

EVOLUTION OF THE MAIN ENVIRONMENT COMPONENTS IN IASI COUNTY (2001 – 2005)

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Resumé : L'ouvrage en cause représente une synthèse de l'évolution des principaux composants de l'environnement du département de Iassy (l'air, l'eau, le sol, la biodiversité). Il s'agit de deux sous titres : Le cadre naturel et le développement socio-économique du département, aussi les composants principaux monitorisés et analysés dans une dynamique évolutive. Les principaux composants de l'environnement sont traités sous la forme des six chapitres dont on y trouve six figures et huit tables qui exemplifient la monitorisation, l'analyse et l'évolution de ces composants.

1. Natural framework and socio-economical development

Iasi County territory is located in North-East of Romania and in central East of Moldova, between parallels 46° 50' and 47° 36' Northern latitude and between 26° 33' and 28° 07' Eastern longitude.

Geologically, the County territory belongs to the structural unit of Moldavian platform, characterized by a reduced tectonic mobility, a relatively simple structure and nature: the basement is made up of folded crystalline rocks with granite intrusions of pre-Cambrian age and a sedimentary covering of 1.000 and 2.000 m thick, formed of Cambrian-Devonian, cretaceous and neogene deposits. The last deposits, the neogene ones, on which a fluviatic-delugean relief was formed, are the sarmatian, meotian and quaternary deposits. Petrographically, marles, sands, sandstones, oolite limestone are predominant in these deposits; and: sands, gravel, clays, sandy clays and lutes with loess are predominant in the alluvian-colluvium, delugean and eluvial quaternary formations.

Hidrogeologically, the underground waters of Iasi County are: deep internal waters and free waters.

The relief is of fluviatic-delugean type with three subunits:

- Moldavian Plain with a large undulated relief with hilly inter-streams and adobe deluvial with altitudes between 125 and 150m;
- Hilly massifs and structural plains having an altitude of 400-500m and over (Suceava Plateau);

- Central Moldavian Plateau with a relatively high and massive relief with many structural surfaces and altitudes of 350-450 m.

The maximum and minimum altitudes are considered the Holm hill (556m) and river Prut Meadow at the confluence of Jijia and Prut streams (28 m).

Climatologically, the County territory belongs to the temperate-continental climate under the influence of the Atlantic and Euro-Asiatic cyclones.

The Iasi County does not have important natural resources, influencing in a certain way the economical and social development.

The non-regenerable natural resources, recovered and exploited at local level are: clays, siltites and lutes (e.g. Vladiceni clay pit), sandstones (e.g. Deleni, Harlau etc), gravels and sands (e.g. Lespezi-Siret, Cristesti-Moldova), mineral waters (e.g. Nicolina-Iasi).

The regenerable limited natural resources are: water resources (surface water resources with multi-annual stock rate of 1144 mil. cubic meters, on the river Prut in the Ungheni sector and of 1044.7 mil. cubic meters on the river Siret in the Lespezi sector); they are completed by complex accumulations and ponds with a total volume of 61 mil. cubic meters; for the underground water resources there are exploitation conditions in the Siret and Prut rivers terraces. At a county level, these resources are estimated to have a flow of 4.047 cm/s, out of which only 1.787 cm/s are good quality exploited waters; the soil resources cover an area of 380 200 ha (70% of the county surface) out of which 66.5% agriculture lands, 28.3% pastures and grass lands, 30.7% vineyards and 2.12% orchards but also 50.066,5 of land affected by several pollution limiting factors: erosion, humidity, salting, acidifying, land slides; the flora and fauna resources are: forest vegetation in the West and North part of the County (99.022 ha, 18% of the county surface), silvo-steppe in the North-East and South-East of the county, completed with the steppe and meadows vegetation; the fauna resources are characteristic for the woods, silvo-steppe, steppe and meadows.

Likewise the natural flora and fauna of the county were strongly affected by the human induced interventions; leading even to the extinction of some species. There were 33 vulnerable and endangered species in 2003.

2. The main environment components

2.1 Air

In Iasi County, within the surveyed interval (2001-2005), some re-engineering and making efficient measures were applied (e.g. CET Iasi conversion from low fuel usage – lignite to the high fuel usage – pit coal; use of low sulphuric content fuel etc).

In figures 1-6 it is shown the yearly average of the monitorized pollutants in the period 1995-2004 (of the Report on environment state of Iasi County, A.P.M. Iasi-2004).

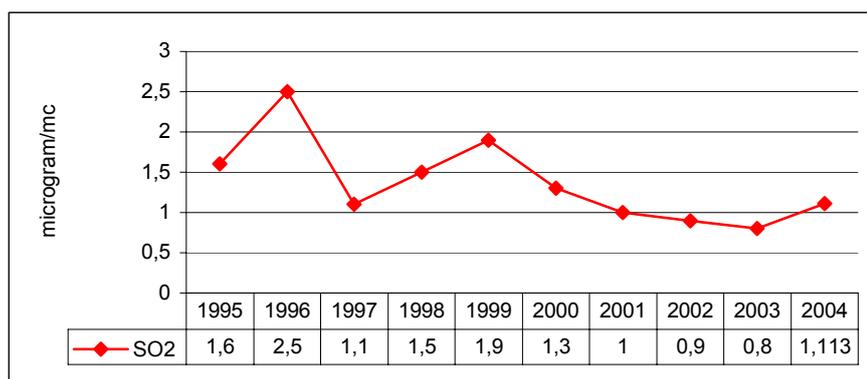


Figure 1. – Yearly averages of SO₂ within 1995-2004

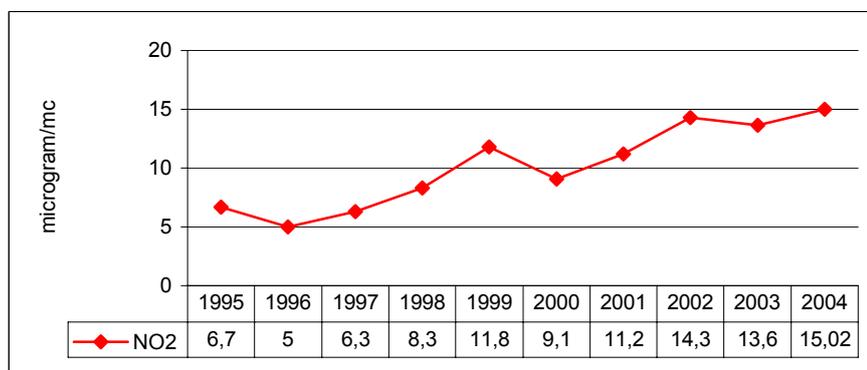


Figure. 2. – Yearly averages of NO₂ within 1995-2004

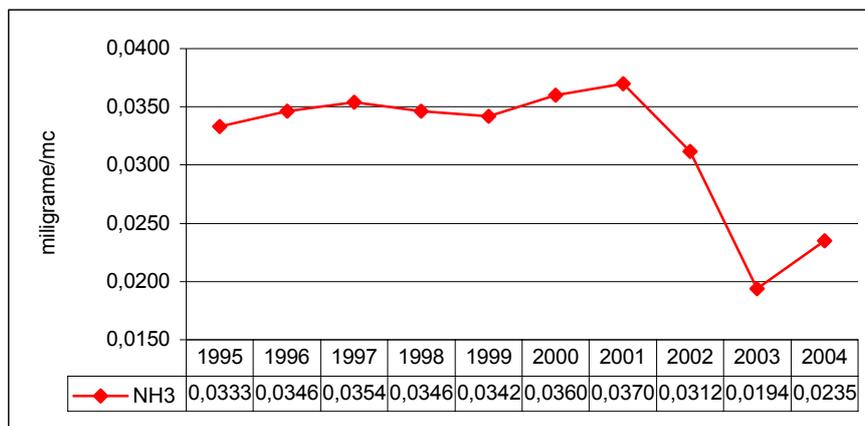
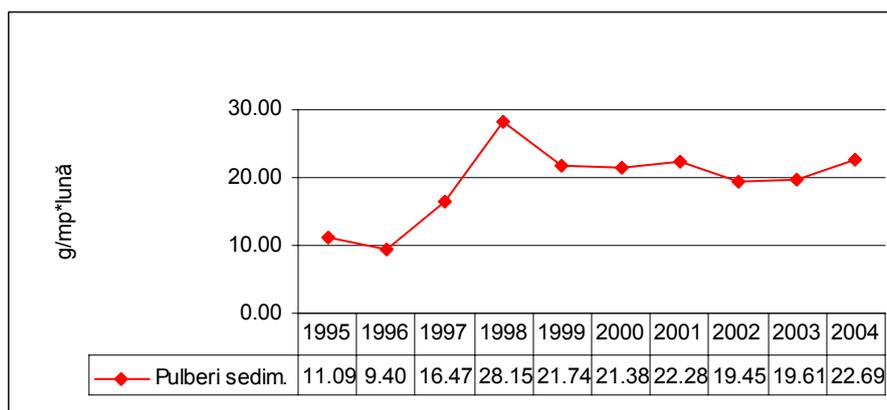
Figure. 3. – Yearly averages of NH₃ within 1995-2004

Figure. 4. – Yearly averages of sedimentary powders within 1995-2004

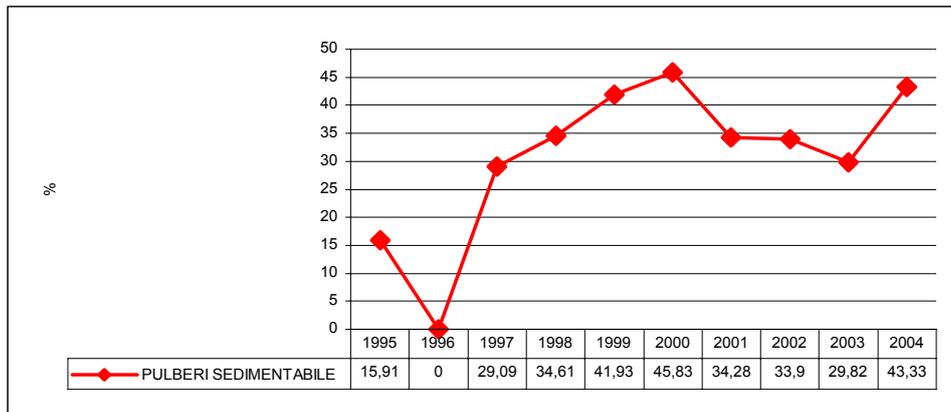


Figure 5. Sedimentary powders – frequency of exceeding over the monthly averages within 1995-2004

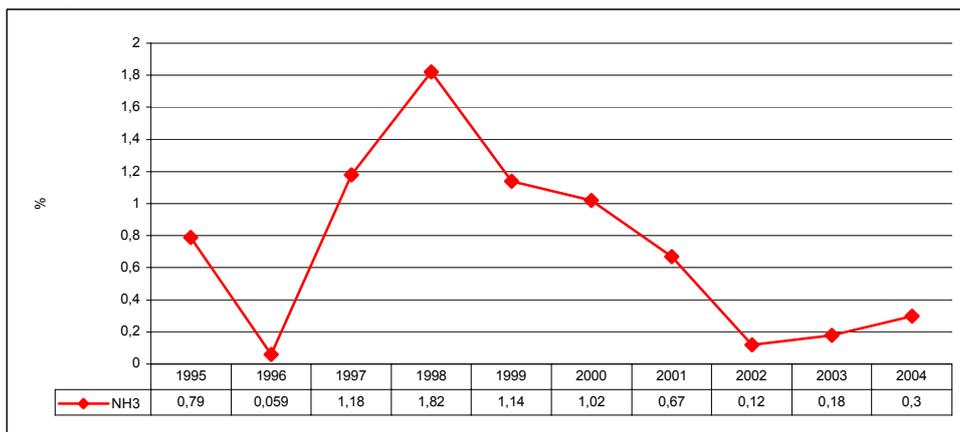


Figure 6. NH₃ – frequency of exceeding over the daily averages within 1995-2004

The conclusions regarding the evolution of these pollutants are: exceeding of the maximum admissible concentration has been recorded at the sedimentary powders and NH₃; the other pollutants were within the admissible limits.

Worth mentioning as well is the fact that beginning with the year 2005 5 automatic monitoring stations of air quality were set up in Iasi urban area for monitoring the: traffic, urban background, industry, suburban and regional background. The obtained results at these stations should set a much clear and secure evolution of the air quality in Iasi urban area (338560 inhabitants in 2005).

2.2. Water

The water is an economically important natural resource in all its way of use. Conservation, re-use and saving of water are encouraged by economic measures that regulates the protection of water quantity and quality, including the penalties for those who waste and pollute the water resources.

In tables 1 and 2 are shown the river length cumulated based on quality classes, at the level of 2004 and the main polluting resources with specific pollutants for the surface waters.

Table 1. Summary of river lengths cumulated based on quality classes in 2004

River	Length (km)	Distribution lengths based on quality classes									
		I		II		III		IV		V	
		km	%	km	%	km	%	km	%	km	%
Prut	214	-	-	121	56,54	93	43,46	-	-	-	-
Jijia	88	-	-	-	-	-	-	88	100	-	-
Miletin	35	-	-	-	-	-	-	35	100	-	-
Bahlui	119	-	-	-	-	36	30,25	60	50,42	23	19,3
Bahlueț	41	-	-	-	-	-	-	-	-	41	100
Nicolina	20	-	-	-	-	-	-	-	-	20	100
Siret	78	-	-	78	100	-	-	-	-	-	-
Moldova	23	-	-	23	100	-	-	-	-	-	-

Source: A.P.M. Iasi

Table 2. The main polluting sources and specific pollutants

Crt. No.	Pollution source	Emitter	Specific pollutants	Treatment degree
1	RAJAC – Hârlău Sector	Bahlui	Total nitrogen, total phosphor, H ₂ S + sulphides	insufficient
2	SC Cotnari SA	Bahlui	Suspensions, CBO ₅ , CCOCr, H ₂ S + sulphides	insufficient
3	RAJAC – Belcești Sector	Bahlui	Ammonium, total phosphor, H ₂ S + sulphides	insufficient
4	RAJAC - Tg. Frumos Sector	Bahlueț	H ₂ S + sulphides	insufficient
5	RAJAC - Podu Iloaiei Sector	Bahlueț	H ₂ S + sulphides	insufficient

6	SC Antibiotice SA – CC1	Bahlui	Suspensions, CBO ₅ , CCOCr, ammonium, H ₂ S + sulphides	Not treatable
7	SC Antibiotice SA – CC2	Bahlui	CBO ₅ , CCOCr, H ₂ S + sulphides	Not treatable
8	RAJAC –Iași Sector – mechanical stage	Bahlui	CBO ₅ , CCOCr, Suspensions, total nitrogen	Insufficient
9	CET II Holboca SA (mouths)	Bahlui	CBO ₅ , CCOCr, H ₂ S + sulphides, residue	Not treatable
10	SC Fortus SA (mouths)	Nicolina	CBO ₅ , CCOCr, Ni	Not treatable
11	DAC Pașcani	Siret	CBO ₅ , CCOCr, ammonium	insufficient
12	CFR Cristești Railway Station	Jijia	Suspensions, CBO ₅ , CCOCr, ammonium, residues, H ₂ S + sulphides, retrievable	insufficient
13	RAJAC – Răducăneni Sector	Bohotini	CBO ₅ , CCOCr, H ₂ S + sulphides	insufficient
14	RAJAC – Țibănești Sector	Sacovăț	Ammonium, total phosphor, H ₂ S + sulphides	insufficient

Source: A.P.M. Iasi

The conclusion is that the length distribution depending on quality classes is shifted to 3rd quality class (129 km), 4th class (183 km) and 5th class (84 km) compared to the 2nd class (222 km) and 1st class (0 km). Also, the treating degree at the main polluting sources depending on the specific pollutants is totally insufficient and even the treatment is not performed.

Considerations regarding the underground water pollution are: the maximum admissible limits compared to laboratory analyses carried out mainly for drillings on the main industrial platforms. Table 3, shows their pollution with organic matters, nitrogen, iron and manganese compounds.

Table 3. Industrial platforms where drill sampling were carried out

Crt. No.	Unit name (Industrial platform)	No. of drills monitorized
<i>Iasi County</i>		
1.	CET II Holboca	2
2.	S.C. ANTIBIOTICE S.A. Iași	11
TOTAL		13

Source: A.P.M. Iasi

2.3. Soil

The following soil classes are present in Iasi County: molisols (57.7%), argilluvisols (7.7%), hydromorphous (2%), halomorphous (1.6%) and not evolved, truncated or trenched (31%) soils.

Tables 4 and 5 show soil distribution based on utilization categories, soil distribution based on probability classes, and tables 6 and 7 show quality restrictions of the soils on determined surfaces in Iasi County as well as the actions initiated to be carried out for ecological rehabilitation of the degraded lands and for improving the quality state of the soils.

Table. 4. Soil distribution on utilization categories

Soil category	Surface (ha)	%
Agriculture lands out of which:	380400	
Arable	257000	67,6
Pastures	87948	23,12
Grass lands	19452	5,17
Vineyards	10000	2,6
Orchards	6000	2,6

Source: A.P.M. Iasi

Table 5. Soil distribution on suitability classes

Quality class	Surface (ha)
1st quality class very good	23781
2 nd quality class good	105736
3rd quality class medium	98237
4th quality class poor	81097
5th quality class very poor	71549

Source: A.P.M. Iasi

Table 6. Main restrictions of soil quality

Limiting factor	Surface (ha)
Erosion	114545
Land slides	66527
Acidity	64887
Salting	53392

Humidity in excess	83782
Inundability	29523
Settling (compactness)	180316

Source: A.P.M. Iasi

Table 7. Actions carried out to ecological rehabilitation of the degraded lands and for improving the quality state of soils

Work	Surface (ha)
Re-calibration of old water stream of Jijia river	21,51

Source: A.P.M. Iasi

The conclusions regarding the soil quality evolution in Iasi County are: soils with agriculture utilization have a shortage of nitrogen (e.g.) of 0.065-0.280%, the evolution of loading with organo-chlorinated pesticides is in a variable decrease; and the industrial pollutants have still an impact on heavy metals (Pb and Cd especially) and sulphuric oxides (energetic industry based on coal and hydrocarbons).

2.4. Biodiversity

The biodiversity and its preservation represent a domain which gathers specialists and knowledge of various fields, that are directly or indirectly connected to biodiversity and has as its main purpose the diminishing and stopping of the accelerated process of extinction of the species due to brutal human intervention.

Table 8 shows the protected natural areas state in Iasi County, 23 areas in 2005.

Table 8. The state of ANP according to Law no. 5/2000 and GD no 2151/2004

ANP name and Crt. No.	Surface (ha)	Location (administrative territorial units)	Administrator Custodian	Preservation state	Protection and preservation object
1.AQUATIC RESERVATION BALTA TEIVA VISINA	25	com. Victoria	5579/22.06.2004 Ecological Society AquaTerra Iași Davideanu Grigore, 0741462378, aquaterr@uaic.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
2*.AQUATIC RESERVATION COTUL BRAN	10	com. Probota		Favorable	Flora and fauna species of communitary interest (Law 462/2001,

					appendix 3 and 4)
3*.AQUATIC RESERVATION COTUL SALAGENI	5.8	com. Grozesti		Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
4*.AQUATIC RESERVATION PRUTET BALATAU	24	loc. Prutet, com. Probotă		Unsatisfactorily	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
5*.AQUATIC RESERVATION PRUT RIVER	4316 ha (211 km length of Prut river)	River course Prut Bivolari-Gorban		Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
6*.AQUATIC RESERVATION CHIRITA	78	com Holboca		Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
7*.AQUATIC RESERVATION PIRCOVACI	50	Pircovaci location		Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
8*.FLORISTIC RESERVATION SECULAR GRASS LANDS OF VALEA LUI DAVID	46	com. Miroslava		Satisfactory	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
9.FLORISTIC RESERVATION POIANA CU SCHIT	9	com. Grajduri	5587/22.06.2004 Forest Management Directorate of Iași Efrosa Adrian, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
10*.FLORISTIC RESERVATION DRY SALTY	10	com. Dumesti		Satisfactory	Flora and fauna species of communitary

LAND OF VALEA ILENEI					interest (Law 462/2001, appendix 3 and 4)
11.FOREST RESERVATION CATALINA-COTNARI	7,6	com. Cotnari	5580/22.06.2004 Forest Management Directorate of Iași Cojocaru Constantin, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
12.FOREST RESERVATION FAGETUL SECULAR HUMOSU	73,3	com. Siretel	5583/22.06.2004 Forest Management Directorate of Iași Cojocaru Constantin, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
13.FOREST RESERVATION FRUMUSICA	97,3	com. Madirjac	5581/22.06.2004 Forest Management Directorate of Iași Parascan Corneliu, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
14.FOREST RESERVATION ICUSENI	11	com. Victoria	5584/22.06.2004 Forest Management Directorate of Iași Zamfirescu Paul, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
15.FOREST RESERVATION LUNCA MIRCESTI	26,3	com. Mircesti	5585/22.06.2004 Forest Management Directorate of Iași Sandu Ioan Vasile, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
16.FOREST RESERVATION PIETROSU	83	com. Dobrovat	5586/22.06.2004 Forest Management Directorate of Iași Tanasa Dumitru, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
17.FOREST RESERVATION POIENI - CARBURARIE	9,2	com. Dobrovat	5588/22.06.2004 Forest Management Directorate of Iași Doncean Gabriel, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)

18.FOREST RESERVATION ROSCANI	34	com. Victoria	5589/22.06.2004 Forest Management Directorate of Iași 4Zamfirescu Paul, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
19.FOREST RESERVATION TATARUSI	49,9	com. Tatarusi	5590/22.06.2004 Forest Management Directorate of Iași Sandu Ioan Vasile, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
20.FOREST RESERVATION URICANI	120	com. Miroslava	5591/22.06.2004 Forest Management Directorate of Iași Doncean Gabriel, dsi@mail.dntis.ro	Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
21*.GEOLOGICAL AND PALEONTOLOGICAL RESERVATION BAICENI-CUCUTENI	3.23	com Cucuteni		Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
22*.GEOLOGICAL AND PALEONTOLOGICAL RESERVATION BOHOTIN PIETROSU	0.25	com. Raducaneni		Favorable	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)
23.GEOLOGICAL AND PALEONTOLOGICAL RESERVATION REPEDEA	6.8	com. Birnova	5578/22.06.2004 Ecology and Tourism Club TURISTOR Platon Constantin, 0740902463, turistor@k.ro	Satisfactory	Flora and fauna species of communitary interest (Law 462/2001, appendix 3 and 4)

NOTE

* ANP for which the custody was not given

As we may conclude from table 8, a number of 13 protected areas are under the management (custody) of Forest Management Directorate of Iasi (with nominated responsible persons) and of some non-governmental organizations. Their preservation state is generally favourable and satisfactory with only one exception (the aquatic reservations Prutet- Bălățau)

2.5. Critical areas where the quality state of the environment is damaging

The critical areas of Iasi County from the point of view of environment quality state damaging can be divided as follows:

- 2.5.1. Critical areas from an air pollution point of view
- 2.5.2. Critical areas from a surface water pollution point of view
- 2.5.3. Critical areas from an underground water pollution point of view
- 2.5.4. Critical areas from a soil damaging/pollution point of view
- 2.5.5. Critical areas requiring an ecological reconstruction

2.5.1. Critical areas from an air pollution point of view. These areas are generally connected to the activity in the metropolitan area of Iasi municipality namely: Pacurari, Gara (traffic, sedimentary powders over the admissible limit); industrial sources, (S.C. CET S.A., S.C. FORTUS S.A., S.C. CERAMICA S.A., S.C. MOLDOMOBILA S.A.)

2.5.2. Critical areas from a surface water pollution point of view. Critical areas are considered river sections belonging to the 5th quality class as follows:

- Bahlui river, Belcesti-Podu Iloaiei sector, Nicolina river –Jijia river
- Bahluiet river, origin of Bahluiet sector – Bahlui river
- Nicolina river, origin of Nicolina sector – Bahlui river

2.5.3. Critical areas from an underground water pollution point of view

In 2004 a number of 25 drills with a half of year frequency was examined. The critical areas set based on analyses carried out on these drills are:

- S.C. Antibiotice S.A., Iasi platform;
- S.C. CET S.A., Iasi platform;
- S.C. FORTUS S.A., Iasi platform, industrial waste deposit Zanea-Ciurea;
- S.C. TEROM S.A. Iasi, industrial waste deposit Capacioaia-Holboca;
- Municipal waste deposit Tomesti-Iasi;

2.5.4. Critical areas from a soil damaging/pollution point of view

The main areas of the category are:

- Grave pit and borrow pit areas for ceramic factories (e.g., Probota, Pascani, Motca gravel pits, Vladiceni quarry);
- Garbage deposits (e.g., Tomesti, Valea Seaca - Pascani);
- Industrial waste dumps (e.g., S.C. CET II S.A. Iasi, S.C. FORTUS S.A. Iasi)

- Zootechnical waste (e.g., S.C. AVICOLA S.A., Iasi, S.C. AGROCOMPLEX S.A. Pascani, S.C. AGROINDUSTRIALA S.A. Bucium);

5.5.5. Critical areas requiring an ecological reconstruction

The areas that by their vulnerability require an ecological reconstruction are:

- Active and significant land slides of Rediu-Aldei, Deleni-Harlau.
- Degraded lands resulting of dry salty and acidifying lands of Lunca Prutului and Jijiei (e.g., Prisacani area, 98 ha)
- The areas affected by erosion of Andrieseni, Comarna, Cotnari, Deleni, Tansa, etc.

Bibliography

- Cojocaru I.(1995), *Surse, procese si produse de poluare*, Editura Junimea, Iasi.
- Horaicu C.(2004),*Monitorizarea intergrata a mediului*,Editura TipoMoldova, Iasi.
- Jelev I. (1999), *Managementul mediului inconjurator*, Editura Universitatii, Oradea.
- Macoveanu M.(2003), *Auditul de mediu*, Editura Ecozone, Iasi.
- Mihai N.(2001), *Bilanturi de mediu*, Editura Tehnica, Bucuresti.
- Negulescu M. si colaboratorii(1995), *Protectia mediului inconjurator*, Editura Tehnica Bucuresti.
- Rojanschi V. si colaboratorii(1997),*Protectia si ingineria mediului*, Editura Economica, Bucuresti.
- *** Rapoarte privind starea mediului judetului Iasi (2001-2005), Agentia de Protectie a Mediului Iasi.
- *** Regulamente si Directive ale Parlamentului si ale Consiliului Europei.
- *** Legi, Hotarari de Guvern, Ordine ale Ministrului, Norme de aplicare si Standarde privind protectia mediului(1991-2006).