

## 2.7 LAND COVER AND LAND USE

### 2.7.1 CHARACTERISTICS OF THE EXISTING LAND USE

#### (1) Statistical Data on the Existing Land Use

Table 2.7-1 shows the existing land use of the Study Area by Okres in 1996, based on the data from the statistical office of the region. According to the data, the Study Area is utilised as follows;

The Study Area (covered by forests; 45 %, agriculture; 48 %, other use; 7 %)

Of which;

- Banska Bystrica Kraj (covered by forests; 58 %, agriculture; 36 %, other use; 6 %)
- Nitra Kraj (covered by forests; 14 %, agriculture; 76 %, other use; 10 %)

Table 2.7 - 1 Existing Land Use by Okres (ha)

Kraj	Okres	Agricultural area	Forest area	Water area	Builtup area	Others	Total area
Banska Bystrica	Brezno	34 548	84 206	497	1 422	3 629	124 302
	Banska Bystrica	29 010	46 831	448	1 835	2 820	80 944
	Banska Stiavnica	6 454	10 612	126	358	727	18 277
	Detva	20 910	16 916	263	892	1 224	40 205
	Revuca	10	91	0	0	1	103
	Zarnovica	13 168	28 197	420	852	1 156	43 793
	Ziar nad Hronom	20 617	28 380	553	1 313	2 303	53 166
	Zvolen*	24 646	25 449	612	1 532	2 829	55 068
	Subtotal	149 363	240 682	2 919	8 204	14 689	415 858
Nitra	Levice	83 409	19 080	1 764	3 432	4 902	112 587
	Nove Zamky	48 245	5 329	1 968	1 876	3 115	60 533
	Zlate Moravce*	(129)	129	(129)	129	(129)	129

\* some data is not available

Source: Statistical Data by Obec/Mesto (Refs. 14 - 4, 14 - 7, 14 - 8, 14 - 14)

#### (2) Corine Landcover Map 1998

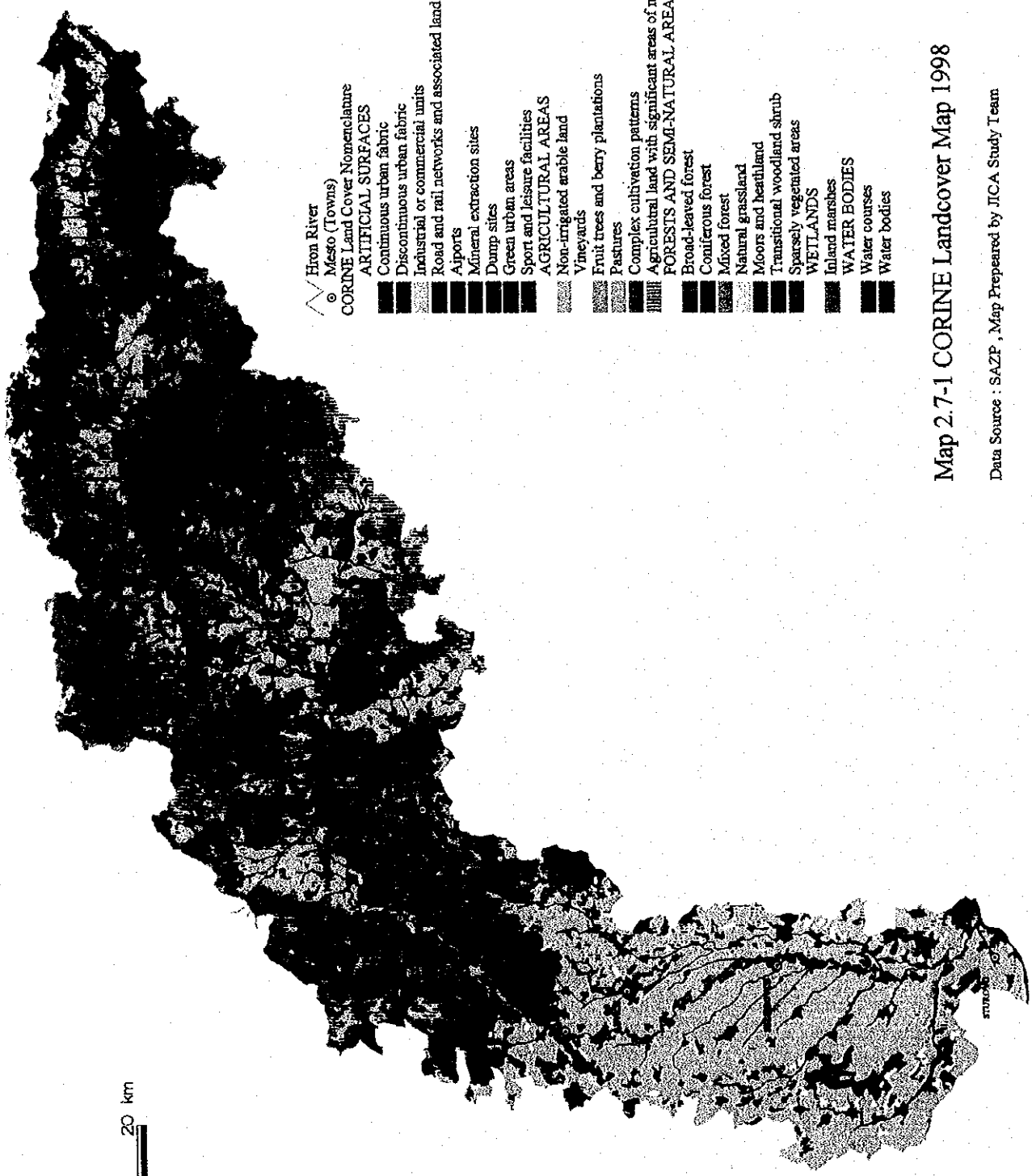
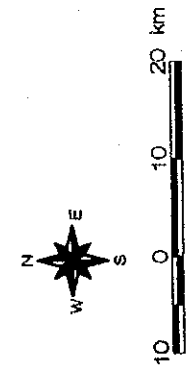
The SAZP/JICA have made Corine Landcover Map during this study, based on the satellite image of 1998, as shown in Map 2.7 - 1. According to the data, the major categories of land use in the Study Area in 1998 can be summarised as follows:

- Forest area..... approx. 2 730 km<sup>2</sup> (45.3 %)
- Agricultural and pasture area ..... approx. 3 020 km<sup>2</sup> (50.0 %)
- Other land usea..... approx. 290 km<sup>2</sup> (4.7 %)

The general characteristics of the land use in the Study Area are as follows:

- Upper basin : dominated by forest lands
- Middle basin : mixed pattern with forest and agricultural lands
- Lower basin : dominated by agricultural lands

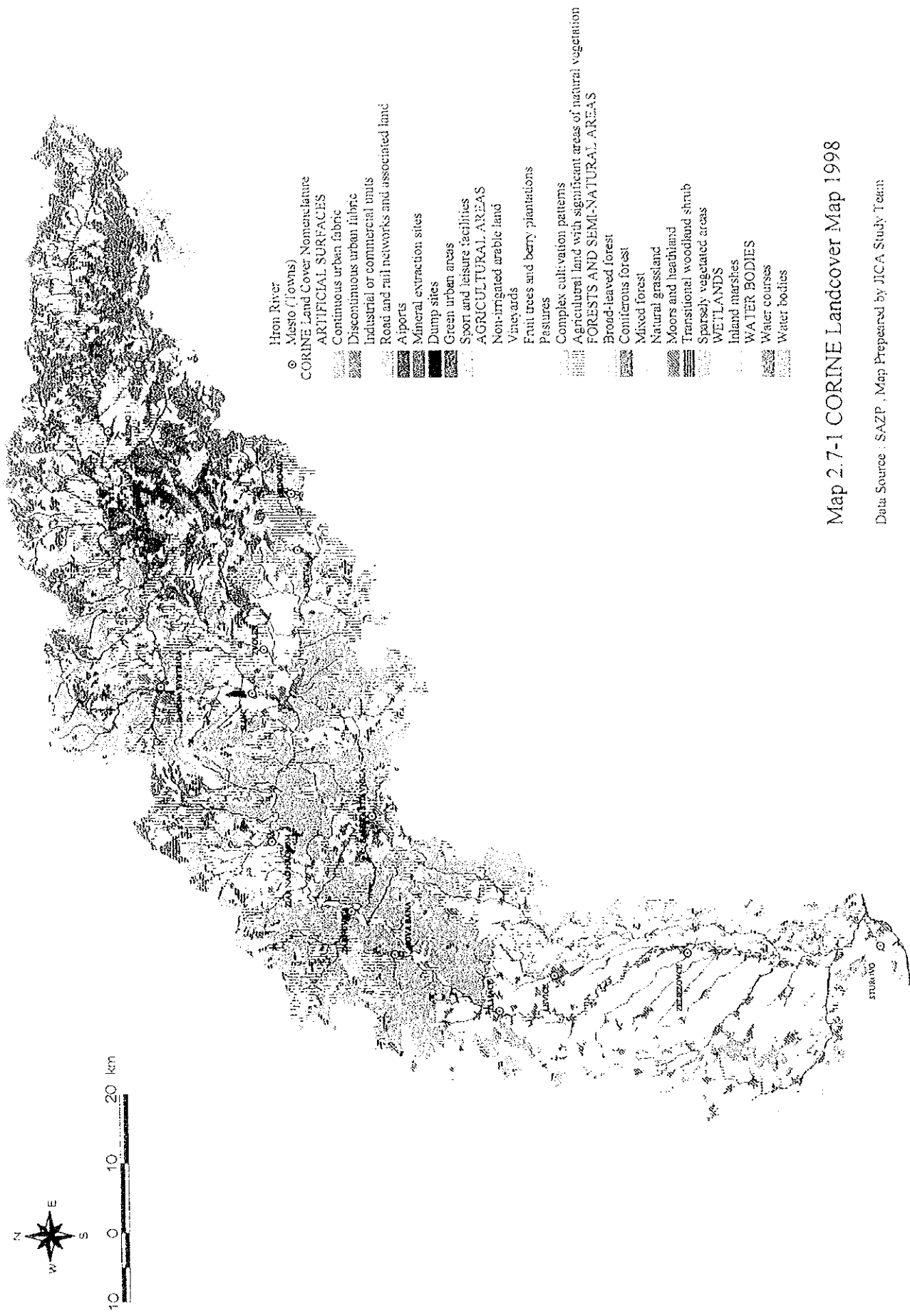
Maps 2.7 - 2 and 2.7 - 3 show the distribution of the agricultural and forest lands, respectively.



- ∩ Hiron River
- Mésos (Towns)
- CORINE Land Cover Nomenclature**
- ARTIFICIAL SURFACES**
- Continuous urban fabric
- Discontinuous urban fabric
- Industrial or commercial units
- Road and rail networks and associated land
- Airports
- Mineral extraction sites
- Dump sites
- Green urban areas
- Sport and leisure facilities
- AGRICULTURAL AREAS**
- Non-irrigated arable land
- Vineyards
- Fruit trees and berry plantations
- Pastures
- Complex cultivation patterns
- Agricultural land with significant areas of natural vegetation
- FORESTS AND SEMI-NATURAL AREAS**
- Broad-leaved forest
- Coniferous forest
- Mixed forest
- Natural grassland
- Moors and heathland
- Transitional woodland shrub
- Sparsely vegetated areas
- WETLANDS**
- Inland marshes
- WATER BODIES**
- Water courses
- Water bodies

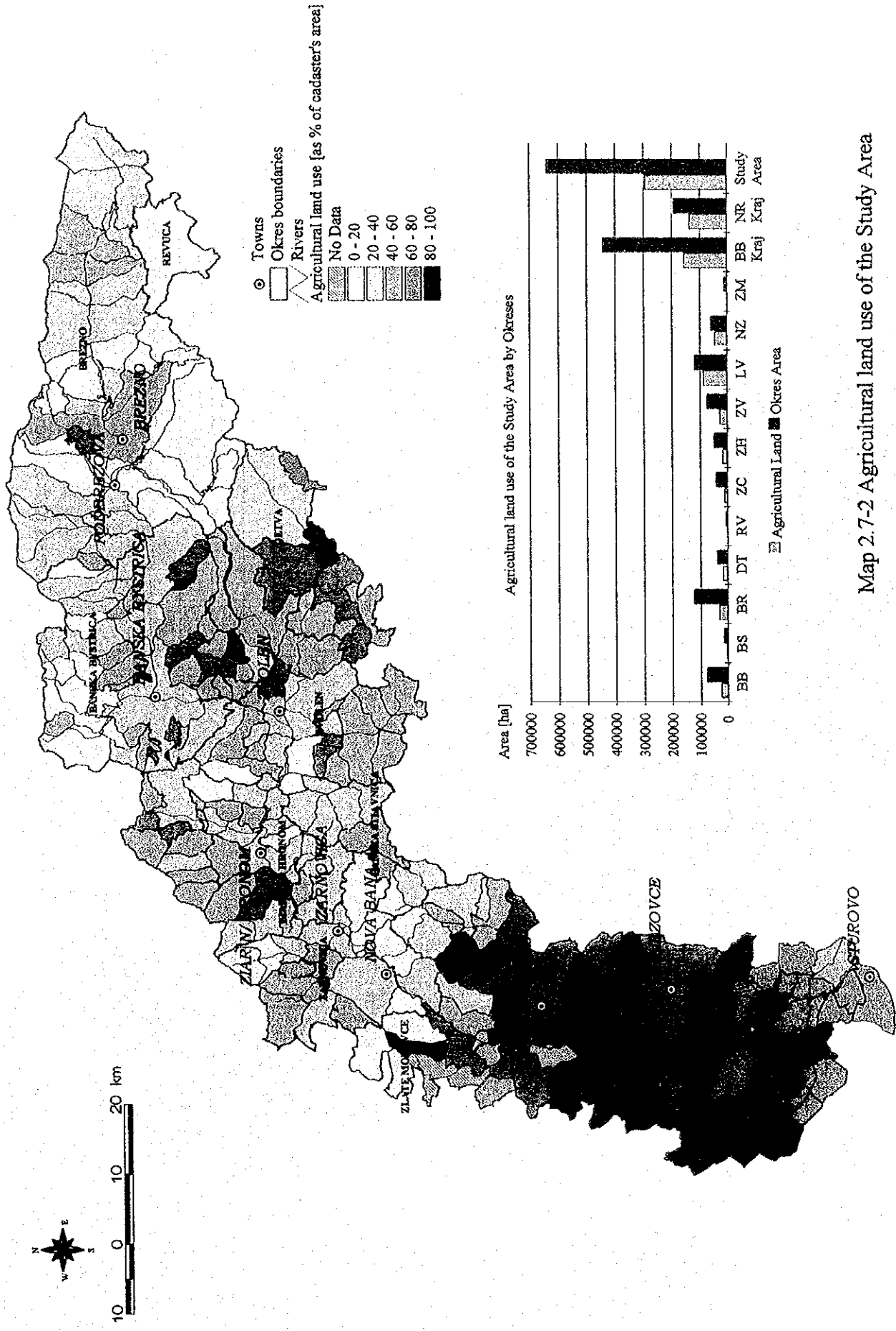
Map 2.7-1 CORINE Landcover Map 1998

Data Source : SAZF, Map Prepared by JICA Study Team

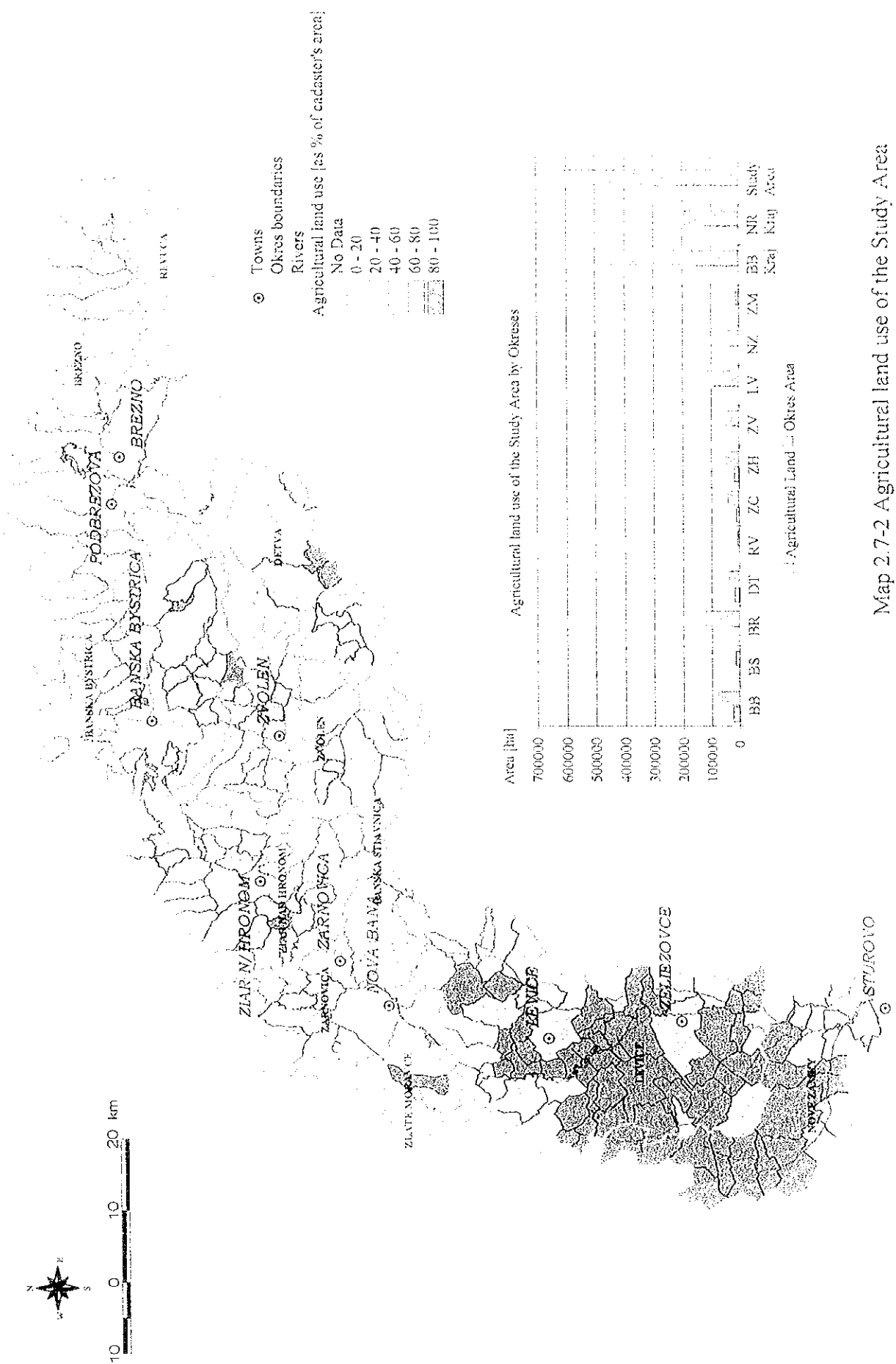


Map 2.7-1 CORINE Landcover Map 1998

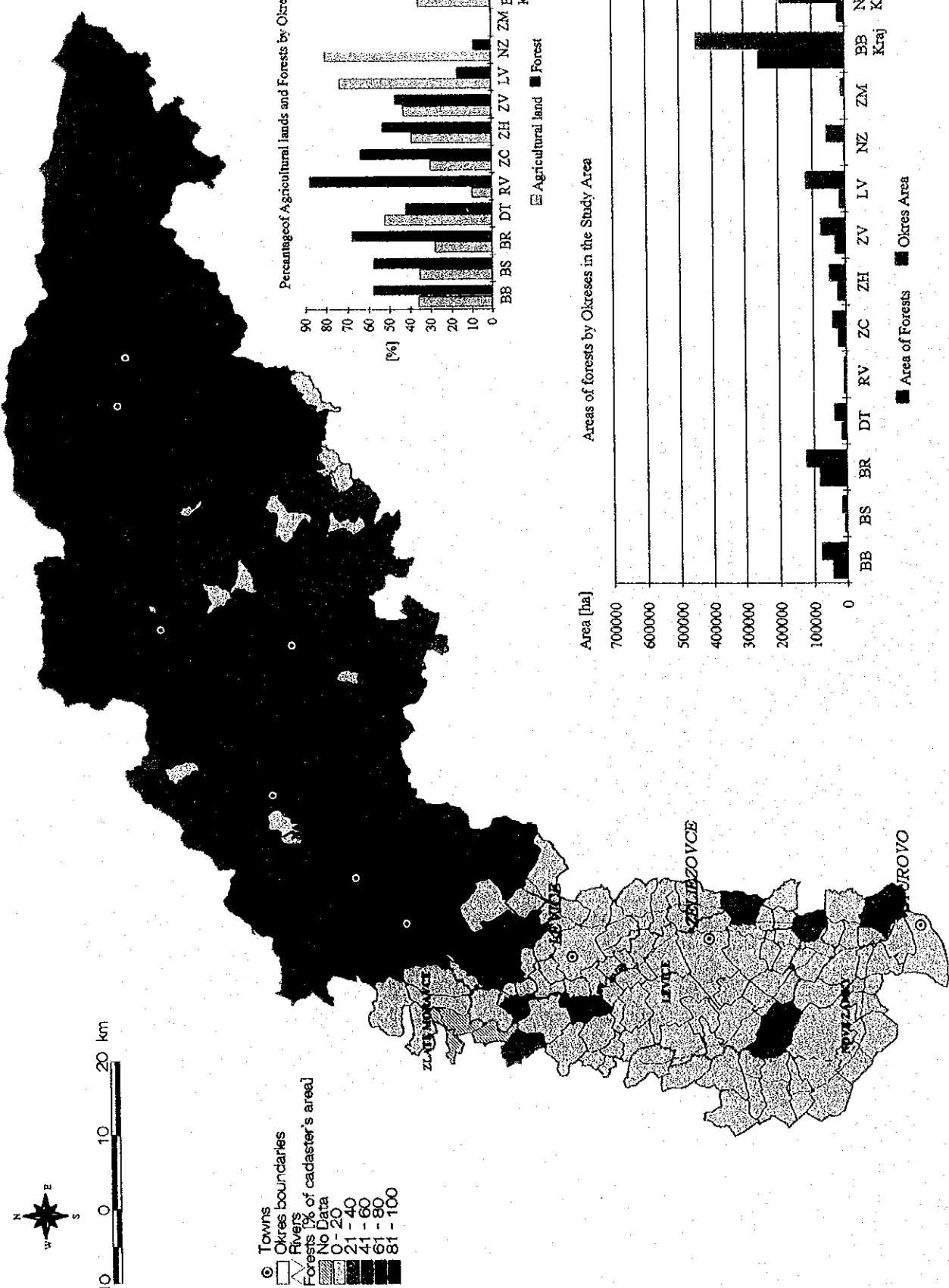
Data Source : SAZP , Map Prepared by JICA Study Team



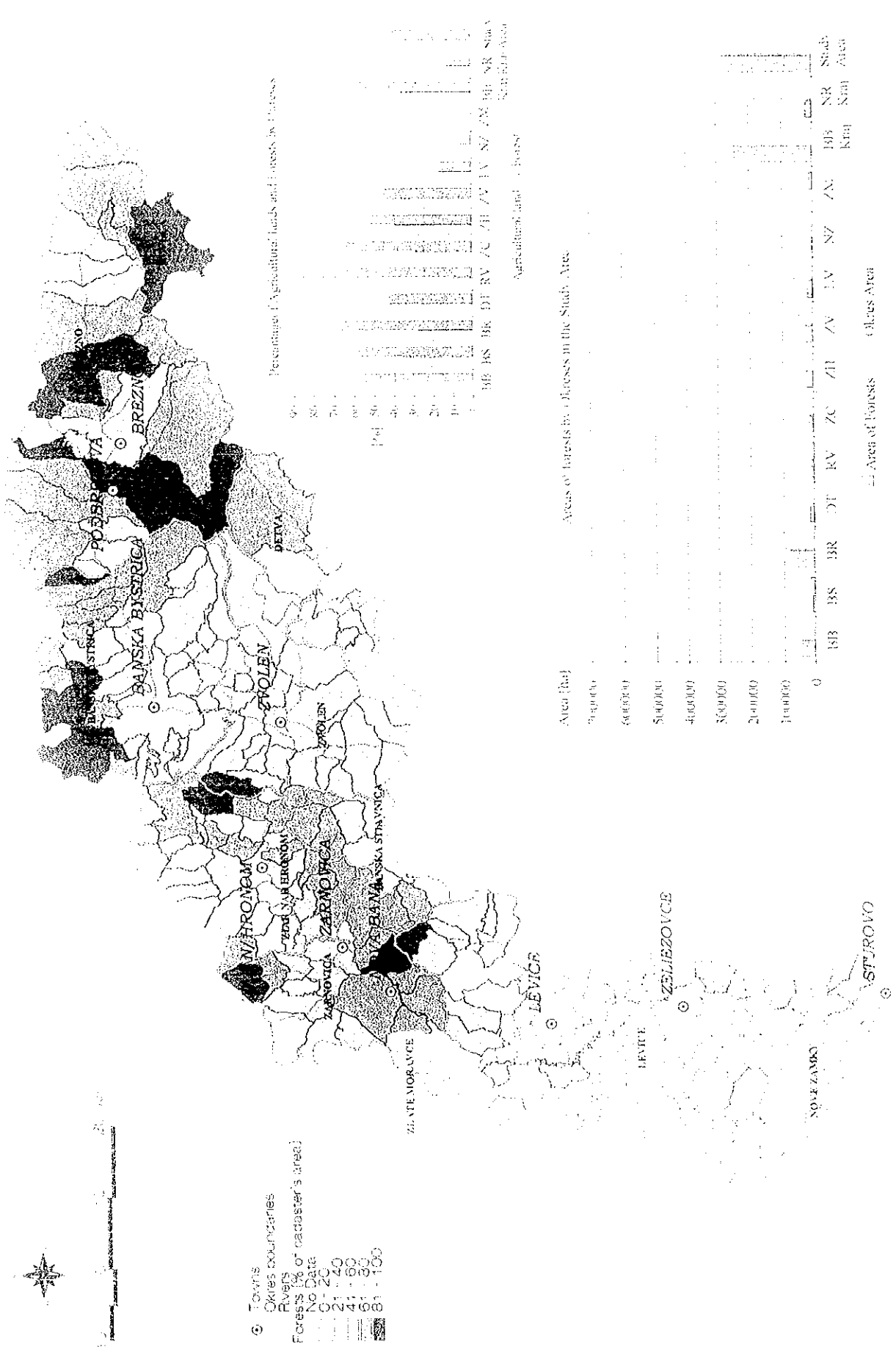
Map 2.7-2 Agricultural land use of the Study Area



Map 2.7-2 Agricultural land use of the Study Area



Map 2.7-3 Areas of Forests in the Study Area



Map 2.7-3 Areas of Forests in the Study Area



## 2.7.2 LANDCOVER CHANGES (1990-1998)

Maps 2.7 - 4 and 2.7 - 5 show the location of the areas which have been changed those landcover between 1990 and 1998. The areas have been changed from one to other types of land cover between 1990 and 1998 is around 3 000 ha, which is 5 % of the total Study Area. Table 2.7-2 show the detail data of landcover changes between 1990 and 1998.

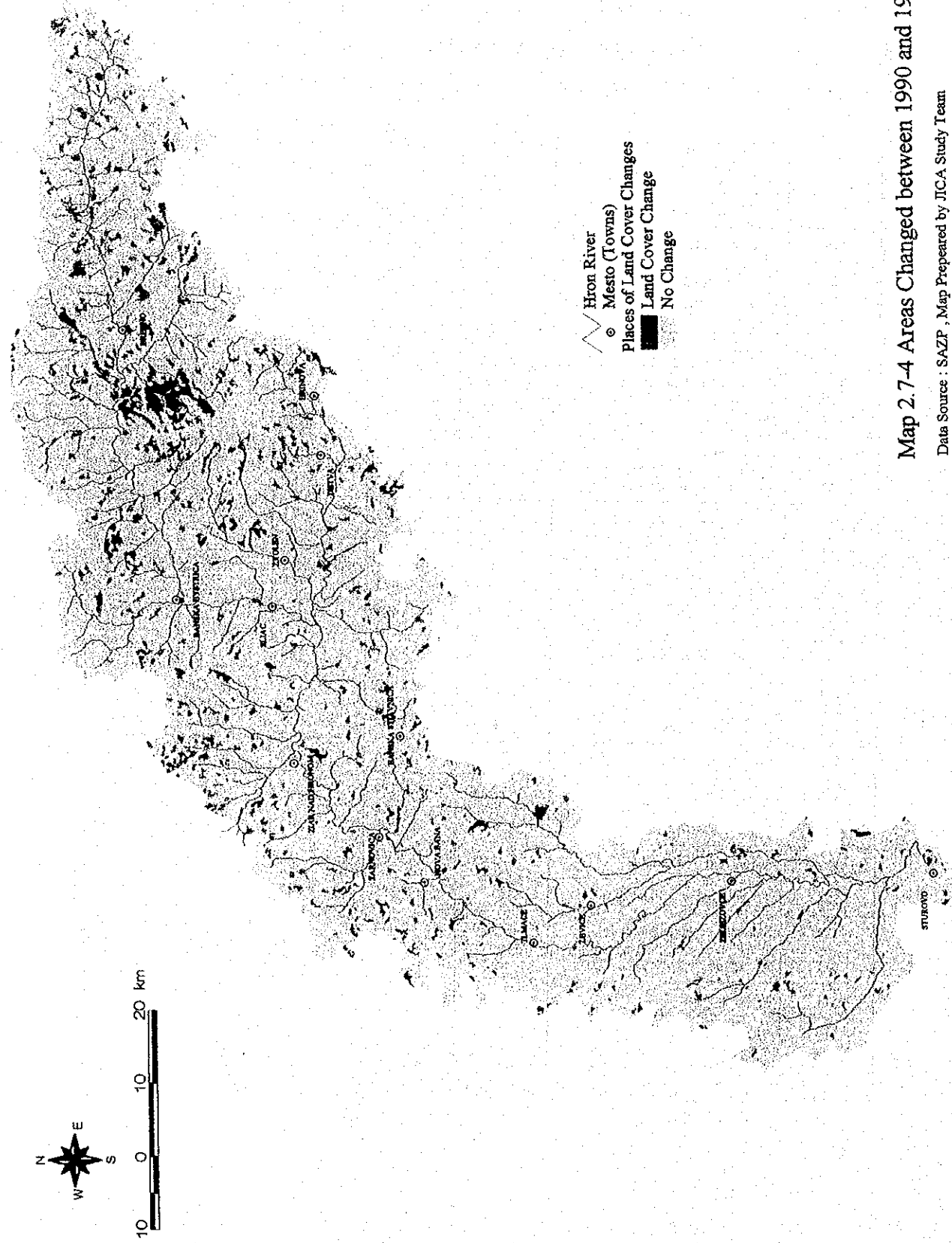
Table 2.7 - 2 Landcover Change 1990 - 1998 (ha)

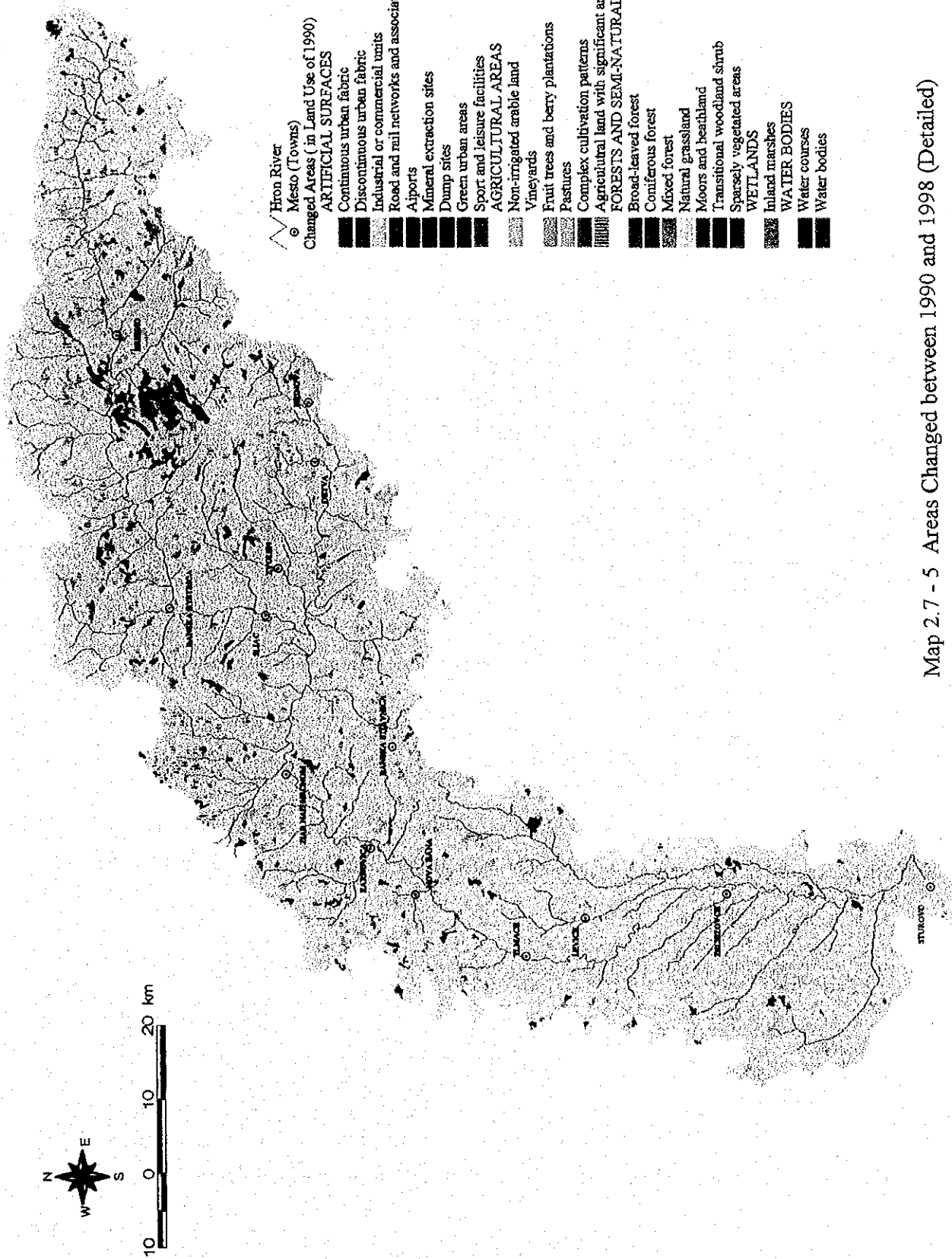
code no.	item	1990	1998	changes	loss	gain
111	Continuous urban fabric	144	144	0	0	0
112	Discontinuous urban fabric	21 274	21 425	151	113	264
121	Industrial & commercial units	3 126	3 299	173	0	173
122	Road & railway and associated lands	111	111	0	0	0
124	Airports	234	234	0	0	0
131	Mineral extraction sites	248	292	44	0	44
132	Dump sites	139	139	0	0	0
141	Green urban areas	29	29	0	0	0
142	Sports and leisure facilities	1 174	1 258	84	0	84
211	Non-irrigated arable land	166 713	166 222	-491	2 696	2 205
221	Vineyards	3 097	2 971	-126	243	117
222	Fruits gardens	1 246	1 092	-155	163	8
231	Pastures	27 035	28 355	1 320	3 251	4 572
242	Complex cultivation patterns	4 212	5 052	840	55	895
243	Land principally occupied by agriculture	72 861	69 704	-3 157	6 726	3 569
311	Broad-leaved forest	121 609	123 544	1 935	3 443	5 379
312	Coniferous forest	74 709	71 426	-3 283	4 128	845
313	Mixed forest	77 247	76 182	-1 066	4 129	3 063
321	Natural grassland	5 756	5 190	-565	582	16
322	Moors and heathland	2 081	2 094	13	16	29
324	Transitional woodland shrub	10 316	23 398	4 083	4 029	8 111
333	Sparsely vegetated areas	234	358	124	6	130
411	Inland marshes	376	391	15	0	15
511	Water courses	468	468	0	0	0
512	Water bodies	412	472	61	15	75
Total		603 851	603 851	0	29 595	29 595

Source: Landcover Maps of 1990 and 1998, made by SAZP and SAZP/JICA (Data: SAZP RS1, RS5)

### Map 2.7-4 Areas Changed between 1990 and 1998 (General)

Data Source : SAZP , Map Prepared by JICA Study Team





- Iron River
- Meso (Towns)
- Ezi
- Tlokoeng
- Mankwago
- Mafikeng
- Maseru
- Muroko
- Changed Areas (in Land Use of 1990)
- ARTIFICIAL SURFACES
- Continuous urban fabric
- Discontinuous urban fabric
- Industrial or commercial units
- Road and rail networks and associated land
- Airports
- Mineral extraction sites
- Dump sites
- Green urban areas
- Sport and leisure facilities
- AGRICULTURAL AREAS
- Non-irrigated arable land
- Vineyards
- Fruit trees and berry plantations
- Pastures
- Complex cultivation patterns
- Agricultural land with significant areas of natural vegetation
- FORESTS AND SEMI-NATURAL AREAS
- Broad-leaved forest
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- Transitional woodland shrub
- Sparsely vegetated areas
- WETLANDS
- Inland marshes
- WATER BODIES
- Water courses
- Water bodies

Map 2.7 - 5 Areas Changed between 1990 and 1998 (Detailed)

Data Source : SAZP , Map Prepared by JICA Study Team.

Within the areas of changed land cover, large areas of some types of the forest and agricultural lands have been changed as shown in Table 2.7 - 3. The factors of these changes could be explained by the following reasons;

- Abandonment of large-scale agricultural and pasture lands including state farm
- Abandonment of arable lands, vineyards and fruits gardens
- Effort of forestation on agricultural land

Table 2.7 - 3 Major Changes in Land Cover 1990 - 1998 (ha)

Code no.	1990	1998	Loss	Gain	Change	
					balance	share to 1990
1xx	26 480	26 932	113	565	452	1.7%
211	166 713	166 222	2 696	2 205	-491	-0.3%
231	27 035	28 355	3 251	4 572	1 320	4.9%
243	72 861	69 704	6 726	3 569	-3 157	-4.3%
Other 2xx	8 555	9 115	461	1 021	560	6.5%
311	121 609	123 544	3 443	5 379	1 935	1.6%
312	74 709	71 426	4 128	845	-3 283	-4.4%
313	77 247	76 182	4 129	3 063	-1 066	-1.4%
324	19 316	23 398	4 029	8 111	4 083	21.1%
Other 3xx	8 071	7 642	604	175	-429	-5.3%
4,5xx	1 256	1 332	15	90	75	6.0%

Notes;

- 211 Non-irrigated arable land
- 231 Pastures
- 243 Land principally occupied by agriculture with significant natural vegetation
- 311 Broad-leaved forest
- 312 Coniferous forest
- 313 Mixed forest
- 324 Transitional wood and shrub

Source; Corine Land Cover, SEA and JICA (Data: SAZP RS1, RS5)

It is noted that although the area is not so large, the artificial use of land has tendency to grow, i.e. urban expansion, extraction of construction materials, building industrial sites, and due to those trend, the agricultural use of land are decreasing, as shown in Table 2.7-4.

Table 2.7 - 4 Change of Land Cover 1990 - 1998 (Increase ratio)

	1990	1998	increment(ha)	increase ratio
Artificial use(1xx)	26 480	26 932	452	1.7%
Agriculture(2xx)	275 164	273 396	-1 767	-0.6%
Of which arable land(211,221,222)	171 056	170 285	-771	-0.5%
Forest and nature(3xx)	300 951	302 192	1 241	0.4%
Of which forest(311,312,313)	273 565	271 151	-2 413	-0.9%
Others(4,5xx)	1 256	1 332	75	6.0%

Source: Corine Landcover 1990 and 1998, SEA and JICA (Data: SAZP RS1, RS5)

### 2.7.3 SETTLEMENTS PATTERN

#### (1) Territorial configuration, inhabitation and development of residential structure

According to the national conception for territorial development of SR, the settlement structure is composed of settlement core areas and development lines. The structure of the settlement in the Study Area is designated as shown in below.

Hierarchy	I	II	III
Name of Kraj	Settlement core area of nation-wide and/or international importance with developed agglomeration ties	Settlement core area of regional importance with potential and/or developed agglomeration ties	Settlement core area of local importance with centripetal ties to the centre
Banska Bystrica	Slovenska Lupca-Banska Bystrica-Zvolen-	Kremnica-Ziar nad Hronom-Zarnovca	Brezno and Banska Stiavnica
Nitra	(Nitra)-Zlate Moravce (Vrable/Sela)	Timace-Levice-Zeliezovce	Sturovo

Source: Slovakia Spatial Development Perspective 1999, MAP (Ref. 5 - 27)

#### (2) Population distribution

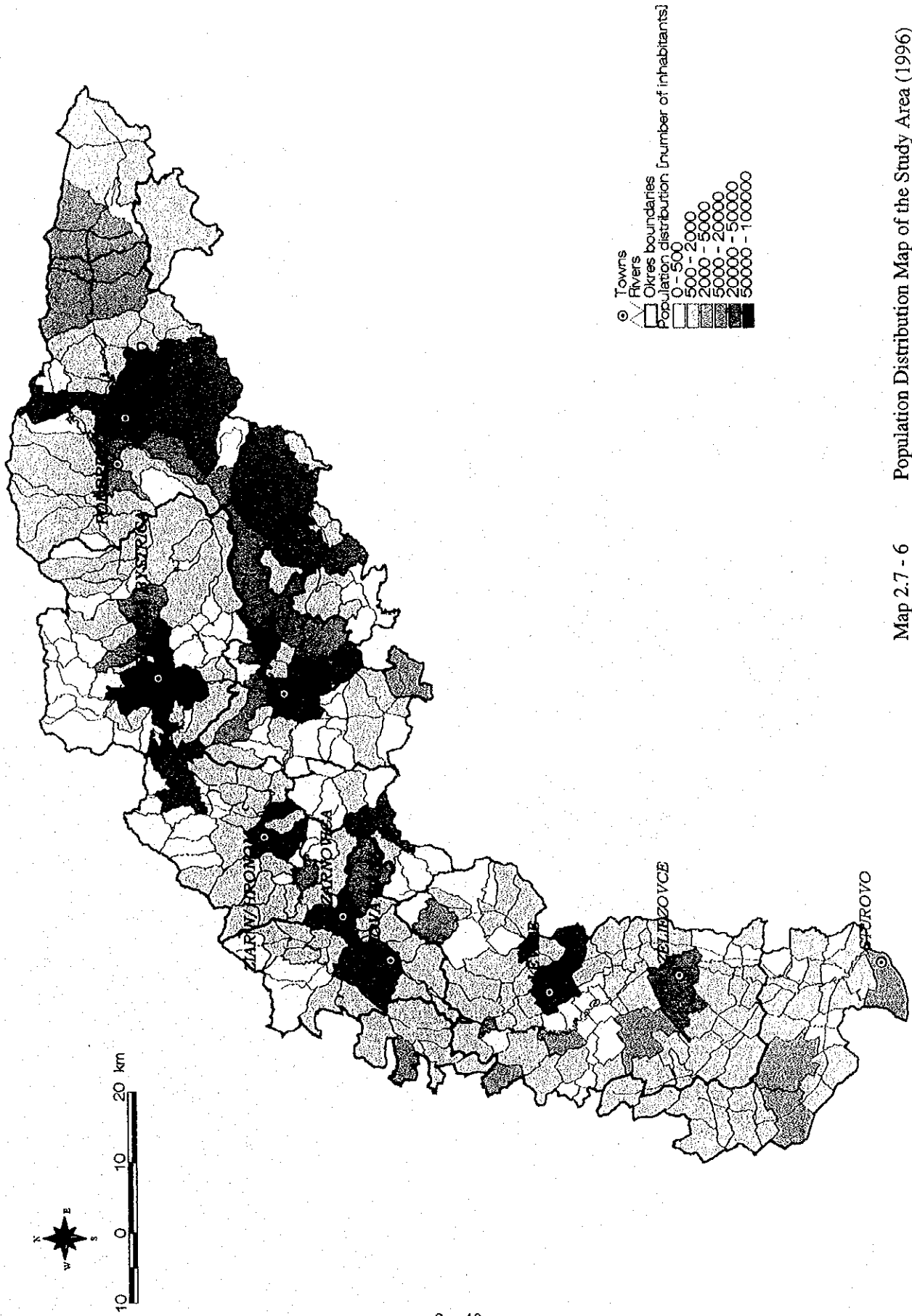
Table 2.7-5 shows the number of the inhabitants, area and population density in 1996 by 3 parts of the Hron basin. More than 59% of the inhabitants lives in the middle basin and 29 % in the middle and 13% in the lower basin. The average density of the population is 86 persons/ha in the Study Area in 1996, composed by 49 p/ha at the upper, 104 p/ha in the middle and 82 p/ha in the lower part of the basin. Map 2.7-6 shows the population distribution, and Map 2.7-7 shows the population density map of the Study Area by Obec/Mesto units.

Another characteristic of the population distribution is that the majority of the inhabitants and major industrial factories are located closely along the main flow of the Hron river, especially in the upper and middle parts of the basin. More than 70 % of the inhabitants live along the main reach of the Hron river. In the lower part of the basin, the settlement patterns forms rather scattered due to the agricultural character.

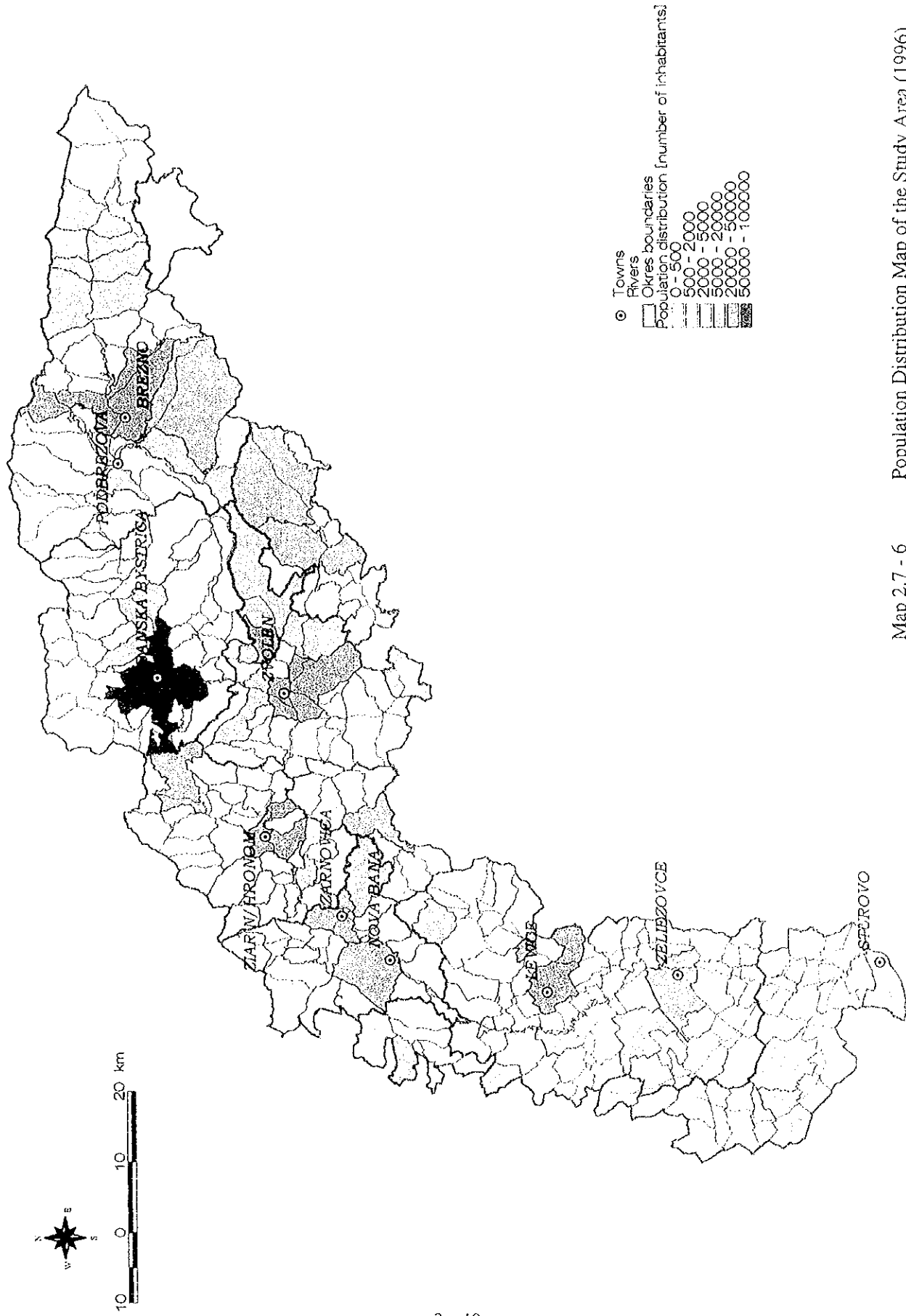
Table 2.7 - 5 Distribution of the population by Sub-basins and Okres 1996

Name of Sub-basin	Name of Okres	No. of Obec/Mesto	Population in 1996		Area in km <sup>2</sup>		Pop. density (p/km <sup>2</sup> )
			absolute	share	absolute	share	
Upper	Brezno	28	65 483	13%	1 243	21%	53
	Revuca	1	1 123	0%	103	2%	11
	Sub-total	29	66 606	13%	1 346	22%	49
Middle	Banska Bystrica	42	112 926	22%	809	13%	140
	Banska Stiavnica	10	14 419	3%	183	3%	79
	Detva	12	32 541	6%	343	6%	95
	Zarnovica	18	27 780	5%	425	7%	65
	Ziar nad Hronom	34	48 617	9%	531	9%	92
	Zvolen	24	67 469	13%	584	10%	116
	Sub-total	140	303 752	59%	2 875	48%	104
Lower	Levice	63	98 952	19%	1 133	19%	87
	Nove Zamky	25	40 109	8%	548	9%	73
	Zlate Moravce	7	8 204	2%	129	2%	64
	Sub-total	95	147 265	29%	1 810	30%	82
Total		264	517 623	100%	6 031	100%	86

Source: Statistical data by Obec/Mesto, 1996 (Refs. 14-6 through 14-16)



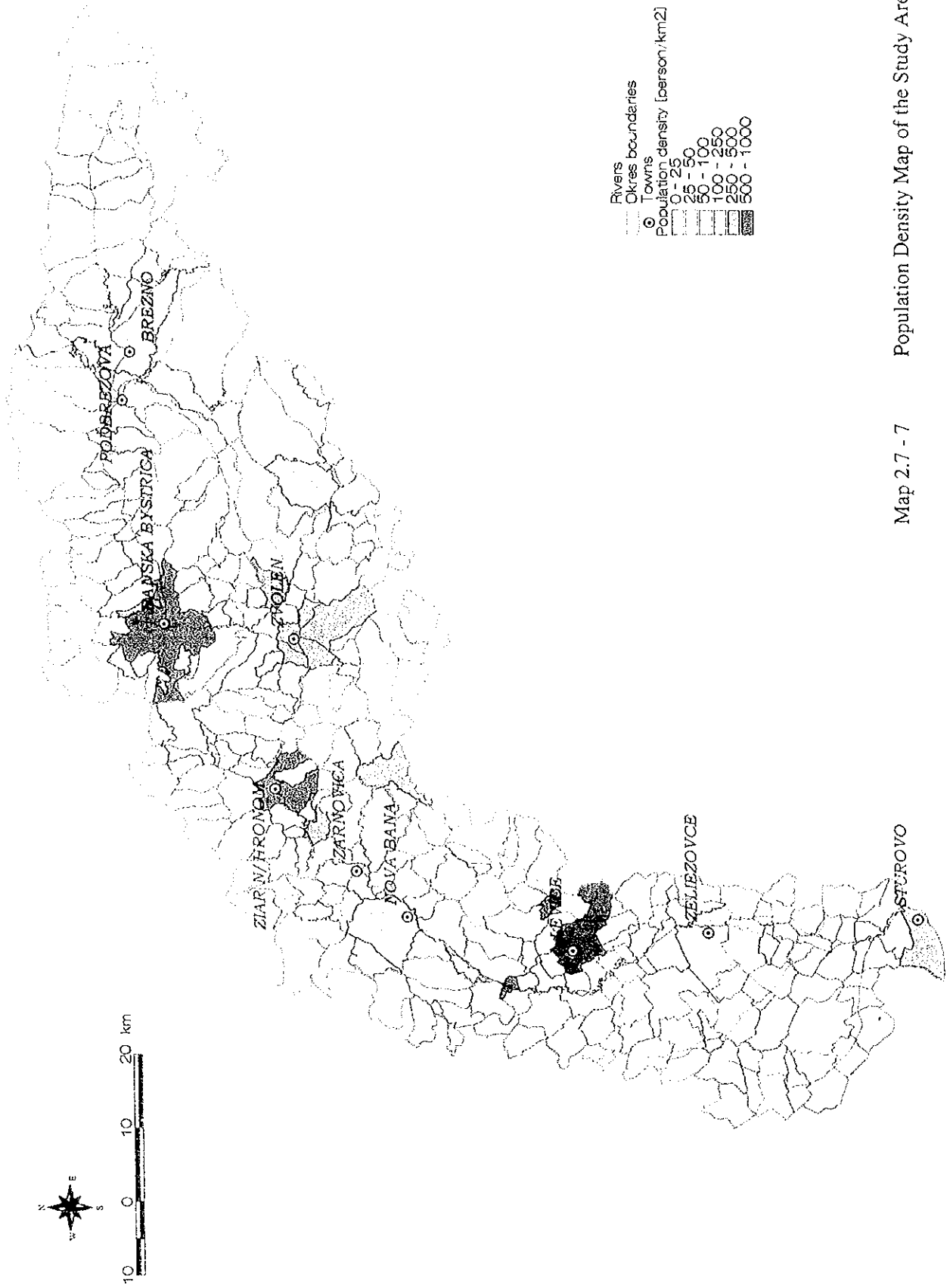
Map 2.7 - 6 Population Distribution Map of the Study Area (1996)



Map 2.7 - 6 Population Distribution Map of the Study Area (1996)







Map 2.7 - 7 Population Density Map of the Study Area (1996)

## 2.8 WATER INFRASTRUCTURE AND UTILISATION

### 2.8.1 GENERAL DESCRIPTION OF HYDRAULIC INFRASTRUCTURE

#### (1) Reservoirs

The Hron river system has few main reservoirs. Only one is on the Hron itself, at Vel'ke Kozmalovce near Levice, whilst two (at Hrinova and Motova) are on the Slatina river tributary and the fourth is at Batovce on the Jablonovka river. Basic details of these reservoirs are given in Table 2.8-1

Table 2.8 - 1 Basic Characteristics of Main Reservoirs in The Hron Basin

Reservoir	Dam Height	Catchment Area	Capacity	Main Uses
	(m)	(km <sup>2</sup> )	(m <sup>3</sup> ×10 <sup>6</sup> )	
Vel'ke Kozmalovce	8.0	4 016	3.23	Industrial, hydropower, domestic supply, irrigation, fish pond supply
Hrinova	51.0	71	7.28	Domestic water supply
Motova	16.2	411	2.93	Industry, hydropower, recreation, flood control
Batovce	13.4	-	1.04	Irrigation, increase minimum discharge, recreation, fish breeding

Source: Dams in Slovakia, TRT Medium, Bratislava, 1995 (Ref. 22 - 4)

These reservoirs are all small-medium size and are not a major influence on the hydrological characteristics of the Hron river. The barrage and reservoir at Vel'ke Kozmalovce reduce flows immediately downstream for a few kilometers. None has a significant retentive capacity.

In addition to these few comparatively large reservoirs there are about 330 small impoundments on the Hron river and its tributaries. These have been constructed for local industrial and domestic supply, hydropower and fish breeding purposes. The best known of these are the reservoirs constructed for the mining industry at Banska Stiavnica. Of the 54 originally constructed, 15 remain. Their construction started in the 16th century and they and their associated ancillary structures are of considerable historical and cultural value. The remaining reservoirs (eg Halcany, Banský Studenec) are still used for industrial supply and recreation. Other reservoir systems of considerable industrial/historical value are those at Turcek and Motycky-Stare Hory. The former dates from the 16th Century and transfers water from the Vah river basin, and is located just outside the Hron basin.

#### (2) Hydropower

The Hron river itself is not a major source of hydropower. The present installed capacity is 8.1 MW, principally at the Vel'ke Kozmalovce barrage (5.1 MW). Smaller hydropower stations are at Motova on the Slatin river (1.0 MW) and Turcek on the Turiek river.

Additionally there are a number of small hydropower stations such as the one on the Motycky-Jelenec-Stary Hory system with an output up to 485 KW. Total annual power production in the Hron basin is 25.1 GWhr. The hydropower system at Turcek is of considerable historical interest, being the first underground hydropower station in Europe.

The total technically useable hydropower potential of the main Hron river is an estimated 46.9 MW with an annual production of 247.8 GWh. The total hydropower potential of the whole Hron basin is an estimated 140 MW installed capacity at 98 locations with a total annual output of 340 GWh. The proposed Slatinka dam on the Slatina river has the potential of 36.6 MW.

### (3) Flood protection

Flood protection works have been undertaken on about 80 km (27%) of the Hron river. A large part of such regulated flows are on the lower Hron and designed to prevent the flooding and erosion of agriculture lands as well as urban areas. The lowest part of the Hron, from its junction with the Danube to the Blatniansky Potok (14.4 km) is fully protected by levees. Shorter levees have been built at Zeliezovce, Vynne nad Hronom to Dolna Sec, Kalnica, Vel'ke Kozmalovce, Hronsky Benadik, Zvolen and Banska Bystrica. River channelisation has been undertaken mainly at Banska Bystrica and Zvolen. Below Levice the Hron has been shortened by about 11 km by elimination of meanders. The increased river gradient and flow rates have reduced the flood risk. In parts of the Hron especially at Zvolen and Banska Bystrica, riverside trees have been removed to minimise obstructions at times of high river flow.

Despite these measures, some flood risks remain, particularly in the lower Hron. The 1-in-100 year flood is predicted to inundate large areas of agricultural lands, particularly those between the river and the Perec Canal. There is also doubt that at least some levees are high enough to provide the intended degree of protection.

Further flood protection works are proposed for the Hron to increase protection to farming and urban lands. Remedial measures are also planned for forest and wetland ecosystems damaged by some of the existing flood protection works which, besides limiting the inundation necessary for some of them, have also reduced water tables by up to 1.5 m in some areas.

Overall, flooding is not considered a major risk or danger in the Hron basin. The environmental action plans of both the Banska Bystrica and Nitra Kraj's do not raise any concerns or worries about this issue.

## 2.8.2 WITHDRAWALS FROM SURFACE WATER AND GROUNDWATER

### (1) Withdrawals from Surface Water

Surface waters supplied less than half (43.3%) of total water consumption in the Hron basin in 1998. Surface water consumption in the basin for the period 1989-1998 is given in Table 2.8-2.

Table 2.8 - 2 Water Consumption in the Hron Basin, 1989-1998

Consumer	Year and consumption (m <sup>3</sup> × 1000)									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Municipal and domestic	10 343	10 634	10 598	10 405	10 670	9 317	8 084	7 261	6 751	6 671
Industry	57 423	58 669	47 576	41 302	29 043	25 053	24 883	28 772	25 261	28 998
Agriculture	12 191	23 746	3 198	6 203	7 188	3 067	2 253	1 736	3 008	1 210
Total	79 957	93 049	61 372	57 910	46 901	37 437	35 220	37 769	35 020	36 879

Source: Povodie Hrona, 1999

Withdrawals of surface waters declined during the 1990s, the consumption of water in 1998 being only 39.6% of that in 1990. The reasons for this are:

- lower industrial and agricultural production;
- increased recycling of industrial water;
- decrease of grants for irrigation water;
- increases in domestic water tariffs (from SK 1.74/m<sup>3</sup> in 1990 to SK 8/m<sup>3</sup> in 1998).

Water sources include the Hron basin's major reservoirs such as Veľke Kozmalovce and Hrinova, as well as the Hron river itself and major tributaries such as the Slatina, Vyhniansky, Hnusno, Lupcica Bystrica, Perec, Driekyna, Tajovsky and Podlucianka. Additionally small lakes and reservoirs are used as water sources.

### (2) Withdrawals from Groundwater

Groundwater supplied more than half (56.7%) of total water consumption in the Hron basin in 1998. Groundwater consumption in the basin for the period 1989 to 1998 is given in Table 2.8

- 3.

Table 2.8 - 3 Groundwater Consumption in the Basin for the Period 1989 - 1998

Consumer	Year and Consumption (m <sup>3</sup> × 1000)									
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Municipal and domestic	71 372	75 783	77 774	74 872	68 676	68 977	65 470	45 645	45 317	44 339
Industry	4 264	4 098	4 397	5 036	3 582	3 414	3 522	3 309	2 932	2 680
Agricultural	2 908	2 899	2 572	2 169	1 902	1 808	1 999	1 807	1 545	1 356
Total	78 544	82 780	84 713	82 077	74 160	74 199	70 991	50 761	49 794	48 375

Source: Povodie Hrona, 1999

Withdrawals of groundwaters declined in the 1990s, the consumption of water in 1998 being only 58.4% of that in 1990. Proportionally, the withdrawal of groundwater declined less than that of surface water. The reasons for the decline in groundwater consumption are the same as those for surface water.

In the Hron basin there are 88 groundwater sources with a yield of more than 5.0 l/s, of which 40 are springs and 48 are wells. Of these there are 20 with yields above 20 l/s and a combined yield of about 2 m<sup>3</sup>/s. Some of the groundwater consumed in the Hron basin, particularly in the lower Hron (Nitra Kraj), is piped in from sources outside the area.

### 2.8.3 WATER SUPPLY AND UTILIZATION

#### (1) Water Supply for Agriculture

The data in Tables 2.8 - 2 and 2.8 - 3 show the annual volumes of water used for agricultural purposes, mainly irrigation, from 1989 to 1998. In 1998 the amounts of water used from groundwater and surface water sources were 1 356 Mm<sup>3</sup> and 1 210 Mm<sup>3</sup> respectively (total of 2 566 Mm<sup>3</sup>). In the 1990s the amount of water used for agricultural purposes declined by more than 90% from a total utilised volume of 26 645 Mm<sup>3</sup> in 1990. Most of this decline was due to the sharp fall in surface water consumption, from 23 746 Mm<sup>3</sup> in 1990 to 1 210 Mm<sup>3</sup> in 1998. The decline in agricultural consumption was due to falling agricultural production and a decrease of subsidies for using water for irrigation.

#### (2) Water Supply for Industry

The data in Table 2.8 - 2 and 2.8 - 3 show the annual volumes of water used for industrial purposes from 1989 to 1998. In 1989 a total volume of 31 678 Mm<sup>3</sup> was used by industry, equivalent to 50.5% of the 1990 consumption (627 667 Mm<sup>3</sup>). In 1998 by far the biggest source of industrial water was surface water (90.8%), drawn mainly from the Hron river and principal tributaries (eg Hnusno, Lupcica, Bystrica, Driekyna and Tajovsky) and major

reservoirs such as Motova and Vel'ke Kozmalovce. The decline in industrial consumption was due to decreasing industrial activities in the 1990s, improved technologies and water recycling in the major industries.

### (3) Municipal and Domestic Water

The data in Table 2.8-2 and 2.8-3 show the annual volumes of water used for domestic and municipal supply from 1989 to 1998. In 1998 the total supply was 51 010 Mm<sup>3</sup>, of which 44 339 (86.9%) was from groundwater sources. Major surface water sources included the principal reservoirs of Hrinova and Vel'ke Kozmalovce as well as Hron river tributaries (eg Slatina and Vyhniansky). The Hron river itself is not used as a source of drinking water. Supply in 1998 was 59.0% of that in 1989. This significant decline was probably due to the sharp increase in domestic water tariffs in the 1990s.

More than 90% of Banska Bystrica Kraj domestic and municipal water supply is from groundwater, including springs and shallow wells. The main sources are the aquifers of the south east part of the Vel'ka Fatra mountains, the Low Tatras range between Plaska and Donovaly, neovolcanites of the Kremnicke Hills and the Zvolen Basin and alluvial sediments of the Hron river from Ziar nad Hronom to Zelizovce. Most of the groundwater supply in Nitra Kraj is from sources outside the Study Area. These include Dunajska Streda and Galanta Okres as well as the pipeline from Gabcikovo and Jelka.

Groundwater quality is generally good, through some of the drinking water quality standards are exceeded before treatment. Groundwater sources along the Hron river are susceptible to pollution from discharges of inadequately treated domestic, industrial and agricultural wastes, as well as the application of fertilizers and pesticides in areas of intensive agriculture.

The highest proportions of connections to the public water supply are in the districts of Banska Bystrica (94%), Zvolen (87%), and Ziar nad Hronom (85%). Table 2.8-4 summarises the proportion of people in the Study Area connected to the public water supply system. The percentage connected in Nitra Kraj (64%) is significantly lower than in Banska Bystrica Kraj (85%).

Table 2.8 - 4 Proportions of Study Area Population Connected to Public Water Supply Systems in Banska Bystrica and Nitra Krajs

Kraj	Okres	No. of Obecs	No. of Obecs with Supply	No. of Connections	Population Connected	% Population Connected
Banska Bystrica	Banska Bystrica	42	38	10 941	106 041	94
	Banska Stiavnica	12	6	1 684	11 208	77
	Brezno	28	28	11 987	54 477	83
	Detva	12	5	1 971	20 951	66
	Revuca	1	-	-	-	-
	Zarnovica	18	15	4 569	22 992	81
	Ziar n. Hronom	32	29	6 867	41 362	85
	Zvolen	24	18	8 133	58 436	87
	Sub Total	169	139	46 152	315 467	85
Nitra	Levice	63	28	11 080	72 959	74
	Nove Zamky	25	17	6 399	30 042	75
	Zlate Moravce	7	-	-	-	-
	Sub Total	95	45	17 479	103 001	64
	Study Area Total	264	184	63 631	418 469	79

Source: Statistical data of BB and Nitra Kraj, and other supplementary data from Okres and health offices (Refs. 14-4, 14-7 through 14-11, 14-14, 14-15, 14-17)

Out of the 264 obecs/mestos in the Study Area, 30% have no connections to the public water supply system. People in these areas are mainly dependent on shallow wells at or close to their houses. The greater proportion of these unconnected obecs (63%) is in Nitra Kraj, particularly in the lower part of the Hron valley.

#### 2.8.4 WATER UTILISATION – OVERALL SITUATION

The REMP team does not have sufficient information to consider the overall water balance for the Hron basin. It is understood that a Water Management Plan is being prepared by Povodie Hrona and that this will contain much information on the available water resources and water demand situation in the basin. Such information is important for environmental planning.

Water supply in the basin in 1998 (85 254 Mm<sup>3</sup>) was 48% of that in 1990 (175 829 Mm<sup>3</sup>). This suggests that at the present time there is considerably less pressure on the basin's water resources than there was at the beginning of the decade. The pressure can rapidly increase if the trends of the 1990s (declining industrial, agricultural and domestic consumption) are reversed.



## 2.8.5 WASTEWATER INFRASTRUCTURE

### (1) Wastewater Treatment Plants

Recent data (1998) for the present and planned future capacities of domestic wastewater treatment plants were provided by Povodie Hrona as shown in Table 2.8 -5.

Table 2.8 - 5 Present and Planned Future Capacities (based on BOD<sub>5</sub>) of Wastewater Treatment Plants in the Hron Basin

Locality of Wastewater Treatment Plant	Present Capacity as of 31 Dec. 1998 (Person equivalent)	Planned Future Capacity (Person equivalent)
Banska Bystrica	134 400	544 000
Banska Stiavnica		
Brezno	27 000	50 000
Cierny Balog	2 500	2 500
Detva	27 390	27 400
Dolna Lehota	2 500	5 000
Hrinova	9 100	10 000
Jasenie	100	500
Kalna nad Hronom	3 000	3 000
Krpacova	1 000	1 000
Levice	123 000	275 000
Nova Bana	8 600	10 000
Osrblie	500	500
Pliesovce	5 000	5 000
Podbrezova - Stiavnicka	3 500	3 500
Polomka	3 500	3 500
Pukanec	2 500	2 500
Slatinske lazy	500	500
Stara Kremnicka	1 000	1 000
Tale	1 000	1 000
Tlmace	10 000	10 000
Trangoska	500	500
Valaska	3 500	5 000
Zeliezovce	9 100	10 000
Ziar nad Hronom	58 483	60 000
Zvolen	117 611	235 000

Source: Internal data of Povodie Hrona

The above figures refer generally to design capacities. Since information on the wastewater quantity, influent and effluent water quality is limited, it is not possible to make reliable estimates on the overall efficiency of wastewater treatment in the Study Area. It is clear however that actual capacity in such major centres as Banska Bystrica, Levice and Zvolen is less than that currently needed. Untreated or partially treated wastewater discharges are therefore a threat to surface and groundwater quality. There is a major requirement for improved treatment of domestic wastewaters in the Study Area.

(2) Connections to Sewers and Wastewater Treatment Plans

The numbers of people connected to existing sewer systems are shown in Table 2.8-6.

Table 2.8 - 6 Numbers of People Connected to Sewer Systems (SS) in the Study Area

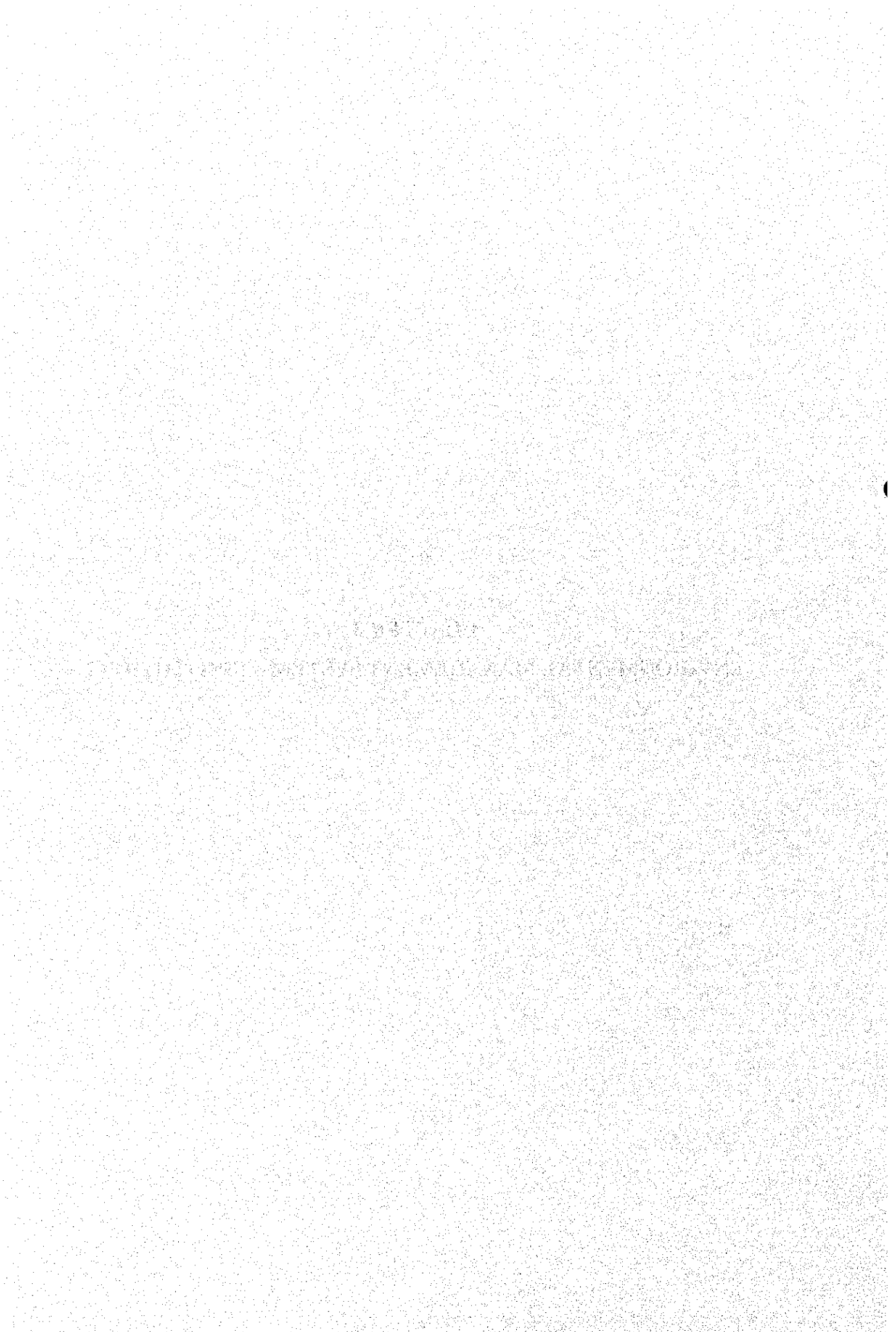
Kraj	Okres	No. of Obecs	No. with SS	No. of Connection to SS	Population Connected to SS (*)	% of Population Connected to SS	No. of STP
Banska Bystrica	Banska Bystrica	42	4	3 191	87 381	77	1
	Banska Stiavnica	12	2	597	9 598	66	1
	Brezno	28	3	1 001	23 615	36	1
	Detva	12	3	636	14 495	46	0
	Revuca	1	-	-	-	-	0
	Zarnovica	18	6	295	10 946	39	2
	Ziar n. Hronom	32	11	1 364	31 643	65	2
	Zvolen	24	5	2 862	48 026	71	1
	Sub Total	169	29	9 946	225 704	61	8
Nitra	Levice	63	6	2 962	46 475	47	5
	Nove Zamky	25	1	576	10 150	25	0
	Zlate Moravce	7	-	-	-	-	0
	Sub Total	95	7	3 538	56 625	35	5
Study Area Total		264	36	13 484	282 329	53	13

Source: Statistical data of BB and Nitra Kraj, and other supplementary data from Okres offices (Refs. 14-4, 14-7 through 14-11, 14-14, 14-15, 14-17)

Note: (\*): Figures for "Population connected to SS" for Obec in BB Kraj were estimated by the Study Team by multiplying the number of connections by 20, which was derived from statistical data of Nitra Kraj and Mesto's of Banska Bystrica Kraj.  
STP: sewage treatment plant

In Banska Bystrica Kraj 61% of the population is connected to a public sewer system, whilst in Nitra Kraj it is substantially lower at 35%. Overall in the Study Area, 53% of the population is connected. Many obecs are not connected at all, whilst some okres have a high connection rate, for example Banska Bystrica (79.6%), Zvolen (67.2%) and Ziar nad Hronom (65.4%). The development of the public sewer system is slower than that of the public drinking water supply.

**CHAPTER 3**  
**ENVIRONMENTAL MANAGEMENT SYSTEM – INSTITUTIONS**



### 3.1 OVERALL ADMINISTRATIVE FRAMEWORK IN SLOVAKIA IN RELATION TO ENVIRONMENTAL MANAGEMENT

#### 3.1.1 INTRODUCTION

With respect to the management of the six environmental 'sectors' that are the main focus of this REMP:

- Surface water quality
- Soil and groundwater
- Air quality
- Solid Waste
- Ecology and biodiversity (including forestry)
- Heritage and tourism resources

some details of the institutional responsibilities and arrangements, and of the supporting legislation, are given in Chapter 5 (part 3 of each section).

The text which follows here (Chapter 3) describes and discusses the broader institutional situation and legislation, in Slovakia and the Hron Basin/Study Area, in so far as these are concerned with (or have an effect on) environmental management. Community participation, the provision of environmental information and environmental education and the arrangements for environmental monitoring are also described and discussed in this section. These all form part of the institutional system related to managing the environment. For the technical measures, which form the Core Plan of the REMP (Main Report, Chapter 5; Summary, Chapter 2), to receive widespread support and then be implemented successfully, it is essential that this 'institutional system' is functioning well. Recommendations on how the institutional system (including environmental education etc) might be improved in order to improve environmental management within the Study Area are given in Chapter 6; these recommendations constitute the supporting measures for the REMP.

#### 3.1.2 OVERALL ORGANISATION OF GOVERNMENT IN SLOVAKIA

The administration of the Slovak Republic is built upon two strands of government, which together make up the political and administrative fabric of the country. These two strands are:

(1) **Elected Representatives of the citizens**

- at national level (parliamentary representatives) and
- at municipal level.

For a regional study such as the REMP it is the local, municipal representatives that are especially important and their organisation is described further in the following paragraphs; their overall environmental functions are described in section 3.2.4.

The elected representatives of the 2 878 municipalities in Slovakia operate in the form of city (*mesto*) and village (*obec*) councils. There are 136 *mesto* and 2 724 *obec*; each is led by an elected mayor and has a supporting executive, with staff numbers ranging from 1 (in the case of very small *obec*) to over 100 (in the case of Banska Bystrica *mesto*). The mayors of *mesto* are called *Primator* and those of *obec* (ie villages in rural areas) are called *Starosta*. The mayors of cities have a greater degree of autonomy. Most municipalities are members of a Regional Association of Towns and Villages (ZMOS), which together form the National Association of ZMOS; a smaller number are members of the Union of Cities of Slovakia. Some Municipalities are members of both these organisations - membership being on an entirely voluntary basis.

These associations are partners in national government in that they send comments on draft legislation, but only on an unofficial basis ie they have no legal power. Therefore they act as a 'lobby' to parliament and also to the State Administration at national (Ministry), *Kraj*, and *Okres* levels.

The populations of some municipalities are very small (less than 500) so, in some areas, neighbouring Municipalities have established informal unions called 'Microregions', in order to facilitate design and implementation of development programmes and to benefit in other ways from economies of scale.

In the Study Area there are 264 Municipalities, 15 are *Mesto* and 249 *Obec* (see Supporting Report, Annex B; towns having a 'City/Town Council' are called *Mesto*, while the *Obec* are rural municipalities). Those *Mesto* in the Hron River Basin Study Area, with population as at 1st January 1996 are listed in Table 3.1 - 1. The 8 marked with an asterisk\* are also *Okres* towns; the remainder have been designated *Mesto* for historical reasons.

Table 3.1 - 1 Mesto in the Study Area

Mesto	Population
Banska Bystrica*	84 919
Zvolen*	44 328
Levice*	36 502
Brezno*	22 988
Ziar nad Hronom*	20 390
Detva*	15 347
Sturovo	13 497
Banska Stiavnica*	10 596
Hrinova	8 534
Zeliezovce	7 628
Nova Bana	7 563
Kremnica	6 610
Zarnovica*	6 595
Tlmace	5 415
Slac	4 604

Source : VKU (Military Cartographic Institute), 1996

(2) **The State Administration, which is made up of civil servants at three levels across the Republic:**

1) National Level – including Ministry of Environment and its Agencies

Civil Servants administering policies through the various Ministries of the Slovak Republic. Ministries with particular responsibilities for environmental management are the Ministry of Environment; Ministry of Interior (through its responsibility for 8 *Kraj* and 79 *Okres* offices throughout the country); Ministry of Land Resources/Agriculture (responsible for agriculture, forestry and water management); the Ministry of Economy (responsible for industry and tourism); Ministry of Culture (responsible for monuments).

The Ministry of Environment assumes the primary responsibility of the state environmental administration. The current structure of the Ministry is shown in Figure 3.1-1. Significant elements of the work of the Ministry of Environment (MZP) are carried out by its agencies/institutes, such as the Slovak Environment Agency (SAZP) and the National Parks Administration. The current structure of the SAZP is shown in Figure 3.1-2 and its responsibilities and activities are described further in subsequent sections of this chapter (3.2, 3.4, 3.5 etc) and under the appropriate sections of Chapter 5, as are those of other MZP institutes of relevance to the REMP.

## 2) Regional (*Kraj*) level administration.

There are 8 *Kraj* across the Slovak Republic, with staff appointed by the Ministry of Interior, but no elected representatives. The *Kraj* Offices (*Krajsky Urad*) are required by law to co-ordinate the preparation and implementation of social and economic development plans (especially in the form of medium- to long-term Territorial Plans), with local government and other public sector institutions of the *Kraj* area. They possess environmental staff, recently (1996?) transferred from independent regional offices of the Ministry of Environment and who still operate under the technical guidance of the Ministry of Environment, but with decision-making now the responsibility of the *Kraj* administration.

The organisational structure of a *Kraj* office (in this case Nitra) is shown in Figure 3.1 – 3; this *Kraj* Office has 17 Departments.

## 3) District (*Okres*) level administration.

There are 79 *Okres* across the Slovak Republic and, as for the *Krajsky Urad*, their staff are appointed by the Ministry of Interior and there are no elected representatives. The role of the District Office (*Okresny Urad*) is the co-ordination of social and economic development plans and strategic development of the district. They have a host of other roles including environmental planning, registration of small firms, transport planning and provision, consumer protection and provision of health care, education and culture and international co-operation. The regional development function is undertaken by regional development departments, which are responsible for preparing and monitoring social and economic development strategies for the district, and co-ordinating the initiatives of citizens and institutions with regard to district development. One aspect of this is the co-ordination of the needs and requirements of small municipalities (*Obec*) in rural areas of the district.

The *Kraj* and *Okres* occurring within the Hron River Basin have already been listed in Chapter 1; further statistics relating to each *Okres* were presented in Chapter 2 (Table 2.5 – 2).



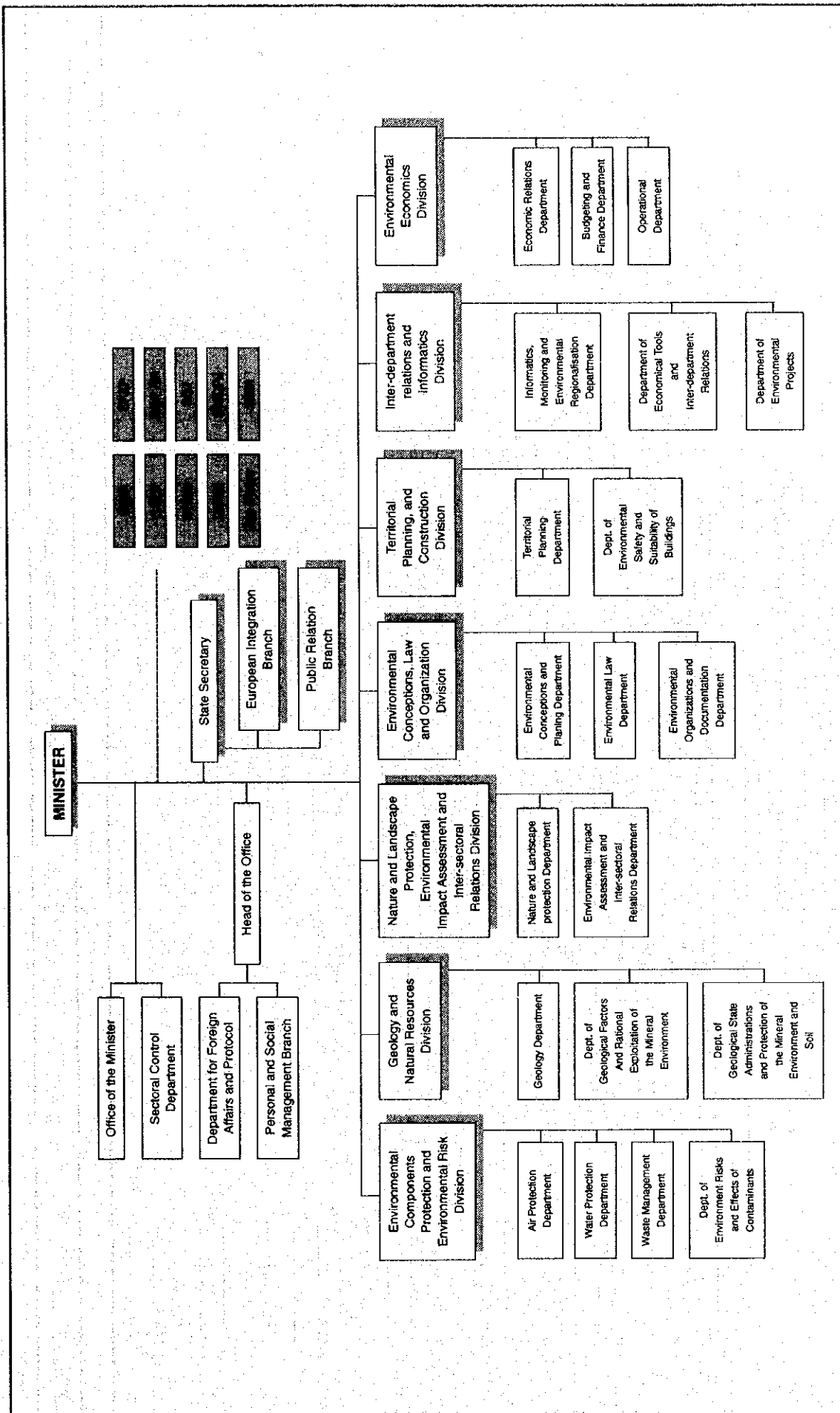


Figure 3.1-1 Organization of the Ministry of the Environment of the Slovak Republic

2) Regional (*Kraj*) level administration.

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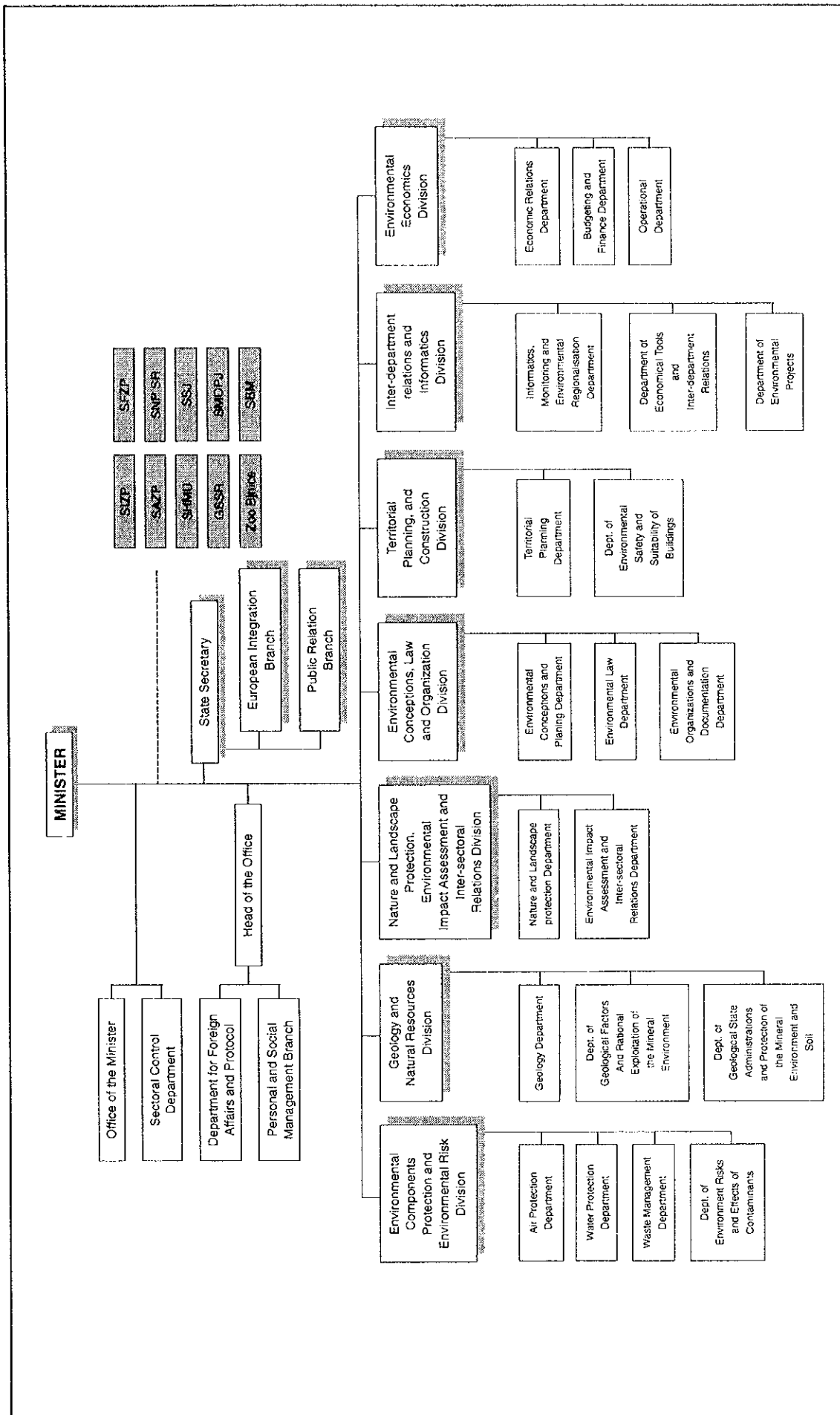
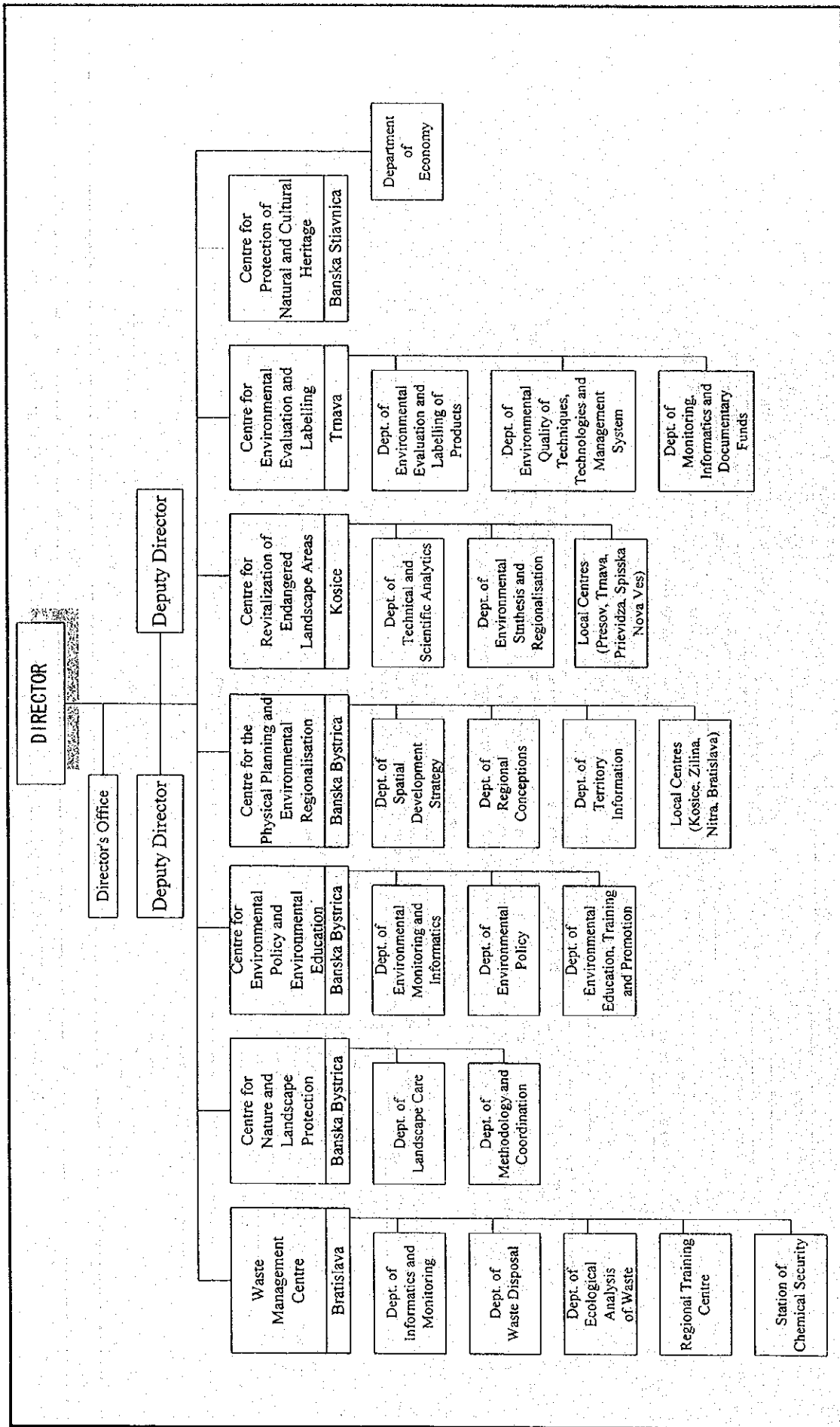
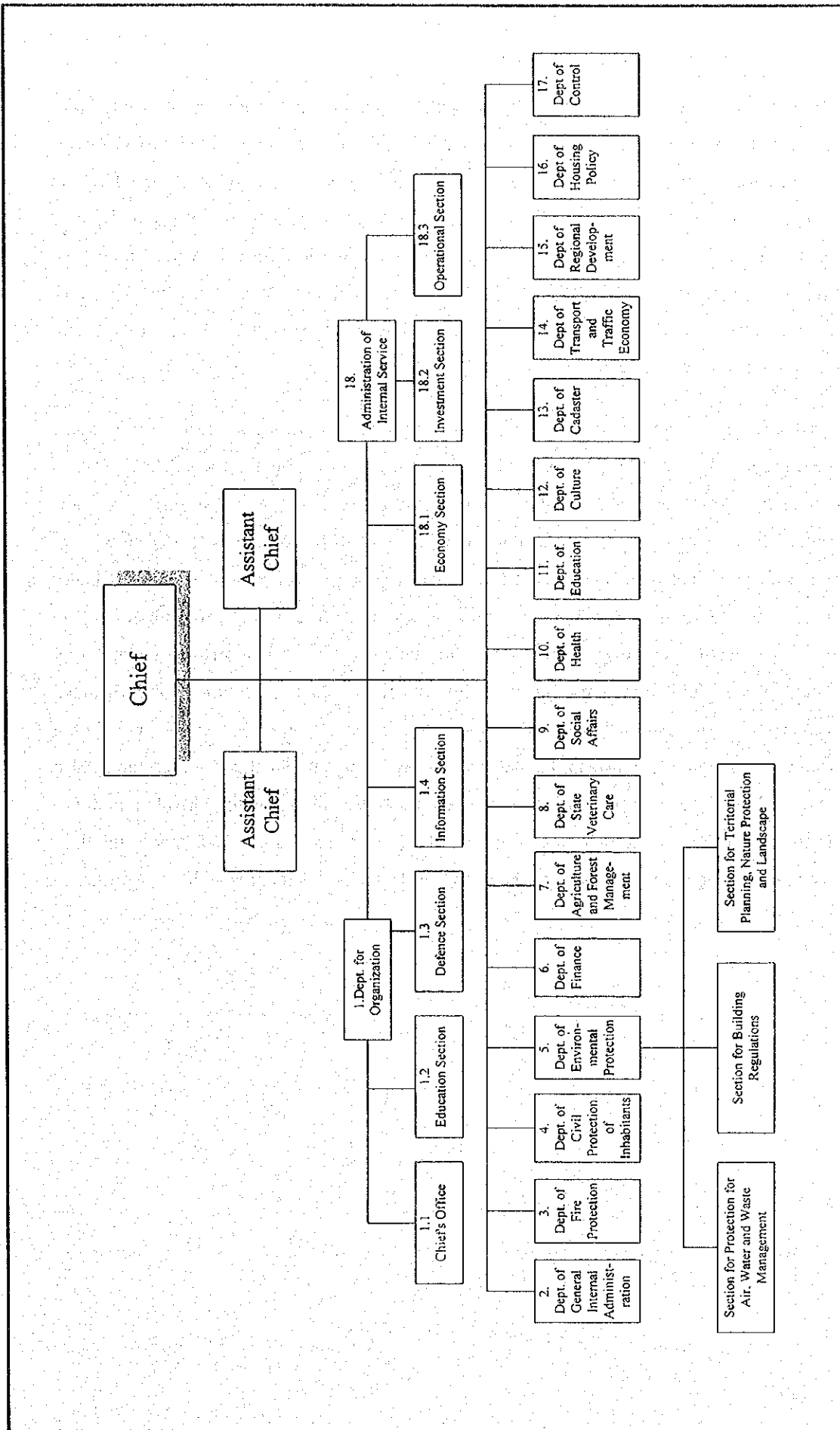


Figure 3.1-1 Organization of the Ministry of the Environment of the Slovak Republic



Organization of the Slovak Environmental Agency

Figure 3.1 - 2



Organization of the Kraj Office in Niitra

Figure 3.1 - 3

#### 4) Previous Administrative Divisions

It should be noted that, prior to July 1996, Slovakia was divided into four major *Kraj*/regions, Bratislava and West, Central and Eastern Slovakia and these were sub-divided into 37 *Okres*. These previous *Okres* were larger; for example the former *Okres* of Ziar nad Hronom encompassed three of the current *Okres*, namely Banska Stiavnica, Zarnovica and Ziar nad Hronom. Though some organisations (eg the Central and Western Slovak Water Supply and Sewerage Companies, StVak and ZsVak), still operate according to the previous divisions, these administrative divisions are, formally, no longer in existence as far as regional government is concerned.

Nevertheless, these 'old' regions (or similar ones) may be of value again in the future. Some of the European Union (EU) development funding for pre-accession and member countries is provided to regions with a population above a minimum size (eg 2 million). The new administrative regions (*Kraj*) of Slovakia therefore tend to be too small to be eligible for regional development assistance, while the previous (larger) *Kraj* would have fitted better with such EU funding arrangements. Similarly, sectoral projects and programmes (eg to improve air quality, wastewater treatment), for which it can be demonstrated that larger numbers of people will benefit, are also more likely to receive technical and financial assistance from international sources. Other factors (eg physical geography, population distribution, economic conditions, the balance between state and local self-government) also have an influence on the selection of suitable administrative divisions for Slovakia, and it is understood that the Government is considering changes to the existing divisions in the light of such factors, including accession to the European Union. This topic is addressed further in Chapter 6.