THE ENVIRONMENT IN YOUR POCKET | 1 - 2006

CROATIAN
ENVIRONMENT AGENCY

THE ENVIRONMENT IN YOUR POCKET

THE ENVIRONMENT IN YOUR POCKET I – 2006

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CEA – Croatian Environment Agency

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Cover page:
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Print run:
500 copies

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Printed on recycled paper.

THE ENVIRONMENT IN YOUR POCKET

Introduction

Welcome to the second edition of our annual brochure The Environment in Your Pocket, which gives an overview of selected environmental indicators for Croatia for 2005.

The interest aroused by the first edition confirms that we are on the right track to achieve our goal: to present the state of the environment and change trends in a concise and easy-to-understand fashion. The Environment in Your Pocket I-2005 was picked up by many, from environmental health inspectors, media people, experts in different disciplines, local government and self-government officials, to elementary school pupils and university students.

The indicators presented in this edition are only a part of a greater group of indicators for each environmental aspect. Most of the indicators we selected for this brochure are new, not included in the 2005 edition, because we wanted to broaden the range of indicators presented to our readers and to show the progress we have made in ensuring the quality of data needed for the calculation of indicators for air, water, sea, soil, waste and biodiversity.

In the long term, only mandatory systematic monitoring of the state of the environment in all the areas, in line with the practice pursued by EU member countries, will ensure quality, traceable and comparable data for the calculation of indicators, and therefore for environmental assessment.

Environmental information is essential for informed decision-making as well as knowing how the state and loads of particular environmental components facilitate systematic planning and monitoring of environmental policy at all decision-making levels. Furthermore, all citizens of Croatia have the right to accurate, timely and complete information on the environment.

Today more than ever, the environment is in the focus of not only the Croatian professional community but also of the general public. Croatia's status of an EU candidate country and the fact that the environment will be a serious topic in future negotiations will bring numerous additional obligations and pressures in this sector. However, the process is expected to produce positive effects, such as speedier establishment of environmental monitoring and reporting systems and the building of mechanisms for easier, faster and simpler access to environmental information.

We believe that this brochure will contribute to achieving the above objectives, that you will find it interesting and useful and that it will help in the monitoring of the state and changes of the environment in which we live.

Croatian Environment Agency

THE ENVIRONMENT IN YOUR POCKET

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THE ENVIRONMENT IN YOUR POCKET

Basic data

Mainland surface area	56 594 km^2
Territorial sea surface area	31 067 km^2
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 and 426, respectively)
Population	4 437 460
Population density per km^2	78.5
Agricultural households	448 532
Inhabited islands	47
Language	Croatian
Alphabet	Latin
Political system	Parliamentary democracy
GDP per capita in 2005	EUR 6 972

AIR- CLIMATE

Nitrogen dioxide (NO_2)

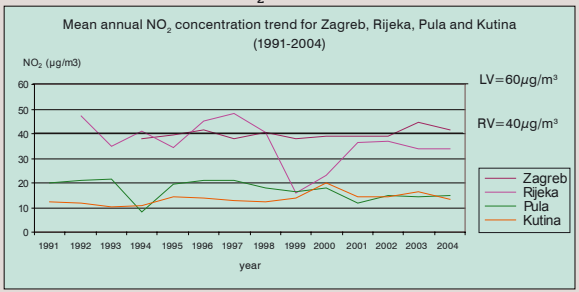
Nitrogen dioxide is a reddish-brown gas soluble in water. Its inhalation causes irritation of airways and damages tissues. It is known to cause greater incidence of respiratory allergies because it affects the immunity of an organism. NO_2 also contributes to acidification, eutrophication and generation of smog.

Trend and current state

The main source of NO_2 emission is liquid fuel combustion, and it is therefore considered as a typical pollution indicator. The greatest contribution of NO_2 emission comes from road transport (about 39% in 2003) and stationary power sources. Stations in the cities listed below have been permanently monitoring and measuring NO_2 since 1991. The NO_2 concentration measurement results for these cities were compared with the recommended values (RV) and limit values (LV) to determine air categories*.

During the period of monitoring, the recommended value (RV=40 $\mu g/m^3$) was never exceeded in Kutina and Pula, and the air quality was of category I. In Zagreb, about 50% of the measured results belonged to category II air quality (40—60 $\mu g/m^3$), and in Rijeka about 45% of measured NO_2 concentrations placed it in category II air quality (40—60 $\mu g/m3$). Increase in NO_2 concentration in the cities has decelerated mainly as a result of the growing number of catalytic converters fitted to petrol-driven automobiles.

Mean annual NO_2 concentration trend



Sources: CEA, IMROH

* Regulation on Recommended and Limit Air Quality Values (OG 101/96)

AIR- CLIMATE

Sulphur dioxide (SO_2)

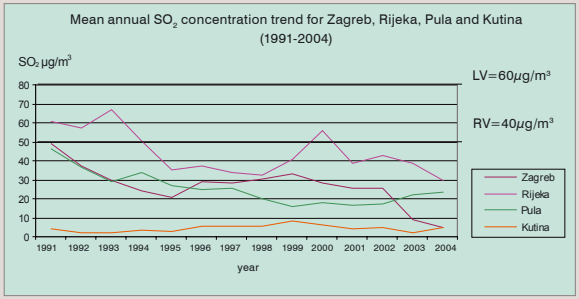
Sulphur dioxide is a colourless gas soluble in water. Increased SO_2 concentrations cause higher incidence of respiratory infections. SO_2 is known as “acid” gas since it chemically binds with water in the atmosphere and returns to earth in the form of “acid“ rain.

Trend and current state

The main source of SO_2 emission is fossil fuel combustion in power plants, energy conversion facilities and industrial combustion processes. Road transport contribution to the total emission is about 9% (2003). Stations in the cities listed below have been permanently monitoring and measuring SO_2 since 1991. The SO_2 concentration measurement results for these cities were compared with the recommended values (RV) and limit values (LV) to determine air categories *.

During the period of monitoring, the recommended value (PV=50 $\mu g/m^3$) was never exceeded in Kutina, Pula and Zagreb, and air quality was of category I. In Rijeka, about 30% of the measured results belonged to category II air quality (50—80 $\mu g/m^3$). SO_2 emission abatement is due to the use of low-sulphur fuels in fossil fuel plants and transport.

Mean annual SO_2 concentration trend



Sources: CEA, IMROH

* Regulation on Recommended and Limit Air Quality Values (OG 101/96)

ENERGY

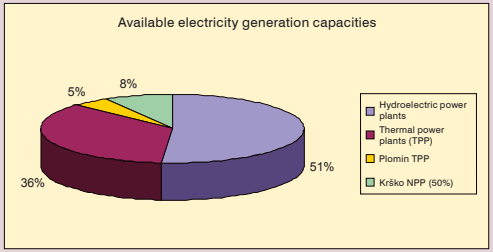
Renewable energy resources

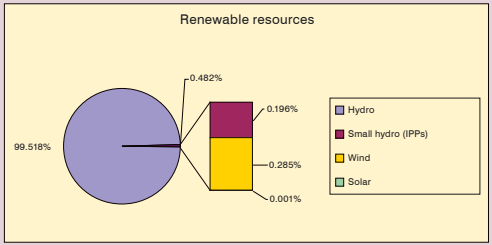
Renewable electricity is considered environmentally sustainable because its CO_2 emission per unit of electricity produced is low. Emission of other pollutants is also generally lower compared to emission from power plants burning fossil fuels. However, it should be borne in mind that hydroelectric power plants, wind parks and solar plants (which are the main renewable energy resources) also impact landscapes, habitats and ecosystems.

Trend and current state

Electricity from renewable resources accounted for 51% of total electricity available in Croatia in 2004. The renewable electricity resources breakdown shows that 99.518% are large and small hydroelectric power plants, 0.196% are hydroelectric power plants owned by IPPs, 0.285% are wind parks, and 0.001% solar plants.

Renewable electricity resources in 2004





Sources: HPEI; HEP; INA Naftaplin; Wood Processing Department, Faculty of Forestry, University of Zagreb

ENERGY

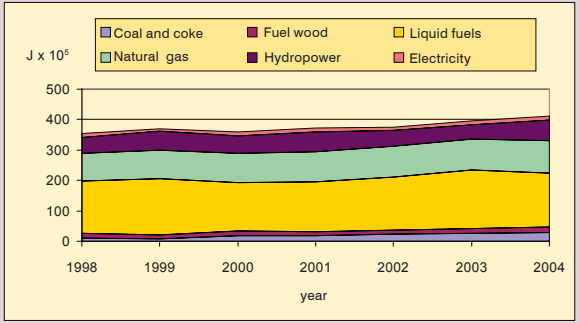
Total energy consumption (1998 – 2004)

Energy consumption is a good indicator of a country's development. A higher development level means higher energy consumption. Depending on its form, energy can have a higher or lower environmental impact. Cleaner energy resources are natural gas, hydropower, wind, etc.

Trend and current state

Total energy consumption in Croatia has increased steadily since 1992. Thus, in 2004 total energy consumption increased by 4.1% compared to the previous year. Although the energy use trend is on the increase, demand for fuel wood, fuel oils and electricity in 2004 decreased compared to 2003. Favourable hydrological conditions resulted in a significant increase of hydropower consumption of 48.5%. Consumption is still dominated by liquid fuels, natural gas and hydropower, which account for 85.7% of total energy consumption.
Total energy consumption per capita is 46.6% lower than in the European Union (EU-15).

Total energy consumption (1998 – 2004)



Year	1998	1999	2000	2001	2002	2003	2004
Total energy consumption (J x 10^5)	353.95	369.77	359.62	371.58	376.23	395.93	412.04

Source: Hrvoje Požar Energy Institute

WATER

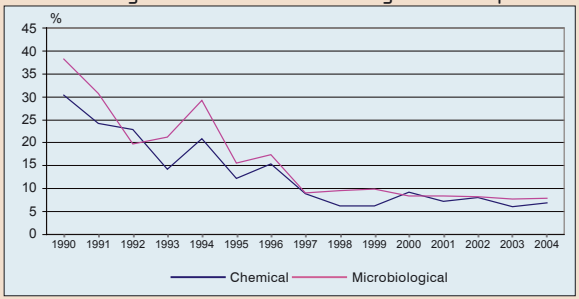
Drinking water quality

Drinking water monitoring is carried out in order to protect the health of the consumers. Drinking water from public water supplies is monitored permanently, while other waters (from private wells and similar) are not included in the monitoring plan and may constitute a health hazard. Drinking water (most often groundwater, less often water from service reservoirs) may be contaminated due to human activities (wastewater, traffic), and it has to be adequately treated before being delivered into the public water supply systems.

Trend and current state

Results of monitoring the quality of drinking water from public supply systems serving 76% of the population indicate that water quality has been constantly improving. Drinking water samples failing to comply with chemical and biological standards[1] have been determined in less than 7.2% and 9.5% cases, respectively. In the event that the quality monitoring results for drinking water are not acceptable, the relevant authority informs consumers and prohibits the use of water for a specified period of time. Although the number of people served by public water supplies is continuously rising, regional variations are significant: from 99% in Dubrovačko–Neretvanska and Primorsko-Goranska Counties, to 39% in Bjelovarsko–Bilogorska County. Settlements on islands and dispersed settlements in rural areas mainly use water from private wells which is not monitored permanently, and about one-third of samples taken indicate microbiological contamination.

Percentage of contaminated drinking water samples



[1]Rules on Drinking Water Quality (OG 182/2004)

Source: CNIPH, prepared by CEA

WATER

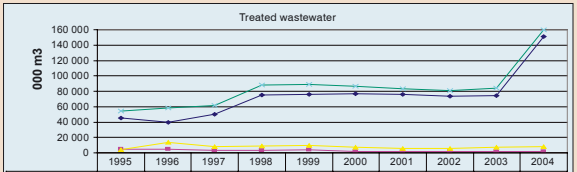
Sewerage system discharge treatment

Public sewerage systems collect and conduct household wastewater, stormwater (which washes away and carries contamination from roads and surrounding agricultural and other land), and treated/untreated industrial wastewater. The collected wastewater is either treated or discharged untreated into the rivers or coastal waters. Wastewater treatment mitigates the risks of the environmental pollution and diminishes threat to wildlife and public health.

Trend and current state

Although the sewerage network construction trend is on the increase (in 2004, total length of city and main sewers was 5 996 km and 1 314 km, respectively), as well as the connection to the public sewerage network (Croatian average is over 40% - over 70% in large cities and under 40% in towns with population less than 10 000), and the population connection to the wastewater treatment increases (altogether 83 plants), the treatment of discharges from public sewerage networks is inappropriate. Generally, the primary (mechanical) wastewater treatment[2] is provided, and only minimum quantity of contamination (dispersed and floating bulk material, sand and gravel) is removed in the process. Use of this treatment method has considerably increased since the Zagreb Wastewater Treatment Plant was put into operation. Thirty-four plants are equipped for secondary treatment. No facility with tertiary wastewater treatment (nutrient removal) has been built yet. No progress has been made in development and use of artificial wetland for wastewater treatment, which is a cost-effective and environmentally sound method of wastewater treatment, particularly for small settlements.

Sewerage system discharge treatment



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mechanical	45 449	39 229	50 063	75 137	75 598	77 149	75 684	73 676	74 734	150 846
Biological	4 867	4 971	3 568	3 546	3 873	1 983	1 998	1 855	1 983	1 522
Combined	4 037	13 809	8 030	9 113	9 314	7 447	5 851	5 665	7 566	7 909
Total	54 353	58 009	61 661	87 796	88 785	86 579	83 533	81 196	84 283	160 277

Source: CBS, prepared by: CEA

[2]National Water Protection Plan (OG 8/99), Rules on Environmental Emission Register (OG 36/96)

SEA AND COASTAL AREA

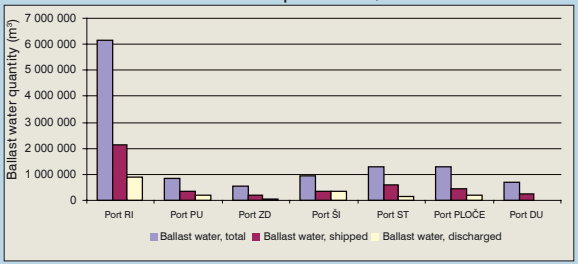
Ballast water

When vessels are emptied of cargo they take on ballast water, along with all the matter dissolved in it and randomly uptaken organisms, for purposes of navigational stability. After cargo is loaded, the ballast water needs to be discharged. In this way, different substances, including marine organisms, are frequently transferred to remote locations. Organisms discharged with ballast water from such vessels could disrupt natural biodiversity and become a direct threat to human health.

Trend and current state

The ballast water problem has been recognised in Croatia as a serious threat to the marine environment. Therefore, collecting of data on discharged ballast water quantities and locations started in January 2005. Ships report ballast water quantities on a voluntary basis. The largest quantity of discharged ballast water has been recorded by the Rijeka Port Authority, since this port handles up to 50% of total cargo unloaded in Croatian ports (data for the period 1994–2004). The Dubrovnik Port Authority, however, received no reports of ballast water discharge. In November 1997, the International Maritime Organisation (IMO) adopted a Resolution on ballast water, and Croatia will continue to act in compliance with its provisions until related national regulations are implemented.

Ballast water quantities, 2005



	Ballast water, uptaken (m³)	Ballast water, shipped (m³)	Ballast water, discharged (m³)
Port RI	6 168 291	2 145 989	896 440
Port PU	826 463	356 413	200 908
Port ZD	546 579	211 896	31 845
Port ŠI	942 053	352 874	346 428
Port ST	1 281 540	573 034	169 113
Port PLOČE	1 293 374	439 556	189 290
Port DU	684 935	238 422	0
MSTTD	11 743 235	4 318 184	1 834 024

Source: MSTTD, prepared by: CEA

SEA AND COASTAL AREA

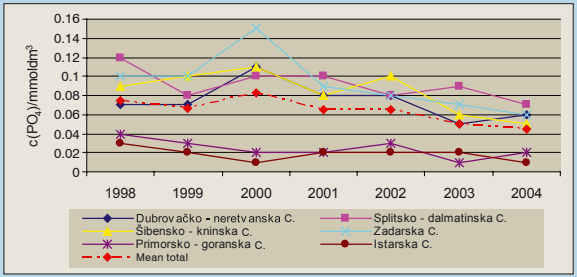
Phosphate concentration

Enhanced concentration of nutrients, primarily nitrogen and phosphorus, has numerous unfavourable effects, collectively known as eutrophication. One of the parameters and limiting factors of eutrophication is concentration of phosphates in water. Since these salts are naturally present in sea water, an increased concentration need not necessarily be caused by human activities (rather by abrasion, erosion, groundwater loads), but it is most often due to discharge of untreated wastewater (municipal, industrial) and agricultural land runoffs.

Trend and current state

Most monitoring stations in the Croatian part of the Adriatic have recorded a relatively low concentration of orthophosphates, and its decreasing trend has been observed. A somewhat higher phosphate concentration has been recorded in Bakar Bay, Northern Adriatic (groundwater loaded with nutrients), and in semiconfined areas of Vranjica, Kaštela and Šibenik Bays, Central Adriatic (wastewater). Nutrient concentrations in Southern Adriatic are relatively low. The orthophosphate concentration decreasing trend along the Istrian coast is probably caused by climate changes which resulted in diminished input of nutrients (River Po). The national list for classification of the coastal sea with regard to eutrophication has not yet been adopted. However, comparison of recorded values with the criteria from the international list[3], which specifies that phosphate concentration below 0.3 mmol/m^3 is one of the criteria classifying sea as oligotrophic, indicates that the situation is very good.

Annual mean concentration of orthophosphates in surface layer of the water column (0-10 m) by counties



Source: IOF, RBI; prepared by CEA

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

FISHERIES AND MARICULTURE

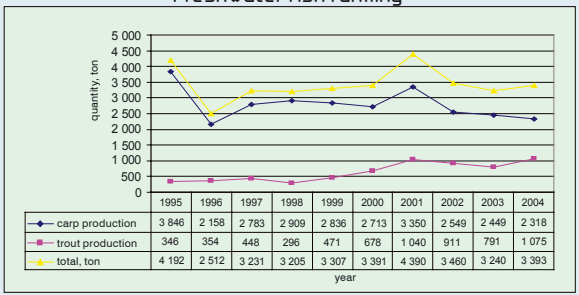
Freshwater fish production

Croatia's resources for production of freshwater organisms are good. Careful planning is particularly important for sustainable use of water in this industry, since fish farms are main sources of nutrients (introduction of large quantities of metabolism products and uneaten food) which may increase eutrophication and negatively affect the ecosystem and farm products. Organic production is recommended for sustainable use of water resources and as a condition for production of quality food[4].

Trend and current state

Production of freshwater species in Croatia is organised as production of cold water species in salmonidal or trout fish ponds (mainly rainbow trout), and warm water species in cyprinidal or carp fish ponds (mainly carp and bighead carp, white carp, tench, pike, catfish, pike-perch). Over the past few years, production in warm water fish ponds (carp), yield per hectare of production area, and number and surface area of active fish ponds for commercial development have been constantly falling. Cold water fish ponds (trout), on the other hand, have increased production and the number of producers. Cold water fish ponds use running water (channels, ponds) of high quality. Since trout production demands that the water is of high quality, cold water fish ponds are located near river springs. Discharge of untreated wastewater from fish ponds into rivers may cause stream water quality degradation. In 2004, 54 concession permits were issued for freshwater production in Croatia.

Freshwater fish farming



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
carp production	3 846	2 158	2 783	2 909	2 836	2 713	3 350	2 549	2 449	2 318
trout production	346	354	448	296	471	678	1 040	911	791	1 075
total, ton	4 192	2 512	3 231	3 205	3 307	3 391	4 390	3 460	3 240	3 393

[4]Rules on Organic Production of Animal Products (OG 13/02)

Source: Department of Fisheries, MAFWM

FISHERIES AND MARICULTURE

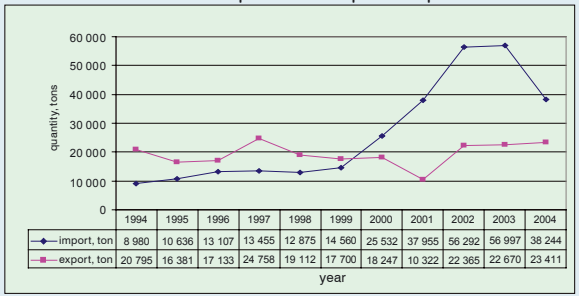
Import and export of fish and fish products

Data on import and export of fish and fish products may be used as indicators of sustainable management of natural resources. They also reflect the intensity of activities in fisheries and aquaculture sectors, and the situation with regard to the supporting national infrastructure for fish marketing (fishing ports, processing industry, etc.). Croatia has ample resources for production of sea organisms in terms of fishing area and high quality sea. Therefore, provided that the rules regulating sustainable fisheries and organic production[4] are complied with, Croatia possesses a high potential for production of fish and other marine products.

Trend and current state

Local market demand (including the processing industry and production sector) is a minimum of 65 000 tonnes of fish a year. With an estimated consumption of 8 kg of fish per capita, Croatia is below the world average (16 kg per capita). The sharp increase in fish imports in 2002 is related to the import of herring for feeding of tuna fish in fish farms, the production of which also increased in the same period. Imports of fish for mariculture brings about a risk of foreign species imports (including parasitic species) and demand intensified control to protect the health of indigenous species and biological diversity of the marine ecosystem. The drop in imports of fish and fish products in 2004 is probably related to stagnation in tuna fish production (caused by limited tuna fish catch quotas) and start the commencement of implementation of the measures from the *National Program for Increase in Production and Consumption of Fish in the Republic of Croatia*, which is expected to ensure sustainable management of this natural resource.

Fish and fish products import/export



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
import, ton	8 980	10 636	13 107	13 455	12 875	14 560	25 532	37 955	56 292	56 997	38 244
export, ton	20 795	16 381	17 133	24 758	19 112	17 700	18 247	10 322	22 365	22 670	23 411

Source: Department of Fisheries, MAFWM

[4]Rules on Organic Production of Animal Products (OG 13/02)

WASTE

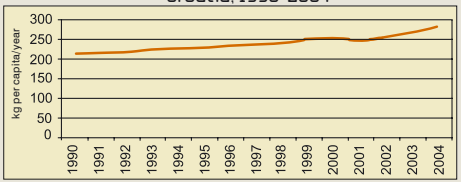
Municipal waste collection

Municipal solid waste (MSW) consists of household and similar waste from processing industry and services. Consumer lifestyle causes generation of this type of waste. Regretfully, most of it ends in landfills, and reduction of landfilled waste quantity depends on efficient separate collection schemes and recycling of individual MSW components.

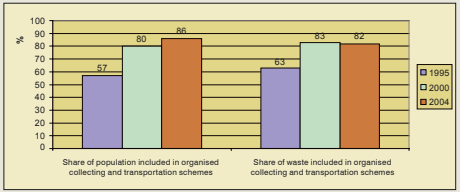
Trend and current state

Total quantity of municipal waste generated in Croatia in 2004 is estimated at 1 310 643 tonnes, i.e. 295 kg per capita a year.
The quantity of collected and landfilled municipal waste is constantly increasing due to the increase in population served by organised waste collection schemes and quantity of waste generated per capita.
In 2004, of 82% of waste collected within a framework of organised schemes, 1 037 500 tonnes were landfilled and about 15 000 tonnes composted. Waste separated for recycling amounted to about 27 000 tonnes, of which about 48% was paper, 42% glass, and approximately 10% other kinds of waste. Waste collection and disposal was carried out by 206 operators. Eight percent of municipalities have not introduced waste collection schemes.

Estimated trends of landfilled municipal waste quantities in Croatia, 1990-2004



Share of population and waste included in organised MSW collecting and transportation schemes, 1995, 2000 and 2004



WASTE

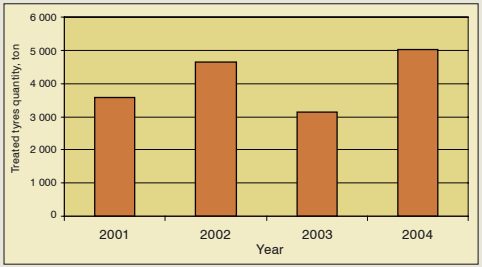
Recovery of used tyres

Used tyres occupy considerable space on landfills, and average tyre decay time is exceptionally long. Used tyres should be recovered or used in power generation (waste-to-energy) rather than disposed of on landfills or, as commonly practised, fly-tipped.

Trend and current state

Used tyre quantities are estimated at somewhere between 20 000 and 30 000 tonnes a year, and they are steadily increasing, which is closely related to the increase in quantity of scrap vehicles. It is estimated that the quantity of scrap vehicles reached 65 650 tonnes in 2003, which is almost three times more than in 2000 (26 247 tonnes).
Although seven companies are licensed for recovery of used tyres, a cement mill has until recently been recovering the complete quantity of tyres (waste-to-energy in thermal process, capacity approximately 7 000 t/year). The remaining used tyres have been disposed of at landfills (tipped separately at some landfills), fly-tipped, or burned in the open. Late in 2005, a new facility for recovery and processing of tyres was commissioned. This, along with new regulations stipulating authorities and responsibilities for used tyre management and setting up a procedure for treatment of the earlier disposed tyres, should make a considerable contribution to adequate disposal of used tyres.

Quantities of thermally treated tyres, 2001-2004



Year	Quantity, t
2001	3 590
2002	4 640
2003	3 129
2004	5 022

Source: CEA

WASTE

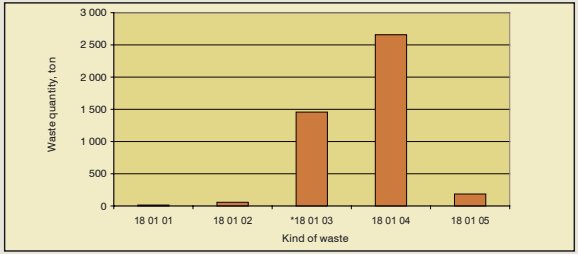
Medical waste

Medical waste is potentially a higher public health hazard than any other kind of waste because it sometimes contains hazardous and infectious material. The largest share of waste (86%) generated in health care institutions is not dangerous, but the remaining 15% is pathological, infectious, pharmacological and chemical waste which demands special care and adequate disposal procedures.

Trend and current state

In 2004, a total of 4 384 tonnes of waste from health care institutions was reported, most of it being generated in the City of Zagreb. Potentially infectious waste, which should not be disposed of without re-treatment, accounts for a significant share of this figure. Health care institutions rarely treat their waste themselves. Waste from a large number of institutions is collected by a dozen licensed operators, and some of that waste is disposed of without re-treatment. In 2004, 1 656 tonnes of potentially infectious waste (18 01 03*) was treated, of which 90% was sterilised by two licensed facilities. Incineration of 57 tonnes of potentially infectious waste was declared, and 35 tonnes of other kinds of medical waste were treated at four sites. A hundred and sixty-one tonnes of waste medicines were exported to Austria and Germany, along with 2.5 tonnes of other medical waste.

Quantity of waste reported to the EER for 2004



Waste code	Waste description	Quantity, ton
18 01 01	Sharp objects	14
18 01 02	Parts of human body and organs, blood bags and tins	64
*18 01 03	Other waste collected and disposed of under stringent stipulations to prevent infections	1 460
18 01 04	Waste not collected and disposed of under stringent stipulations to prevent infections (e.g. laundry, gypsum bandages, disposable clothes, linen, diapers)	2 654
18 01 05	Used chemicals and medicinals	192
18 01 00	TOTAL	4 384

Source: CEA

SOIL AND AGRICULTURE

Areas under organic farming

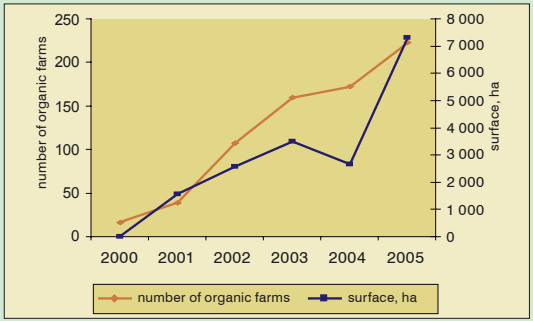
Organic farming is aimed at preservation of the ecological and regulating aspect of soil and, at the same time, enabling its production role. In the EU, an average of 15-20% of total arable land is under organic agriculture.

Trend and current state

While in 2000 only 12 ha of land were devoted to organic agriculture, in 2005 its surface increased to 7 300 ha (about 0.2% of total arable land), which is an increase of approximately 600 times. Most of this land (almost 75.5% of land under organic agriculture) is located in two counties: Primorsko-Goranska (54.6%) and Osječko-Baranjska (20.9%). No farm in the City of Zagreb or Dubrovačko-Neretvanska County has been entered into the *Directory of Producers in Organic Agriculture and Food Production.*
Most of the land used for organic farming is under meadows and pastures (63%), and arable land (35%), while orchards, vineyards, olive groves and forests occupy only 2% of land under organic agriculture. Most of the meadows and pastures are located in Primorsko-Goranska, Zadarska and Šibensko-Kninska Counties, while organic agriculture is more common in Osječko-Baranjska, Zagrebačka and Požeško-Slavonska Counties.

Although the *State Subsidies Act* of 2002 introduced subsidies for organic agriculture, most producers are reluctant to use them. In summer 2005, the number of entries in the *Directory of Producers in Organic Agriculture and Food Production* totalled 223.

Organic farms and organically farmed land, 2000—2005



Source: MAFWM

SOIL AND AGRICULTURE

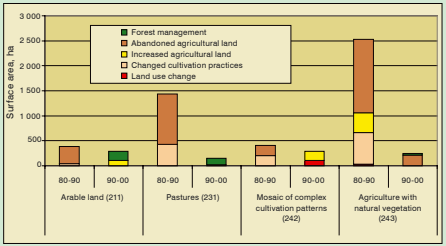
Agricultural land use change in protected areas

Decrease in agricultural production and its abandonment diminishes natural diversity in an area. The most negative effect is that of abandoning cattle grazing and meadow mowing. Since the local climate is characterised by climax of forests vegetation, bushes and pioneering tree species are fast colonising uncultivated pastures and meadows and thus diminishing their natural diversity. Neglected underbrush and forests enable spreading of fires, which is a particular hazard.
This indicator is monitored using land cover database CLC2000.

Trend and current state

Significant changes were noticed during the period 1980–1990, when a total of 4 758 ha of agricultural land changed its use. The most intensive changes occurred *with land principally occupied by agriculture, with significant areas of natural vegetation*, where almost 50% of the surface was left to forest vegetation succession. About 40% of land was converted to agricultural use, of which 15% was to arable land. A relatively small area (about 30 ha) was used for expansion of settlements. Somewhat less intensive but still significant changes, occurred in the category of *pastures* - over 70% of the area was abandoned or left to forest vegetation succession, and the remainder changed to growing other cultures.
From 1990 to 2000, 973 ha of land changed its use. The trend of neglecting agricultural land has reached the stage where land has been completely taken up by forest vegetation, particularly *meadows* and *pastures*. During this period, settlements development extended particularly to those areas with a *mosaic of complex cultivation patterns*.

Course of agricultural land use change in protected areas



Source: CEA

SOIL AND AGRICULTURE

Share of agricultural land in nature protection areas

To maintain the high biological value of protected areas, it is important to be familiar with agricultural practices. This indicator is monitored on the basis of data on participation (share) of agricultural areas within nature protection areas. The calculation is based on land cover and land use database CLC2000.

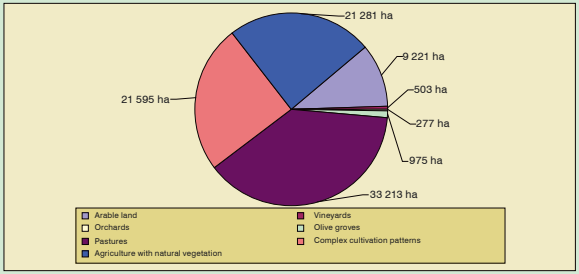
Trend and current state

The protected area in Croatia totals 553 451 ha, which is almost 10% of its total mainland territory. The protected areas include 87 065 ha of agricultural land. Therefore, about 16% of the protected area is under agricultural production. According to the agricultural land use, protected areas are pastures (6%), areas with complex cultivation patterns (3.90%), land principally occupied by agriculture with natural vegetation (3.85%), and arable land occupying 1.67% of the protected areas. Orchards, vineyards and olive groves cover only 0.32% of land in the protected areas.

Agricultural land in protected areas

CORINE land cover classes	2000 (ha)	2000 (%)
Arable land	9 221	1.67
Vineyards	503	0.09
Orchards	277	0.05
Olive groves	975	0.18
Pastures	33 213	6
Complex cultivation patterns	21 595	3.9
Agriculture with natural vegetation	21 281	3.85
Total agricultural land	87 065	15.73
Total protected area	553 451	100

Breakdown of agricultural land use in protected areas



Source: CEA

BIODIVERSITY

Invasive species in the Adriatic

Foreign species, which have not earlier lived in an ecosystem, may permanently damage it and disrupt its biodiversity by colonisation and competition with indigenous species for food and habitat.

Trend and current state

Algae of the genera *Caulerpa* were noticed in the Adriatic in 1994 (*C. taxifolia*) and in 2000 (*C. racemosa*). These two species of green algae are the most researched invasive species in Croatia. They spread quickly and create a thick cover on the sea floor, thereby interfering with the normal life of indigenous benthos communities. *Caulerpa taxifolia* was noticed in three locations, and successful actions were taken for its removal in the Barbant Channel in 2002 and 2003. *Caulerpa racemosa* was noticed in as many as 35 locations. Monitoring and cleanup of affected areas, particularly those belonging to any category of protection, is funded from the national budget. In addition to these algae, the red alga *Wormeselya setacea* and some fish species from the Red Sea and the Pacific have also been noticed in the Adriatic.

Locations affected by invasive alien species - Caulerpa

Source: CEA

BIODIVERITY

Habitat fragmentation by transport infrastructure

Construction of highways, railways and waterways causes fragmentation of habitats, which might have a negative effect on some animal populations, particularly those that inhabit wide areas.

Trend and current state

New roads built in Croatia run through the regions of Lika, Gorski Kotar and Dalmatia, which are habitats of large wild animals: bear, lynx and wolf, and numerous species of game. The man-built wildlife crossings, the so-called green bridges, allow these animals to freely communicate with remote and former habitats and safely cross the highways. Six such crossings have been built so far in the areas of the most frequent migrations.
Green bridges are 100 to 200 m long. Since the animals are gradually becoming accustomed to them, legislation will have to be promulgated regulating hunting and protection of wildlife, which is particularly endangered in these hot spots.

Locations of green bridges in Croatia

Location:
1. Dedin
2.Ivančino Brdo
3. Rasnica
4. Medina Gora
5. Varošina
6. Osmakovac

Source: CEA

BIODIVERSITY

Threatened species by taxonomic groups

Biodiversity, including flora and fauna, habitats and genetic diversity, is threatened by loads incurred by human activities, primarily by construction of infrastructure and habitat use changes, most often to the detriment of areas of natural value.

Trend and current state

Although no systematic and permanent monitoring of biodiversity is carried out in Croatia, freshwater fish are believed to be the most endangered, and vascular plants (particularly those in forest habitats) the least endangered taxonomic groups. Between 2000 and 2005, Red Lists were drafted of vascular flora, underground flora, diurnal butterflies, freshwater fish, reptiles, birds, mammals, sea fish and fungi. Because of specific properties of the fauna of underground habitats, and its importance for biodiversity in Croatia, endangered underground animals are described and analysed separately. Invertebrates have not been described because the data on most groups are insufficient. Regardless of the progress made, certain issues remain unresolved - baseline biodiversity in Croatia has not been determined, and no programs have been launched for systematic and permanent monitoring of key elements that would be used as indicators and which could reveal trends on a long-term basis.

Relation between number of endangered taxa (categories CR, EN, VU) and total number of taxa on global, European and national level

	WORLD			EUROPE			CROATIA		
Group	total number of taxa	number of threatened taxa	%	total number of taxa	number of threatened taxa	%	total number of taxa	number of threatened taxa	%
Mammals	5 416	1 101	20	274	71	26	89	8	9
Birds	9 917	1 213	12	515	134	26	231	76	32.6
Reptiles	8 163	304	4	200	20	10	38	4	10.5
Amphibians	5 743	1 770	31	75	10	13.3	20	4	20
Freshwater fish	8 400	800	9.5	349	272	77.9	150	66	44
Sea fish	15 000						407	26	6.4
Vascular flora	272 655	8 241	3	12 500	672	5.4	5 347	223	4.2
Diurnal butterflies	17 700	176	1	576	69	12	187	11	5.9
Fungi	72 000			8 000	33	0.4	2 300	251	10.9

Taxa – species and subspecies belong to the following IUCN categories):
EX – extinct, RE – regionally extinct, CR – critically endangered, EN – endangered, VU – vulnerable, NT – near threatened, LC – least concern, DD – data deficient

Source: CEA

BIODIVERSITY

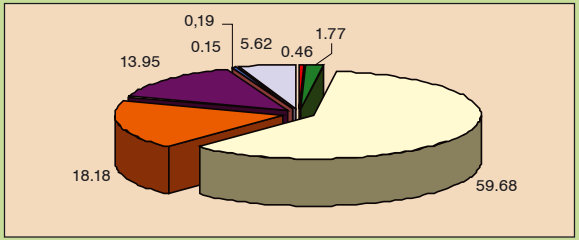
Designated areas in the Republic of Croatia

Designated areas contribute to the preservation of biological and landscape diversity, particularly of rare and endangered species and their habitats. Human activities that could threaten diversity are limited or banned from areas under different forms of protection.

Trend and current state

According to the new Nature Conservation Act passed in 2005 (OG 70/2005), designated areas are classified under nine categories. Currently, 444 locations in Croatia are under some form of protection and cover an area of 5 124,80 km^2, which is almost 9.05% of Croatian territory. The strictest category, *strict reserve*, includes two locations (Hajdučki Kukovi and Rožanski Kukovi; Bijele Stijene and Samarske Stijene, all mountain peaks); the *national park* category includes eight locations (Plitvice Lakes, Risnjak, Paklenica, Island of Mljet, Kornati Islands, Brijuni Islands, Mt. North Velebit and the Krka River), and the *nature park* category includes ten locations (Mt. Učka, Mt. Medvednica, Žumberak-Samobor Hills, Mt. Velebit, Mt. Biokovo, Lonjsko Polje, Kopački Rit, Telaščica Cove, Vransko Jezero Lake and Mt. Papuk). Other categories include: *special reserve, park forest, protected landscape, natural monument, monument of park architecture, and regional park*.

Designated area categories in Croatia



Category	Number	%
Strict reserve	2	0.46
National park	8	18.18
Special reserve	79	5.62
Nature park*	10	59.68
Regional park	0	0
Natural monument	103	0.15
Important landscape	69	13.95
Forest park	38	1.77
Monument of park architecture	135	0.19
Total	444 (445)	

Source: Ministry of Culture

FORESTRY

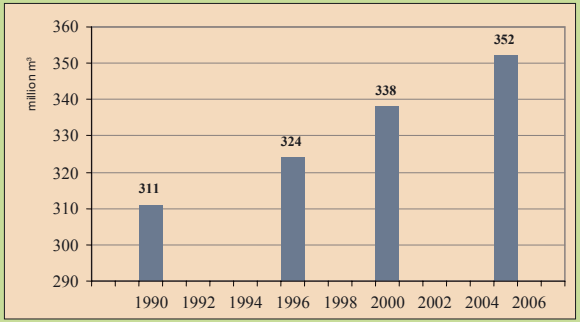
Timber-growing stock - growth estimate for Croatia

The annual wood stock increment exceeds total annual available cut, which indicates that forest resources management is sustainable and that the wood stock increment is stable.

Trend and current state

The wood stock is estimated for the period of ten years. In 1996, total wood stock was 324 million cubic meters. Total wood stock in 2005 is evaluated at 352 million cubic meters. The wood stock is evaluated on the basis of projections made in the Forest Management Scheme, taking into consideration felling records and expected losses caused by fires, drying out, windfall and icefall. The wood stock increment indicates that the forest resources management is sustainable. Average annual felling quantity is 5.35 million cubic meters, which is about 55% of the annual increment. Of total cut wood stock, 28% are young and medium-age trees cut for thinning and cultivation practices, 55% are mature stands, and 12 to 17% of wood stock is unforeseen felling.

Timber-growing stock growth estimate, 1990- 2005



Source: Regional Forest Management Scheme - MAFWM

FORESTRY

Forest ecosystems and biodiversity conservation

Forest areas cover about 2 490 000 ha, i.e. 37% of Croatia's mainland territory. About 95% of forests are of natural origin and structure. About 60 plant communities, which is about one-half of total flora in Croatia, live in forests.

Trend and current state

The *Forests Act* (OG 140/2005) specifies three categories of forests: commercial forests, i.e. forests intended for production of timber volume; protective forests for protection of soil, water resources and protection against erosion, and special-purpose forests, such as forests intended for production of forest seed or forests which are protected parts of nature due to their aesthetic value, recreational opportunities or for scientific research. For reforestation and bedding of plants and seedlings, seedlings and seed material of indigenous species are used from the natural and semi-natural forest areas and local nurseries, which makes a considerable contribution to conservation of biodiversity and stability of forest systems. It also extends rotation of species used for commercial purposes until maximum physiological maturity of trees is reached.

Distribution of forests in Croatia according to the CORINE methodology

Source: CEA

THE ENVIRONMENT IN YOUR POCKET

ACRONYMS AND ABBREVIATIONS

CEA – Croatian Environment Agency

CLC 2000 – CORINE Land Cover for 2000

CO_2 – carbon dioxide

CBS – Central Bureau of Statistics

CNIPH – Croatian National Institute of Public Health

EER – Environmental Emission Register

HEP – Hrvatska Elektroprivreda (*Croatian Power Company*)

HPEI – Hrvoje Požar Energy Institute

IMO – International Maritime Organisation

IMROH – Institute for Medical Research and Occupational Health

IOF – Institute of Oceanography and Fisheries, Split

IUCN – International Union for Conservation of Nature

MAFWM – Ministry of Agriculture, Forestry and Water Management

MSTTD – Ministry of Maritime Affairs, Tourism, Transport and Development

NO_2 – nitrogen dioxide

RBI – Ruđer Bošković Institute

SINP – State Institute for Nature Protection

SO_2 – sulphur dioxide

THE ENVIRONMENT IN YOUR POCKET

Glossary

Abrasion – Destruction caused by marine and lacustrine waves that cave in and erode the coast.

Aquaculture – Economic sector involved in farming of aquatic organisms in natural and controlled environment.

Ballast water – In vessels, ballast water is used to maintain balance, stability and structural integrity.

Composting – Biological process in which biodegradable waste is exposed to anaerobic or aerobic decomposition, the product of which is compost.

CORINE *(COoRdination of INformation on the Environment)* - Program initiated in 1985 by a decision of the European Commission aimed at ensuring consistent information on the state of the environment in the European Community. In 1991, the European Commission decided to expand the land cover inventory based on *CORINE* methodology to Central and Eastern European countries though the Phare program. The *CORINE Land Cover project* aim was to create a database on land cover using a unique methodology for the first time.

Erosion – Natural physical process in which soil is removed by wind, rain and surface water runoff, soil fragments are loosened and removed from land surfaces and often culminate as river and lake sediments.

Eutrophication – Excessive production of organic matter (biomass of the producers) in aquatic and terrestrial ecosystems due to nutrient loading (primarily nitrates and phosphates). Typical symptoms of eutrophication in the sea are its blooming, intensive growth of phytoplankton, etc.

Felling stock – Total cut wood stock in m^3.

Foreign invasive species – Species either accidentally or intentionally imported for economic or other purpose from another area and which, in *competition* for food and habitats become invasive and cause permanent damage to native plant and animal species and thus threaten biodiversity.

Forest Management Scheme – The basic plan (program) for forest and forest land management in an economic unit or region prepared on a ten-year basis.

THE ENVIRONMENT IN YOUR POCKET

Glossary

Habitat fragmentation – Habitat fragmentation is most commonly caused by construction of infrastructural projects (roads, waterways, railroads, dams…). Barriers created in this way make migration of animals, i.e. their communication with previous habitats, difficult.

Low-sulphur fuel – Fuel with reduced sulphur content.

Mariculture – Coastal economy sector involved in breeding marine organisms (algae, invertebrates and fish) in brackish or marine environments.

Oligotrophic sea – Based on the eutrophication degree, coastal sea is classified as oligotrophic, mezotrophic, eutrophic and extremely eutrophic. Oligotrophic sea is in a very good ecological state and of the highest quality, with low concentration of nutrients, low productivity, low turbidity, colourless, and with no hypoxia.

Organic freshwater farming – Farming of freshwater aquaculture, which imposes minimum conditions for quality of water in which the freshwater organisms are grown, production technology complying with the physiological and ethiological needs of farmed organisms, preservation of aquatic ecological entities, and compliance with other farming rules, techniques and standards as stipulated by the *Rules on Organic Production of Animal Products (OG 13/02)*.

Organic (ecological, bio) farming – A method of sustainable management in agriculture and forestry, which includes growing of plants and animals, production of food, raw material and natural fibres and processing of primary products, including all ecologically, economically and socially justified production technology methods, practices and systems, making the most favourable use of soil arability and water availability, natural characteristics of plants, animals and landscape towards increase in yield and resistance of plants using natural forces and laws, stipulated use of fertilisers, plant and animal protection preparations, all in accordance with internationally accepted standards and principles..

Orthophosphates – Phosphorus in water is encountered in various forms, and it is accessible to the living aquatic organisms as a nutrient in the form of orthophosphate(PO_4^{3-}). Concentration of orthophosphate in water is one of five standard

parameters for eutrophication degree assessment.

Potentially infectious waste – Other waste collected and disposed of under special requirements in order to prevent infections (*acc. to Waste Register*, group 18 01 03*).

Recycling – Any process of waste treatment for material reuse or energy recovery (*Waste Act*, OG 178/04, Article 3, para 9).

Red lists – Lists of threatened species by groups classified according to internationally recognised IUCN categories.

Renewable energy resources – Energy resources preserved in nature which are either partly or completely renewable. These are: hydropower, wind energy, solar energy, biofuel, biomass energy, biogas, geothermal energy, wave energy, tidal energy, landfill gases, and wastewater treatment plant gases

Taxonomic groups – Classification of organisms according to their similar characteristics (mammals, fish, birds, amphibians, vascular flora, fungi, lichen, etc.).

Threatened species categories: EX – extinct, RE – regionally extinct, CR – critically endangered, EN – endangered, VU – vulnerable, NT – near threatened, LC – least concern, DD – data deficient

IUCN - International Union for the Conservation of Nature.

Vascular plants – Higher plants, i.e. plants with developed organs such as root, stem, and leaf.

Windfall, icefall – Damage incurred by wind and ice causing breaking of trees.

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