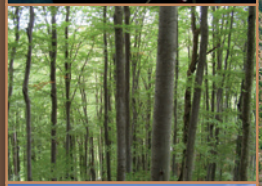
The Environment In Your Pocket I - 2013



CROATIAN ENVIRONMENT AGENCY

THE ENVIRONMENT IN YOUR POCKET

THE ENVIRONMENT IN YOUR POCKET I - 2013

Publisher:
Croatian Environment Agency

Editor-in- Chief:
PhD. Neven Voća

Editorial Board:
MSc. Mira Zovko
Hana Mesić
PhD. Savka Kučar-Dragičević
Rene Vukelić

Prepared by:
Vibor Bulat
Andrina Crnjak-Thavenet
Željko Crnojević
MSc. Snježana Dominković-Alavanja
Melita Došen
Branka Ilakovac
MSc. Tonći Jelić
Gordana Kolačko
Ines Katić
Jasna Kufrin
Biserka Mladinić
Dunja Pofuk
Bernarda Rožman
Ines Seitz
Andreja Steinberger
Maja Šimunović
Jelka Škoton
Vedran Vađić
Marijo Vranaričić
Nina Zovko
MSc. Mira Zovko

Translation:
Ksenija Strbad

Language editor:
Michael Gable

Layout, print and cover page design:
Fokus d.o.o.

Cover page photos:
Antonela Bilčić, Davor Karlović, Miroslav Kis, Tamara Sovilj, Bernard Kotlar

Print run:
150 copies

Croatian Environment Agency, Trg maršala Tita 8, 10 000 Zagreb, Croatia
Phone: +385 1 48 86 840, Facsimile: +385 1 48 26 173
E-mail: info@azo.hr, Internet: www.azo.hr

ISSN: 1846-8454

THE ENVIRONMENT IN YOUR POCKET

Introduction

Dear readers,

The ninth edition of The Environment in Your Pocket has been expanded with a number of new indicators of the state of the environment. The review of data presented in this brochure leads to the conclusion that the state of the environment in the Republic of Croatia is favourable despite environmental loads coming from various sectors.

Thus the use of low sulphur fuels has reduced sulphur dioxide emissions to the atmosphere, which has yet to be reached in the field of total particulate matter concentrations. In general the condition of the soil is satisfactory, but nevertheless it requires comprehensive and continuous research at the national level. Despite the occurrence of accidental pollution, the ecological status of the country's territorial sea shows mostly the highest level. The inland bathing water quality has been systematically monitored since 2011 and water at the majority of bathing sites has been classified as excellent. However, the efficiency of the use of water resources has not reached a satisfactory level which is evident from high water losses inside the water supply system (44%). Based on the assessment of the level of damage to forest ecosystems it may be concluded that most of the trees show the defoliation level 0 or a minimum defoliation. In 2012, however, the forest ecosystem was exposed to high loads due to as many as 953 fires that affected 24 804 hectares.

The recent decades have seen a considerable climate change. On the other hand, the reduction in greenhouse gas emissions or the mitigation of climate change require a number of measures aimed to decrease the consumption of fossil fuels, increase the share of renewable energy sources and ensure a rational and energy efficient use of energy.

Environmental measures such as inspection measures, data submission, implementation of remediation and other measures, etc. are showing positive results.

Croatian Environment Agency

THE ENVIRONMENT IN YOUR POCKET

Table of Contents

THE ENVIRONMENT IN YOUR POCKET

Table of Contents

THE ENVIRONMENT IN YOUR POCKET

Basic Data on the Republic of Croatia

Mainland surface area	56 594 km^2
Territorial sea surface area	31 067 km^2
Coastline length	6 278 km
Islands, rocks, reefs	1 185
Highest mountain summit	Mt. Dinara, 1 831 m
Counties	21
Cities and municipalities	556 (127 i 429)
Population	4 284 889
Population density per km^2	75.7
Populated islands	48
Language	Croatian
Alphabet	Latin
Political system	Parliamentary democracy
GDP per capita in 2012	10 295 EUR

AIR

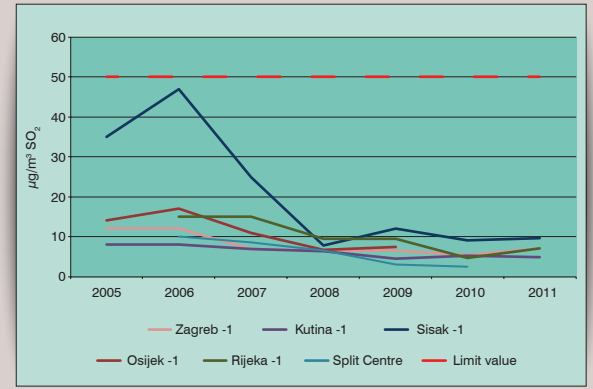
Mean Annual Sulphur Dioxide (SO_2) Concentrations in Urban Areas

Sulphur dioxide (SO_2) is one of the most hazardous components of urban smog (particularly during winter months) because it causes respiratory tract problems. It is produced primarily by the burning of fossil fuels that contain sulphur. It is also called "acid" gas, because in the atmosphere it chemically bonds with water and returns to earth in form of acid rains which have a harmful effect on the plant and animal life. The deposition of sulphur dioxide or its sulphates on the soil causes soil acidification and affects the vegetation. It also has adverse effects on materials, buildings and valuable cultural monuments.

Trend and Current State

The trend of mean annual SO_2 concentrations in towns (agglomerations) is shown at six measuring stations: Zagreb-1, Kutina-1, Sisak-1, Osijek-1, Rijeka-1 and Split Centre and compared with the limit value (LV) of 50 $\mu g/m^3$. Apart from usual variations, SO_2 concentrations in the period 2005 - 2011 slightly decreased in Zagreb, Kutina, Osijek, Rijeka and Split which is a consequence of burning fuels with low sulphur content. The largest drop in mean annual SO_2 concentrations was recorded in Sisak in 2007 and 2008 as a result of putting into operation a desulphurization plant in the Sisak Oil Refinery.

Trend of mean annual SO_2 concentrations in urban areas



Source: CEA

AIR

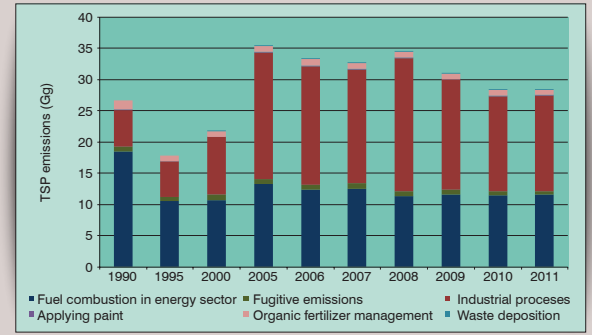
Total Suspended Particulates

Total suspended particulates (TSP) are tiny solid particles less than 100 μm in diameter suspended in the air. They are a mixture of organic and inorganic particles, heavy metals and tiny dust particles which are released into the environment mostly from industrial production, combustion of fuel in the energy sector and organic fertilizers management. Smaller particles remain longer in the air and due to their size they penetrate and reside in the lower respiratory tract.

Trend and Current State

The TSP emissions in 2011 amounted to 28.4 Gg which is 6.4% higher compared to the baseline year 1990. The major source of TSP emissions is the sector of industrial processes which accounts for 54.2% of total TSP emissions. A slight increase of 1.3% recorded in this sector as against 2010 is mainly attributable to a 6.3% increase in activities of the subsector responsible for road paving with asphalt. Compared to the baseline year 1990, this sector accounts for the largest increase in emissions in 2011 (61.4%). The fuel combustion sector of the power industry contributed to TSP emissions in 2011 with 40.56%, which is 37.6% lower than in the baseline year 1990. The contribution of TSP emissions coming from other sectors (5.24% compared to total emissions) in 2011 remained at nearly the same level compared to the baseline year, which is anyway a trend seen throughout the entire period under consideration.

TSP Emissions



Source: CEA

Year	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011
Total (Gg)	26.57361	17.84292	21.74586	35.30163	33.1917	32.60063	34.38559	30.94764	28.27298	28.36797

CLIMATE CHANGE

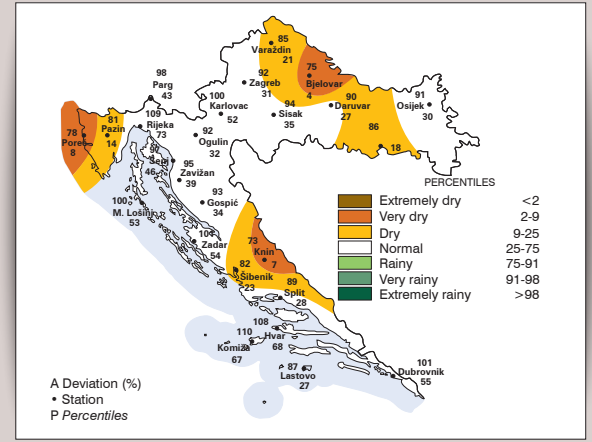
Deviations of Precipitation Amounts in the Republic of Croatia in 2012

This indicator shows deviations of precipitation amounts as compared to the reference 30-year period. These deviations are classified as *extremely dry, very dry, dry, normal, rainy, very rainy and extremely rainy*. When the precipitation amount as an important climatological element shows a marked deviation from the normal (mean) value, this points to a climate anomaly which directly affects the plants, animals and humans and their activities in the area affected by the climate change.

Trend and Current State

The analysis of annual precipitation amounts expressed as a percentage (%) of the average of several previous years (1961-1990) shows that these amounts recorded at the majority of stations in Croatia in 2012 were lower than the average. The only exceptions are Karlovac and Mali Lošinj where the said precipitation amount was equal to the average of several years, while in a part of the Northern, Central and Southern Adriatic that average was exceeded. The category of very dry expressed in percentiles covers the wider area of Bjelovar, Poreč and Knin and the category of dry was recorded in a part of the Northwestern and Eastern Croatia and some areas of the Northern and Southern Adriatic including their hinterland. The rest of Croatia falls within the category of *normal*.

Deviations of precipitation amounts in 2012



Source: MHS, prepared by: Tanja Likso, PhD (MHS)

CLIMATE CHANGE

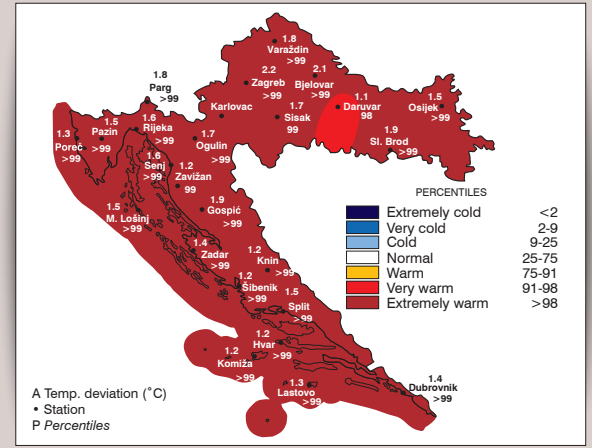
Deviations from Mean Air Temperatures in the Republic of Croatia in 2012

This indicator shows air temperature deviations compared to the reference 30-year period. These deviations are classified as *extremely cold, very cold, cold, normal, warm, very warm and extremely warm*. In case of a marked deviation of air temperatures from normal (mean) values in the reference period we speak of a climate anomaly likely to cause changes in the plant and animal life and affect the human life and health.

Trend and Current State

In 2012 the mean annual air temperatures in the area of the Republic of Croatia were higher than the multi-annual average (1961-1990). The anomalies of the mean annual air temperatures range from 1.1°C (Daruvar) to 2.2°C (Zagreb-Grič). According to the percentile distribution, thermal conditions in 2012 in Croatia may be described by the category *extremely warm*, with the exception of a wider area of Daruvar which falls within the category of *very warm*. From the comparison of mean annual air temperatures for Zagreb-Grič in the period 1862-2012 it is evident that, after 2000, the year 2012 is the second warmest year from the beginning of temperature measurement (the mean annual air temperature measured at the Zagreb-Grič observatory in 2012 was 13.7°C).

Deviations of mean air temperatures in 2012



Source: MHS, prepared by: Tanja Likso, PhD (MHS)

INLAND WATER

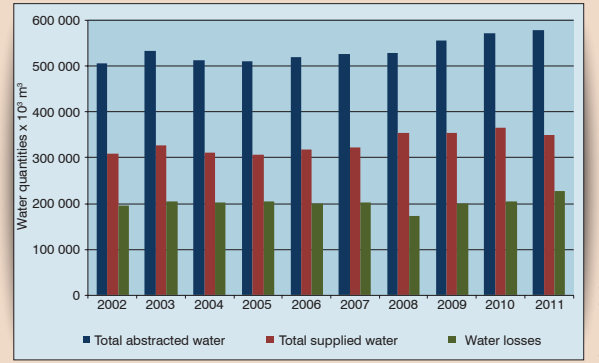
Water Use Efficiency

Public water supply is an activity of abstracting surface and ground water intended for human consumption. It represents therefore an issue of public interest and is given priority in relation to water use for other purposes. Apart from the water supply to the population, water from public water supply systems is also supplied to businesses (companies, institutions, etc.) mostly for sanitary and partly for production purposes. The abstraction of water for public supply accounts for more than a half of the total quantity of abstracted water and as such represents the major source of loads to water resources.

Trend and Current State

According to data[1], 3.28 million of population in Croatia are connected to public water supply systems, and the water use efficiency[2] expressed as a water use efficiency index has been about 56% for several years now. This points to great water losses in the water supply system which amount to some 44%. These losses are largely a consequence of defects in or the malfunctioning of the water supply network and also include quantities of water whose use is not charged (e.g. municipal services, fire protection). According to data supplied by the CBS, the quantity of water abstracted in recent years averaged 530 million m^3 and total losses due to actually established defects or malfunctioning of the water supply network are about 200 million m^3/year. A strategic objective of the water management is therefore to gradually reduce losses to an acceptable level of 15 to 20%.

Annual quantities of water abstracted and supplied and water losses



Source: CBS

[1] Draft River Basin Management Plan, September 2012

[2] Water use efficiency represents the ratio of the supplied water quantity to that abstracted.

INLAND WATER

Inland Bathing Water Quality

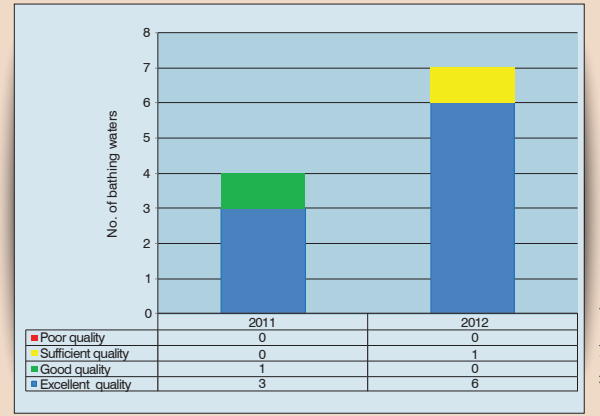
The inland bathing water quality has been systematically monitored according to the provisions of the ordinance[3] since 2011. It is monitored at locations (bathing-waters) determined by local self-government units before the start of the bathing season. The bathing water quality assessment include monitoring of physical and microbiological parameters which, considering the pollution type and level, point to faecal pollution of surface waters.

Trend and Current State

During the 2012 bathing season the bathing water quality was monitored at a total of seven sampling points at 3 locations: Korana Foginovo in Karlovac, TK Jezero - Ružica grad in Orahovica and Poloj in Slavonski Brod. Compared to the previous season the monitoring system was expanded by one bathing water (Poloj) with three sampling points. During the 2012 season a total of 46 samples were taken at those three bathing waters and analysed. The Foginovo bathing water was classified as sufficient quality while other bathing waters were assessed and classified as excellent. Given the latest legislative framework, the number of inland bathing waters which are permanently monitored for the bathing water quality is expected to keep increasing.

[3] Ordinance on inland water bathing quality (OG 51/10)

Classification of inland bathing waters for bathing season 2011 and 2012



	2011	2012
Poor quality	0	0
Sufficient quality	0	1
Good quality	1	0
Excellent quality	3	6

Source: Hrvatske vode

SEA AND COASTAL AREA

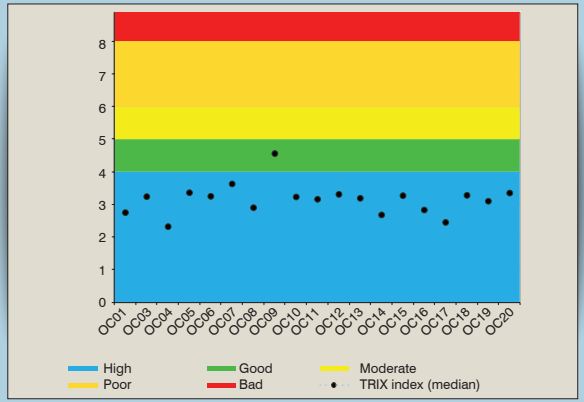
Quantitative Evaluation of the Ecological Status of Transitional, Coastal and Marine Waters (Trophic Index)

The trophic index is used for quantitative evaluation of the ecological status of transitional, coastal and marine waters. Because of lack of a national regulation on classification, the evaluation is carried out on the basis of the Italian law[4]. According to the trophic index value range, four ecological status classes are determined: high (<4), good (4-5), moderate (5-6), poor (6-8) and bad (>8). Deterioration in the status is caused by wastewater pollution, leaching from agricultural land and deposits of airborne pollution.

Trend and Current State

The ecological status of the most part of Croatia's marine waters in 2011 may be evaluated as high, because the trophic index ranges from 2.33 (Cetina) to 3.26 (the Kaštela Bay). An exception is the area of the Šibenik Port (trophic index 4.57) where the rating was one degree lower (good). The status has not substantially changed compared to the previous years, with the exception of the Kaštela Bay and the Bakar Bay, where the state was bordering high (trophic index 3-4), which is an improvement compared to the previous years when it was evaluated as good (trophic index 4-5).

Ecological status of transitional, coastal and marine waters[5] at stations of Croatian Adriatic in 2011



Source: IOF

[4]Italian Water Act (D.LGS. 152/99)

[5] in surface layer 0-10 m

SEA AND COASTAL AREA

Sudden Marine Pollution

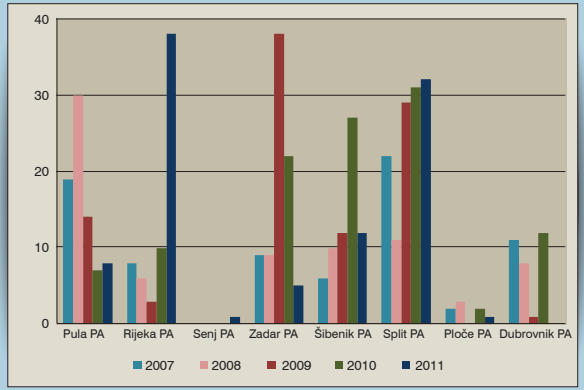
The protection of the sea against pollution and conditions which are to be met by ports are governed by regulations[6]. Given the multiplicity of possible pollution sources (explosions, ship sinking, oil spills, submarine pipeline accidents, etc.) the marine environment is to be protected and pollution sources controlled. Therefore measures are taken with the aim to prevent or limit the damage likely to be caused to human health and the marine ecosystem.

Trend and Current State

The total number of pollution cases in 2007 (77) and 2008 (77) was lower than in 2009 (97), 2010 (99) and 2011 (97). Out of 97 pollution cases recorded in 2011, 33 cases were caused by ships and vessels (Split 15, Rijeka 8, Šibenik 8, Pula 2), 28 were attributable to land-based pollution (Rijeka 16, Zadar 5, Pula 3, Split 2, Senj 1, Ploče 1), and in as many as 36 cases the pollution was caused by an unknown polluter (Split, 15, Rijeka 14, Šibenik 4, Pula 3). To define the trends of impacts on the marine environment it is necessary to carry out a comprehensive analysis of the correlation between all pollution types and quantities and the economic and other activities on the land and sea (transport, tourism, fisheries, etc.), including an analysis of the size and type of vessels that caused the pollution.

[6]Maritime Demesne and Seaports Act (OG 158/03, 141/06, 38/09), Maritime Code (OG 181/04, 76/07, 146/08, 61/11), Regulation on Conditions to be Met by Ports (OG 110/04)

Number of accidental marine pollution cases



Source: MMATI

SOIL AND LAND

Heavy Metal Contaminated Soil and Lead (Pb) Contaminated Sites in the Republic of Croatia

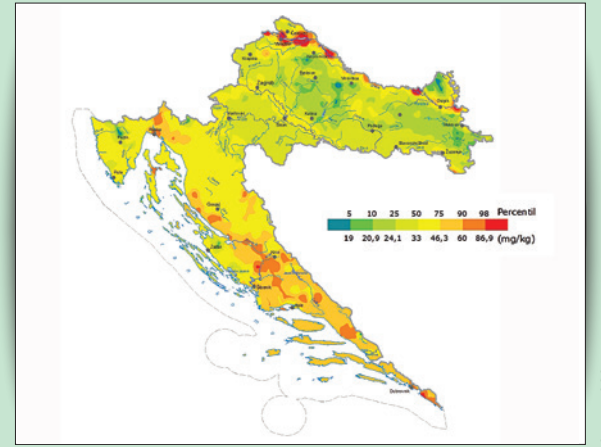
Heavy metals are inorganic substances which, when present in the environment in concentrations exceeding the permitted values, represent pollution likely to endanger the ecosystem balance and eventually the human health. Heavy metal contaminated sites contain most often Pb, Cr, As, Zn, Cd, Cu and Hg.

Trend and Current State

Heavy metals in soil are non-degradable and are accumulated by binding with organic and mineral substances of the soil. They form complex compounds which often have marked harmful effects. The high level of bioavailability makes it possible for them to enter the food chain and, when in form of free ions in the soil solution, they penetrate easily into the surface and ground waters. The major sources of soil contamination are industrial and power plants, mining, hazardous waste landfills, wastewater treatment plants, areas affected by war operations and military sites, transport and agricultural activities. Heavy metals in soil may also occur naturally from parent material and mineral sources. The example of Pb contamination shows elevated concentrations in the coastal Croatia, especially in the area at the foot of the Velebit Mountain and in the Dalmatian hinterland, which is due to the red soil composition and atmospheric pollution. However, the highest Pb concentrations were recorded in the Drava and the Mura[7] valleys which is attributable to intensive upstream mining activities that were taking place in Austria and Slovenia in the last two centuries.

[7] in alluvial sediments (river deposit) and in floodplain sediments (river deposit accumulated by the river after flood)

Lead in Soils of the Republic of Croatia



Source: CGS

SOIL AND LAND

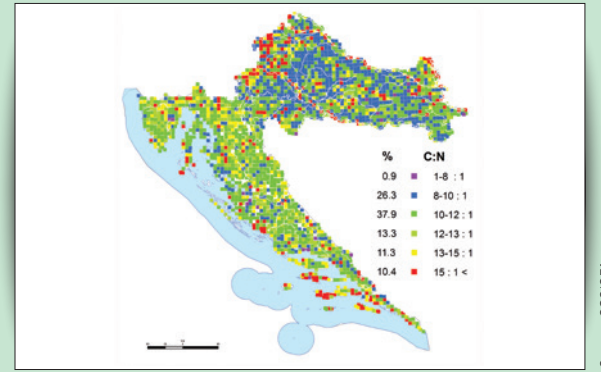
Carbon-to-Nitrogen Ratio in Soils of the Republic of Croatia

The ratio of carbon content to the nitrogen content in the soil (the C/N ratio) is one of the main indicators of the soil quality. The C/N ratios ranging from 8:1 to 15:1 are considered optimal and depend on the type of soil, climate conditions, ground vegetation, organic substance intake into the soil, agro-technical measures and other factors.

Trend and Current State

The C/N ratio in soil influences substantially the decomposition of organic matter conducted by microorganisms in the soil which use C as a source of energy N is needed for their growth and for plant nutrition. A stable C/N ratio ensures high yields in plant production, at the same time retaining C and N in the soil. A low N content compared to the C content slows down the decomposition of organic matter in the soil and has a negative effect on the growth and development of crops. A too high nitrogen content in relation to carbon content causes a rapid decomposition of organic matter and the release of surplus nitrogen into the soil and other environmental components (by leaking to water and emissions into the atmosphere). Apart from the data on the systems of agricultural production and agro-technical measures, the data on the C/N ratio is of vital importance to the assessment of impacts of agricultural production on greenhouse gas emissions (CO_2, CH_4, N_2O, NO_X). The analysis of the C/N ratio in 2 500 samples of soil showed that this ratio in the soils of the Republic of Croatia averages a favourable 12:1 which is due to good soil properties and favourable climate conditions. The country's agricultural land has a slightly lower average C/N ratio amounting to 11:1 and in the forest land it is 13:1. In as many as 88.8% of all soil samples taken the C/N ratio shows ranges from 8:1 to 15:1 which is considered optimal.

C/N ratio in soils of the Republic of Croatia



Source: CGS/CEA

LULUCF categories	Forest land	Cropland	Grassland	Wetlands	Settlements	Other land	Croatia's average
C/N ratio	13:1	11:1	11:1	12:1	13:1	10:1	12:1

BIODIVERSITY

National and Nature Parks Management Plans

A management plan (MP) is a basic document for the management of a specific protected area[8] and is adopted for a ten-year period. The management plan preparation is mandatory for all strict reserves, national parks, nature parks, regional parks and important landscapes.

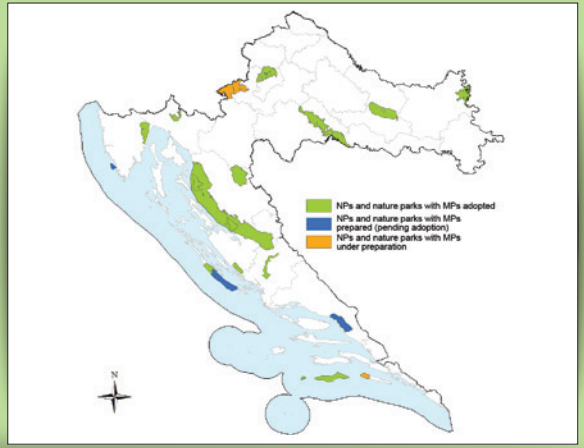
Trend and Current State

The obligation of preparing MPs for protected areas was introduced into the national legislation in 2003 since when a significant shift has been made (14 MPs adopted out of 19). The first protected area management plans were adopted in 2007 for the Northern Velebit National Park, the Risnjak National Park, the Plitvice Lakes National Park, the Paklenica National Park and the Velebit Nature Park. In 2012, as part of the *MedPAN* South[9] project, MPs were prepared for the Brijuni National Park, the Lastovo Islands Nature Park, the Telašćica Nature Park and partly for the Kornati Islands National Park and the Mljet National Park using a unique methodology. The management plan for the Kornati Islands National Park has been prepared and made available to the public, while the management plan for the Brijuni National Park is currently presented for public access. Management plans for the Mljet National Park and the Žumberak-Samoborsko gorje Nature Park are at various stages of preparation.

[8] Pursuant to the Nature Protection Act (OG 70/05, 139/08, 57/11) it lays down development guidelines, methods for the protection, use and management of a protected area, and detailed guidelines for the protection and conservation of natural assets of the protected area, taking into account the needs of the local population.

[9] *Strengthening of the Marine Protected Areas Network in Croatia – MedPAN South*

Overview of the preparation stage of management plans for national and nature parks



Source: MENP

BIODIVERSITY

Role of Bees in Ecosystem

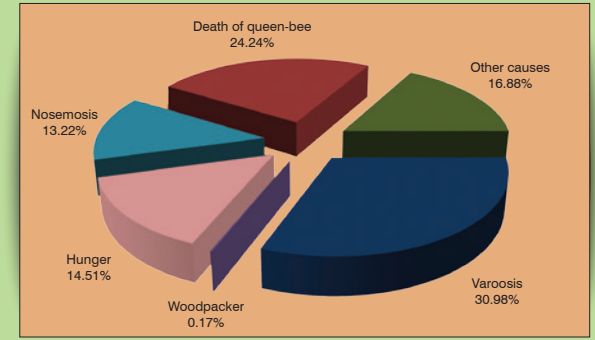
Bees are the most numerous pollinators of plants[10] and play a vital role in food production, conservation of biodiversity and maintenance of the total balance on earth.

Trend and Current State

Bee communities are subject to anthropogenic impacts such as changes in land management, intensive agriculture, use of pesticides and globalization effects through rapid spread of diseases. The greatest damage recorded in beekeeping in the period 2008-2011 was due to varoosis, a disease caused by the parasitic bee mite *Varroa destructor*. Another group of causes is associated with the loss of bee communities as a result of diseases or lost vitality of queen-bees. Due to their long life, the queen-bees are longer exposed to harmful effects from the environment, or rather to a cumulative effect of substances used for disease control in beekeeping. Losses are also caused by the parasitic disease called nosemosis and by bee deaths due to food shortage and the disturbance of bees by various animals (e.g. woodpecker).

[10] A total of 80% of flowering plants are pollinated by insects, 85% of which are honey bees *Apis mellifera (Tautz Jürgen, 2008. The Buzz about bees, Springer – Verlag)*

Causes of bee deaths, 2008-2011



Year	2010	2011	2012
No. of beekeepers	6 594	7 604	8 953
No. of bee communities	330 423	405 024	491 981

Source: CAA

FORESTRY

Forest Fires in the Republic of Croatia

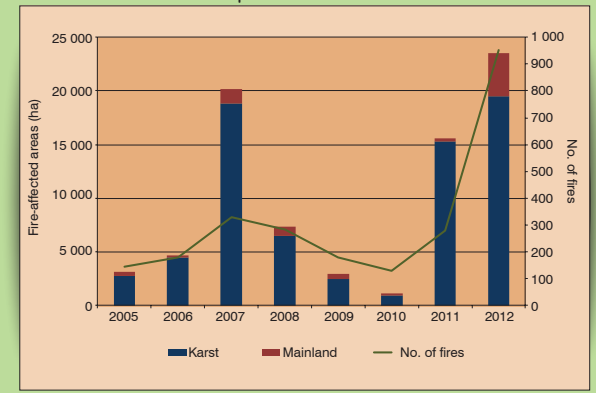
Besides being hazardous to human life and health and material property, forest fires pose the greatest threat to forests and forest land. They break out mostly along coastal and insular forest-covered areas dominated by vulnerable pioneering vegetation and various degraded forest forms such as maquis and garrigue.

Trend and Current State

In the period 2005-2012 a total of 2 488 forest fires were recorded of which 1 792 (72%) in the Mediterranean area. The total fire-affected area in the karst and mainland region in that period was 79 628 ha of which the karst area accounted for as much as 89% (70 758 ha). A great number of fires were recorded in 2007 (331). Afterwards this number declined and reached 131 in 2010, but again increased sharply next year. The year 2012 was extremely dry and warm which resulted in 953 forest fires that affected 24 804 ha of forest and forest and other land (569 fires in the karst area). Causes of fire may be natural and attributable to human negligence. Croatia is undertaking every effort to improve the fire detection and prevention methods, one of which is the observation and reporting service operating from 1 June to 15 September and also beyond this period if required.

[11] Draught, high temperature, low relative air humidity, winds, thunder crashes

Number of fires and fire-affected areas in the Republic of Croatia



Source: MA

FORESTRY

Level of Damage to Forest Ecosystems

The parameters used to assess the level of damage caused to ecosystems are defoliation and discoloration and are expressed by defoliation categories[12]. The major causes of damage to the forest canopy include the pollution of air, water and soil, changes in natural features of the groundwater table due to technical and especially hydrotechnical measures taken in lowland forests, and unfavourable climate conditions (especially draught), insects and plant diseases.

Trend and Current State

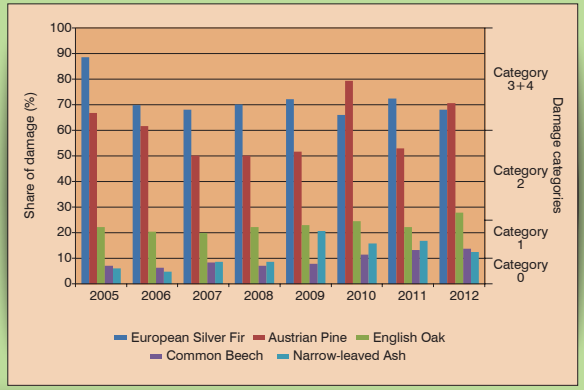
Since 1987 the Republic of Croatia has been included into the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests[13]. All data on the level of damage to forest ecosystems are available in the annual report[14] of the Croatian Forest Research Institute which acts as the national coordination centre. The assessment of the level of damage carried out in 2012 showed that most of the trees fell into the category 0 or category 1. The most vital species are the narrow-leaved ash with a share of 12.5% and the common beech with a share of 13.7% of defoliated trees (category 1). Significant damage was recorded in 70.5% of the Austrian Pine and 68% of the common European Silver Fir (defoliation categories 3+4).

[12] Category 0 = 0-10% (no defoliation);Category 1 = 11-25% (low defoliation); Category 2 = 26-60% (moderate defoliation); Categories 3+4 > 60% (high defoliation)

[13] *International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests – ICP Forests*

[14] Level of Damage Caused to Forest Ecosystems in the Republic of Croatia, 2012

Level of damage caused to forest ecosystems of Croatia



Source: CFRI

AGRICULTURE

Energy Consumption in Agriculture

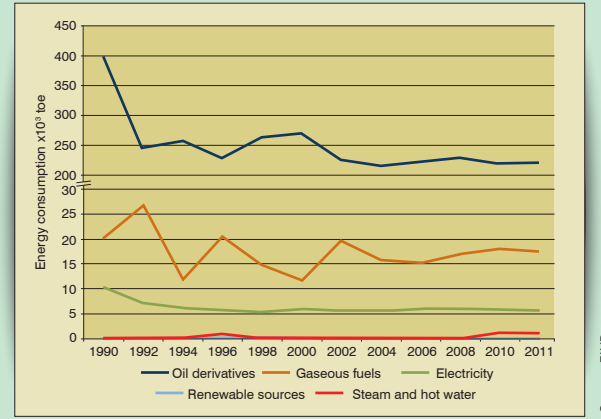
Direct energy consumption in agriculture includes energy consumption in crop production, plantations, livestock breeding and the production of animal and other produce. It is monitored by energy sources[15] but indirect consumption (energy consumed in the production of fertilizers etc.) is not included.

Trend and Current State

Direct energy consumption in agriculture in 1990 amounted to 430.7 x 10^3 toe. Due to the decline in agricultural production in the following two years the consumption was drastically lower and in the period 1992-2011 showed a variable trend. From 1992 to 2001 the average total annual energy consumption was approximately 272.5 x 10^3 toe and in the following ten-year period 246.6 x 10^3 toe. It may be concluded that in the entire period under consideration the energy consumption was showing a continuous downward trend. In 2011 the consumption of oil derivatives accounted for the largest share in total energy consumption (90.4%), followed by the consumption of gaseous fuels (7.2%), while electricity accounted for the smallest share (2.4%). Renewable energy sources (0.1 x 10^3 toe on average) and the energy of steam and hot water (1.2 x 10^3 toe) have been used since 2010, but their share is negligible. In view of the fact that fossil fuels account for the greatest share in energy consumption and are the major source of CO_2 emissions, it is necessary to increase the consumption of RES and continuously implement measures for rational and energy-efficient consumption.

[15] Oil derivatives, gaseous fuels and electricity

Energy consumption in agriculture



Source: EIHP

AGRICULTURE

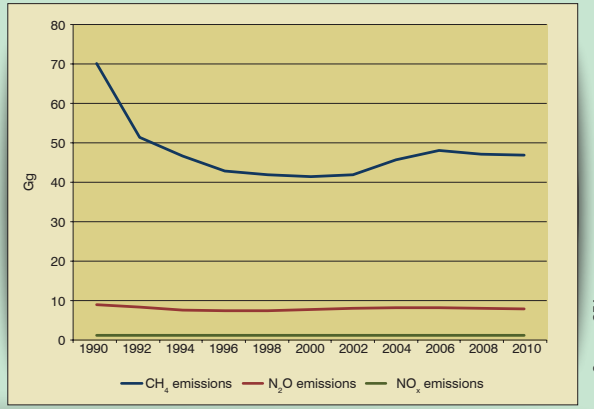
Methane and Nitrogen Oxide Emissions from Agriculture

Agricultural activities are a source of emissions of greenhouse gases and pollutants into the atmosphere. Methane (CH_4) contributes largely to total greenhouse gas emissions and nitrogen oxides – nitrous oxide (N_2O) and nitrogen oxides (NO_x) pose a threat to ecosystems, because in elevated concentrations they cause acidification and eutrophication.

Trend and Current State

In 2010 the agricultural production contributed to total greenhouse gas emissions in Croatia with 11.42% (3 326.88 Gg CO_2-eq). The most important greenhouse gas coming from this sector is CH_4 which is a direct product of animal metabolism (enteric fermentation ≈ 80%) and anaerobic decomposition of manure (≈ 20%). Ruminants (cattle and sheep) are the major methane producers. The CH_4 quantity depends on the number of animals, the digestive tract of the animal and the quantity and type of animal feed. In the period 1990-2000 CH_4 emissions showed a steady downward trend as a result of a decline in livestock production (49% decrease in the livestock number). The period 2001-2006 has seen a 16.8% increase which followed the rise in activities of this branch of agriculture. At the EU level the share of greenhouse gases coming from agriculture is 9% which is 2% lower compared to 1990. N_2O and NO_x emissions are directly related to the manure management method, soil cultivation procedures, cultivation technologies and the kind of crops. In the period 1990-2010 values of N_2O and NO_x emissions did not change considerably.

Methane and nitrogen oxides emissions



Source: CEA

WASTE MANAGEMENT

Quantity of PCB Containing Equipment

Polychlorinated biphenyls (PCBs) are synthetic aromatic chlorinated compounds which have excellent insulating properties and are used in equipment such as capacitors and transformers. Due to their persistence and broad and uncontrolled industrial application in the past, the PCBs have become one of the major persistent organic environmental pollutants.

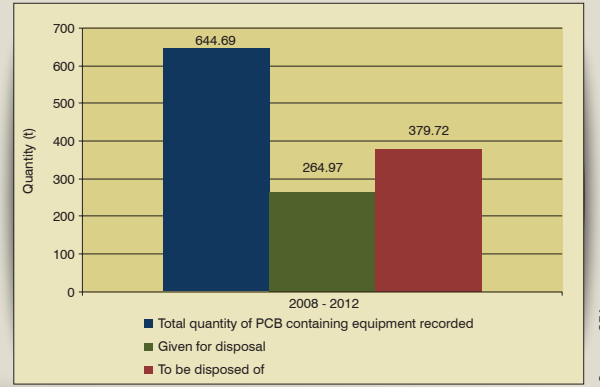
Trend and Current State

The owners of PCB containing equipment[16] were required to put such equipment out of operation and dispose of it by the end of 2010 in the manner as laid down by the Ordinance[17]. According to the CEA data the disposal process of such equipment has not been completed yet. A total of 111 owners of PCB containing equipment were recorded late in 2012 (52 have disposed of all the equipment). Since the beginning of the Ordinance application a total of 644.69 tonnes of PCB containing equipment were recorded, of which 264.97 tonnes were given for disposal. The quantity of 379.72 tonnes remains to be disposed of (2 389 capacitors and 93 transformers), of which 245.32 tonnes (65%) are owned by five companies. The process of disposing of the used and purchasing new equipment has been slowed down by the economic crisis. Therefore a part of the PCB containing equipment is still in use, i.e. not disposed of yet.

[16] PCB containing equipment is any equipment or a device that contains or has contained PCBs, such as transformers, capacitors, containers for residual substances and similar, which are not decontaminated and which are handled as if containing PCBs, unless the analysis carried out by an accredited laboratory proves otherwise.

[17] Ordinance on the Management of Polychlorinated Biphenyls and Polychlorinated Terphenyls (OG 105/08)

Total quantity of PCB containing equipment



Source: CEA

WASTE MANAGEMENT

Remediation of Sites Contaminated by Waste

Sites contaminated by waste (the so-called "black spots") are a result of many years of inadequate management of production waste and pose a threat to the environment and health. The Strategy[18] and the Plan[19] have identified the priority and other sites contaminated by waste whose remediation will be financed or co-financed by the EPEEF.

Trend and Current State

Out of nine priority sites contaminated by waste the EPEEF has financed the remediation of two (slag disposal sites – TE Plomin and the Bakar Coke Plant) and the remediation of six other sites is under preparation (alumina plant pools-Obrovac, oily sludges-Botovo, Sovjak-Rijeka pit, slag disposal site / former Jugovinil at the Kaštela Bay, Lemić Brdo near Karlovac and phosphoric gypsum disposal site of the Kutina Petrochemical Industry). Remediation relating to Salonit d.d.in bankruptcy is carried out through four projects (three are executed[20] and the project for Kosica coastal area is under preparation). Four more sites are identified by the Plan, of which two are remediated (Borovo plant in Vukovar and Šalbunara beach on the island of Biševo), the remediation of the TEF Šibenik site is underway and the remediation of DIV (former TVIK-Knin) is under preparation. All of these 13 sites cover an area of approximately 710 000 m^2.

[18] Waste Management Strategy of the Republic of Croatia (OG 130/05)

[19] Waste Management Plan of the Republic of Croatia for the period 2007-2015 (OG 85/07, 126/10, 31/11)

[20] Remediation of asbestos-cement waste in the factory yard, Mravinačka kava and „Omladinac" football playground in Vranjic is completed.

Remediation of sites contaminated by waste

Source: EPEEF; prepared by: CEA

ENERGY

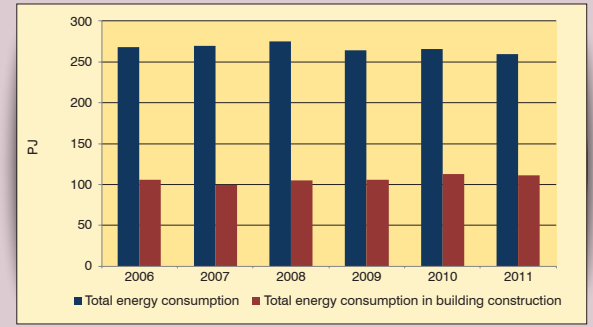
Energy Consumption in Building Construction Compared to Total Energy Consumption

Contemporary standards of life require the compliance with sustainable development principles and make the construction of energy efficient buildings a necessity and an obligation. In most cases the existing buildings do not possess adequate energy properties and it is therefore very important that they are upgraded. National objectives for energy efficiency in building construction[21] are defined by the National Energy Efficiency Programme for the period 2008 - 2016.

Trend and Current State

In the period under consideration the share of the building construction sector in total energy consumption is about 40% which lies within the framework of consumption at the level of EU-27. The highest level of energy consumption in buildings (112.53 PJ) was recorded in 2010 (43%). Although energy consumption in buildings shows an upward tendency[22], the highest energy saving potentials lie in this very sector, as well as a high potential for rational and efficient energy use accompanied by the conservation of energy resources and the environment. The 2012 Physical Planning and Building Act[23] made the energy certification of buildings obligatory and thus gave high priority to energy efficiency and sustainable building. At the implementation level the EPEEF plays an important role in providing financial resources to promote sustainable building within the framework of energy efficiency programmes and projects. In 2011 a total of 9.6 million kuna were invested for this purpose.

Share of energy consumption in building construction in total energy consumption



Source: EIHP

[21] The building construction sector includes the housing sector (households) and the service sector.
[22] Heating, hot water supply and air-conditioning have the largest share in energy consumption in buildings. Most of inhabited buildings constructed in the past have no adequate thermal protection.
[23] OG 76/07, 38/09, 55/11, 90/11, 50/12

INDUSTRY

Facilities Liable to Report to the Pollutant Emission Register (PER)

Environmental pollution is monitored, among other things, through data on emissions and waste quantities reported by facilities (polluters) to the Pollutant Emission Register (PER). The PER was established on the basis of the Ordinance[24] and represents a set of information on sources, types, quantities, methods and places of the release, transfer and disposal of pollutants and waste to the environment.

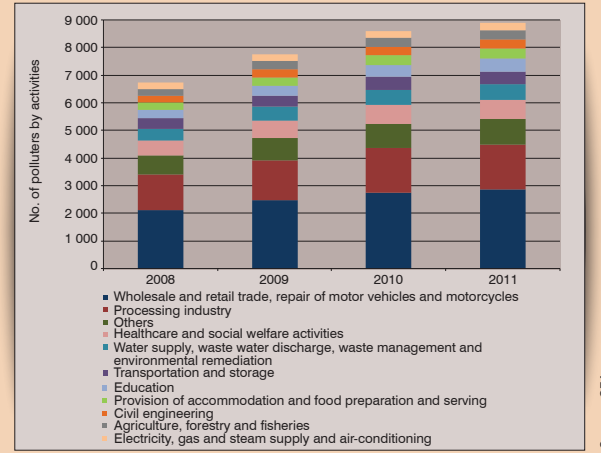
Trend and Current State

Facilities liable to report to the PER, they supply information at the level of the headquarters of the economic operator and the organizational unit (OU)[25]. 6 723 locations were reported in 2008 and 8 894 in 2011. As regards emissions of five major pollutants to the atmosphere (CO_2, CO, NO_2, SO_2 and PM_{10}), the highest share of air pollution reported originates from installations using large combustion plants (capacity over 50 MW) and from the production of cement, bricks, roof tiles and asphalt. The major sources of pollutant emissions from wastewater were continuously the following activities: oil industry, iron, steel and metal industry, wood and pulp industry, industry of inorganic chemicals, industry of organic chemical products, production of animal and plant produce, intensive livestock breeding and fish-farms. The largest quantity of production waste in 2008 was reported from inorganic chemical processes and in 2011 from waste treatment plants and municipal waste treatment plants, drinking water treatment plants and industrial water treatment plants.

[24] Ordinance on Pollutant Emission Register (OG 35/08)

[25] In some cases the headquarters is at the same time the organizational unit; in terms of environmental pollution the number of organizational unit represents therefore the number of environmental polluter locations.

Facilities liable to report to the PER



Source: CEA

INDUSTRY

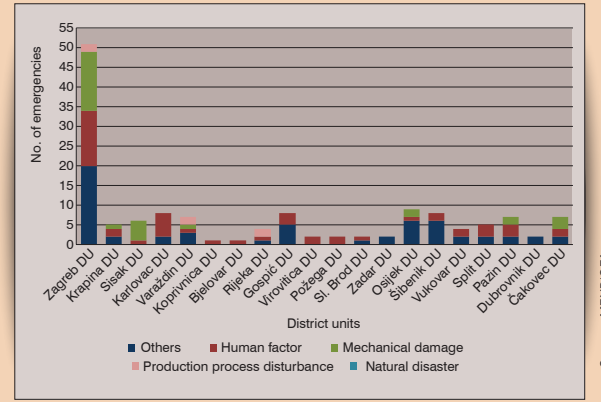
Number of Emergencies by Counties and Causes of Environmental Pollution

Emergency situations in the Republic of Croatia are reported by citizens and/or county 112 Centres of the NPRD. Depending on the nature of the emergency, the firemen, the police, the ambulance, authorized companies and other responsible inspectors apart from environmental inspectors are sent to the emergency site. Environmental inspectors decide on the spot on emergency measures that need to be taken to prevent further pollution and to eliminate consequences of pollution, which include soil remediation, clearing up the roadway, hazardous waste disposal, fire extinguishing, etc.

Trend and Current State

The EI received 192 reports on emergency situations in 2011 through 112 Centres of the NPRD. The greatest number of emergencies (51) was recorded in the Zagreb[26] district unit (DU) which is primarily due to the fact that Zagreb is the major industrial and traffic centre. The most frequent causes of pollution include human factor (48), mechanical damage[27] (29) and others/unknown (58), which most often relates to waste discarded by an unknown person and unpleasant odours. Only six emergency situations recorded in 2011 were caused by a production process disturbance and not a single one by natural disasters

Distribution of the number of emergencies in Croatia in 2011



Source: MENP/CEA

[26] Zagreb DU includes the City of Zagreb and the County Zagrebačka
[27] E.g. gas pipeline leakage, pollutant discharge from the production process, etc.

TOURISM

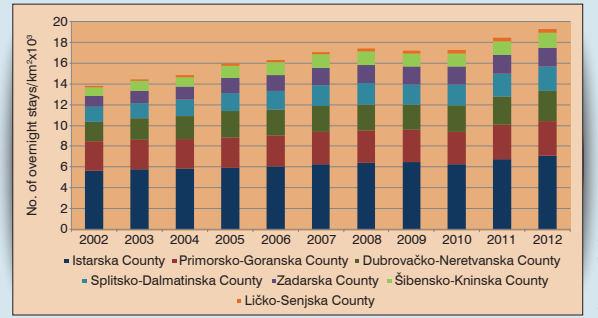
Environmental Load of Tourism on Coastal Counties of the Republic of Croatia

The number of tourist overnight stays by the area of the county (no. of overnight stays/km^2) reflects not only the density of tourist traffic, but also the environmental load of tourism industry caused by tourists staying in a specific area. This load is the greatest during summer months in seven coastal counties[28].

Trend and Current State

Since 2002 the number of overnight stays of tourists in coastal counties has been showing a considerable upward trend – from 43 077 982 overnight stays in 2002 to 60 304 320 in 2012. The Istarska County accounts for the highest number of overnight stays in 2012 (19.88 million) which is a share of almost 33% of the total number of overnight stays recorded in coastal counties. In this county the number of tourist overnight stays per km^2 of the county area amounts to 7.07 which is a 24.6% rise compared to 2002 when this number was 5.67. The following is the Primorsko-Goranska County with 3.4 overnight stays/km^2, or 11.97 million of overnight stays recorded. The least environmental load is felt in the area of the Ličko-Senjska County with 0.34 overnight stays/km^2 and 1.82 million overnight stays recorded. However, although its share is low, the Ličko-Senjska County has seen the greatest increase in tourist overnight stays both in terms of the number and the area, i.e. more than 110% in the period under consideration

No. of overnight stays per km^2 of coastal counties



Source: CBS

[28] Coastal counties: Istarska, Primorsko-Goranska, Ličko-Senjska, Zadarska, Šibensko-Kninska, Splitsko-Dalmatinska and Dubrovačko-Neretvanska have together a 96% share of the total overnight stays recorded in Croatia.

FISHERIES

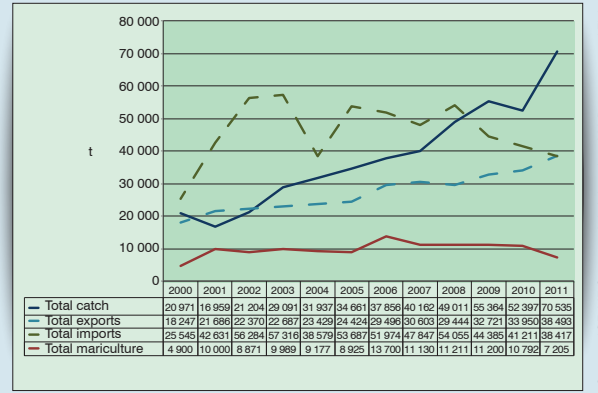
Sea Fishing and Mariculture

Apart from their economic advantages, sea fishing and mariculture may also have a negative impact on the marine ecosystem. It is therefore necessary to implement adequate measures for the protection of special habitats and resources.

Trend and Current State

The increase in catch recorded in the last decade relates primarily to small oily fish (pilchard and anchovy), although the annual catch of crabs and cephalopods shows an upward tendency too. The total catch of marine organisms in 2011 reached the record 70 535 tonnes, with the highest share of oily fish (91%), followed by white fish (6.4%) and cephalopods and crabs (2.46%). The annual production in mariculture amounts to some 11 000 tonnes and takes place at 63 fish farms (in cages) and 223 shellfish farms (open-type farms). The data on the drop of production in 2011 is considered a consequence of the introduction of a new data collection system. Exports continue to rise. In 2011 a total of 38 417 tonnes of fish products (bluefin tuna, salted and fresh anchovy, canned pilchard and fresh farm-raised sea bass) were exported. Croatia still imports considerable quantities of cheap fishery products (herring intended for feeding farm-raised tuna) and exports high-quality types which might be a significant advantage in market development. Estimates of the direct share of fisheries in the GDP are in range from 0.2 to 0.7%.

Marine organisms exports, imports, catch and fish farming



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total catch	20 971	16 959	21 204	29 091	31 937	34 661	37 856	40 162	49 011	55 364	52 397	70 535
Total exports	18 247	21 686	22 370	22 687	23 429	24 424	29 496	30 603	29 444	32 721	33 950	38 493
Total imports	25 545	42 631	56 284	57 316	38 579	53 687	51 974	47 847	54 055	44 385	41 211	38 417
Total mariculture	4 900	10 000	8 871	9 989	9 177	8 925	13 700	11 130	11 211	11 200	10 792	7 205

Source: IOF, MF Customs Administration, MA Department of Fisheries

TRANSPORT

Transportation of Dangerous Substances

Transportation of dangerous substances means the carriage of substances likely to have harmful effects on human health, cause environmental pollution or incur material damage. Transportation or handling and carriage of dangerous substances are defined by the law[29] and the Ordinance[30].

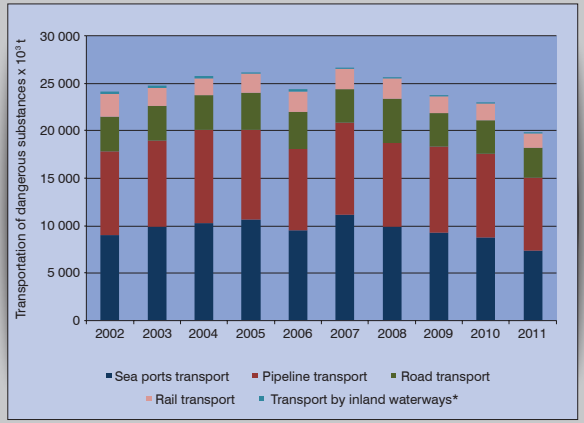
Trend and Current State

Dangerous substances are transported by road and railway and loaded and unloaded in sea ports and inland waterway ports. Oil and gas are conveyed by pipelines. A total of 19.9 tonnes of dangerous substances were transported in 2011, which is the smallest quantity recorded in the period 2002 - 2011. The largest volumes of such goods are transported through sea ports, which is due to international transportation of oil and oil derivatives. Apart from the sea transport, dangerous substances (oil and gas) are also conveyed by pipelines. The transportation of dangerous substances through sea ports and by pipelines accounts for as much as 75% of the total volume of transport of such goods. This is followed by road transport which has shown a downward trend in recent years. The greatest decrease is recorded in rail transport of dangerous substances (which is environmentally most friendly) as a result of the fact that railway is losing importance (a 35% drop in the period under consideration) primarily due to insufficient investments in the railway infrastructure.

[29] Dangerous Goods Transportation Act (OG 79/07)

[30] Ordinance on Handling Dangerous Substances, Conditions and Methods of the Carriage by Sea, Loading and Unloading of Dangerous Substances, Bulk and Other Cargo in Ports, and the Method of Preventing the Spreading of Oil Spills in Ports (OG 51/05, 127/10, 34/13)

Transported quantities of dangerous substances by the mode of transport



*Since 2003 transportation of dangerous goods by inland waterways is exclusive of transit.

Source: CBS

HEALTH AND SAFETY

Life Expectancy

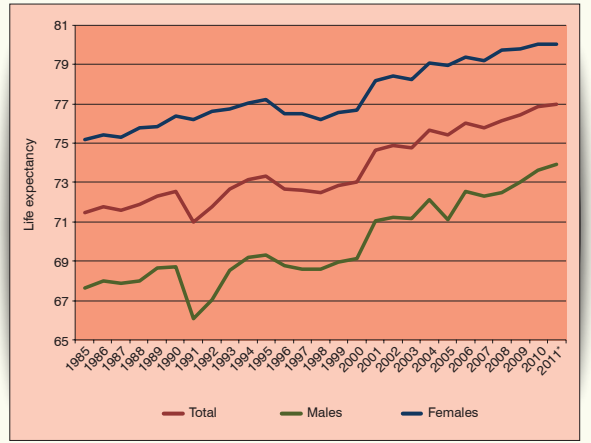
The life expectancy[31], apart from other determinants of health[32], is considerably affected by degradation of environmental quality. According to the WHO, air pollution, excessive noise, chemicals, poor water quality and loss of natural areas may contribute to the increase in the number of diseases which account for 15-20% of total mortality rate.

Trend and Current State

In the Republic of Croatia life expectancy at birth for both genders together in 2011 amounted to 77 years (80.3 years in EU-27), or rather 80 years for females and 73.9 years for males. During the period under consideration life expectancy for both genders showed an upward trend and the difference between genders grew smaller, except during the Homeland War when this difference was the greatest (as much as 10.16 years in 1991) due to a large number of young men killed in war operations. According to the available data showing the extension of life expectancy it may be concluded that the quality of life has improved during the years which was certainly affected by environmental determinants of the health of general, working and recreational environment.

[31] Life expectancy is the expected number of years of life remaining, if the level and causes of mortality in the person's year of birth remain the same during the whole life.
[32] Apart from environmental quality factors, the determinants of human health include the gender, the age, the socio-economic status, life habits and genetics.

Life expectancy in the Republic of Croatia



Source: WHO/CBS

** data in 2011 according to internal documents CBS, 2012*

GENERAL ENVIRONMENTAL ISSUES

Inspection Measures in Environmental Protection

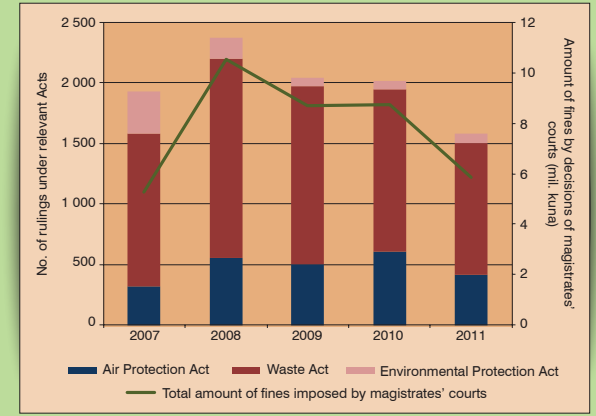
The Environmental Inspection (EI) is tasked with the implementation of the Environmental Protection Act, the Air Protection Act and the Waste Act[33] including other regulations adopted in pursuance of the laws mentioned. Besides, the EI cooperates with 11 inspectorates from several ministries and the State Inspectorate in carrying out coordinated inspections.

Trend and Current State

In 2011, 4 865 entities were subject to the control of 84 inspectors who carried out a total of 7 228 inspections. During the period 2007-2011 the number of inspections increased 9.5% primarily because of the need to bring the activities of operators in line with the new legislation. Most of the rulings issued related to checking the compliance with the Waste Act where the number of operators was the highest. Similarly, the majority of indictments (80%) and the fines imposed related to the failure to comply with this Act. In the period under consideration the total number of rulings decreased 18% (from 1 926 rulings in 2007 to 1 579 in 2011) as a result of inspections carried out and the improved compliance with the conditions laid down, as well as the fact that an ever larger number of entities subject to inspection act upon the measures imposed on them. The highest amount of fines imposed by decisions of magistrates' courts was recorded in 2008 (10 524 250 kuna) after which it continues to decrease (5 872 280 kuna in 2011).

[33] The Environmental Protection Act (OG 110/07), the Air Protection Act (OG 130/11) and the Waste Act (OG 178/04, 111/06, 60/08, 87/09)

Number of rulings issued by EI and the amount of fines imposed by decisions of magistrates' courts



Source: EI

PUBLIC RELATIONS

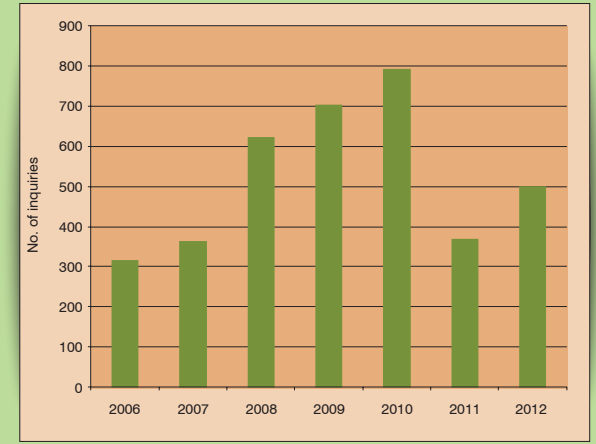
Public Inquiries Addressed to the Croatian Environment Agency

The Croatian Environment Agency (CEA) monitors, collects, processes, shares and stores environmental data and information and publishes them in form of reports, communications and databases on its website (*www.azo.hr*). The general public may also require other information and data by submitting inquiries (primarily through *info@azo.hr*).

Trend and Current State

In the period 2006-2012 the CEA received a total of 3 715 inquiries relating mostly to waste issues (47%). General environmental issues were the subject matter of 7.6%, air/climate changes of 5.5% and waters/sea of 4.1% of inquiries. Inquiries relating to soil issues accounted for 1.6%, sectoral impacts for 1.6% and the biodiversity issues for 0.9% of all requests for information. The structure of applicants has not changed substantially. More than half of a total of 2 961 applicants (51%) were private companies which recognized environmental data and information as a profitable business opportunity. The interest of citizens continues to be high (17%). The share of inquiries received from local self-government units and foreign institutions and companies amounted to 7% each, while the scientific community, state-owned companies and ministries participated in the total number of inquiries with 4% each. Non-governmental organizations submitted 2% of all inquiries and public institutions, schools and healthcare institutions 1.5% each. The smallest number of inquiries (1%) was submitted by participants in various projects.

Total number of inquiries submitted to the CEA



Source: CEA

THE ENVIRONMENT IN YOUR POCKET

Abbreviations

As – Arsenic

C – Carbon

CAA – Croatian Agricultural Agency

CBA – Croatian Beekeeper Association

CBS – Central Bureau of Statistics

Cd – Cadmium

CEA - Croatian Environment Agency

CFRI – Croatian Forest Research Institute

CGS – Croatian Geological Survey

CH_4 – Methane

CO – Carbon monoxide

CO_2 – Carbon dioxide

CO_2 –eq – Carbon dioxide equivalent

CPHI – Croatian Public Health Institute

Cr – Chromium

Cu – Copper

EI – Environmental inspections

EIHP –Energy Institute Hrvoje Požar

EPEEF – Environmental Protection and Energy Efficiency Fund

EU – European Union

Gg – Gigagram (10^9 g)

GDP – Gross domestic product

ha - hectare

Hg – Mercury

IOF – Institute for Oceanography and Fisheries

LULUCF – Land Use, Land-Use Change and Forestry

LV - Limit value

MA – Ministry of Agriculture

ME – Ministry of Economy

MENP – Ministry of Environmental and Nature Protection

THE ENVIRONMENT IN YOUR POCKET

Abbreviations

MF - Ministry of Finance

MHS – Meteorological and Hydrological Service

MMATI – Ministry of Maritime Affairs, Transport and Infrastructure

MP – Management plan

MW – Megawatt (10^6 W)

N – Nitrogen

NO_x – Nitrogen oxides

NO_2 – Nitrogen dioxide

N_2O – Nitrous oxide

NP – National park

NPRD - National Protection and Rescue Directorate

OG – Official Gazette

OG-IT – Official Gazette – International Treaties

OU – Organizational unit

PA – Port authority

Pb – Lead

PCB – Polychlorinated biphenyls

PER – Pollutant Emission Register

PJ – Petajoule (10^{15} J)

PM_{10} – Particulate matter (less than 10 μm in diameter)

RES – Renewable energy source

SO_2 – Sulphur dioxide

TE Plomin – Plomin Thermal Power Plant

TEF Šibenik – Šibenik Electrodes and Ferroalloys Manufacture

toe – Tonne of oil equivalent

WHO – World Health Organization

Zn – Zinc

THE ENVIRONMENT IN YOUR POCKET

Glossary

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

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

Emergency – A kind of situation caused by uncontrolled incidents or impacts that pose an immediate risk to human life and health and have a negative effect on the natural environment.

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

Eutrophication – A process by which water is enriched by nutrients and nitrogen and/or phosphate compounds which favour the growth of algae and higher forms of plant species, causing imbalance in aquatic ecosystems and changes in the status of waters.

Fisheries – A branch of economy devoted to the catching of fish and related activities (raising, selling and processing of fish, shipbuilding, fish processing industry).

Fishing effort – Means a product of the fishing capacity and activities of a fishing vessel in specific forms of fishing

Fossil fuels – Fuels formed from organic remains of plants and/or animals (oil, natural gas, coal and peat).

Garrigue – Degraded maquis of lime-tolerant bushy evergreen species.

List of measuring stations where the trophic index was monitored in 2011:

OC01 Dubrovnik
OC03 Ploče
OC04 Cetina
OC05 Splitska vrata
OC06 Kaštelanski Bay
OC07 Vranjic
OC08 Primošten
OC09 Šibenik (bay)
OC10 Šibenik (St. Ante channel)
OC11 Zadar (Gaženica)
OC12 Zadar
OC13 Petrčane
OC14 Crikvenica
OC15 Bakarski Bay
OC16 Riječki Bay
OC17 Kvarner
OC18 Rovinj
OC19 5 Nm off Rovinj
OC20 5 Nm off Umag

Mariculture – Breeding of marine organisms for commercial purposes

Transitional waters – 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.

Trophic index (TRIX) – A synthetizing indicator of water loads taking into account the level of nitrogen, phosphorus and chlorophyll, oxygen saturation and water transparency.

The Environment In Your Pocket 1 - 2013

CROATIAN
ENVIRONMENT AGENCY