

## **B.4 CLIMATE AND METEOROLOGY**

### **B.4.1 CLIMATOLOGICAL REVIEW OF THE HRON BASIN**

From the SHMU's data (1951-1980), monthly means and yearly means of some important climatological characteristics in the Hron basin are given in Table B.4 - 1.

The variability in the air temperature is highest during the winter months (January, February, December), and the lowest during summer (June, July, August). During winter there are frequent temperature inversions in the valleys. The duration can be some days and the inversion can reach a height of 2 km. The vertical gradient of the air temperature during this period does not reach a negative value; stratification of the air mass is stable. During the summer period there are inversions during the night, but they are only at a height of some tens of meters.

#### **(1) Temperature conditions**

The highest variability in the air temperature is during the winter months (January, February, December), the lowest is during summer (June, July, August). During winter there are frequent temperature inversions in the valleys. The duration can be some days and the inversion can reach a height of 2 km. The vertical gradient of the air temperature during this period does not reach a negative value; stratification of the air mass is stable. During the summer period there are inversions during the night, but they are only at a height of some tens of meters. Average annual and monthly temperatures for 1961-1990 have reached similar values to previous period 1931-1980. Average annual air temperatures for period 1991-1998 increased by 0.3-0.6 degrees above the standard. In a very hot year 1994 was average annual temperature of air 1.3-2.2 C higher in comparison to standard. Warming was obvious mainly in southern parts of basin. In 1994 a tropic day occurred after 42 years on Hron spring. In 90-ties, April 97, September and October 97 were significantly below temperature standard. The minimum temperature measured till this period was broken in these months in upper and middle parts of the Hron. It reached -12 C. The lowest under-standard temperatures in the Hron area were measured in December 1996. In Telgart, the air temperature has fallen to a December minimum -20 C.

Table B.4 - 1 Climatological Review of the Hron Basin

Mean monthly (yearly) air temperatures [Deg. C] (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12	Year
B.Bystrica	427	-3.4	-1.1	2.9	8.5	13.3	16.8	18.1	17.4	13.4	8.4	3.4	-1.1	8.0
Brezno	487	-5.1	-2.7	1.6	6.9	11.8	15.3	16.6	15.7	11.9	7.2	2.4	-2.5	6.6
Chopok	2008	-9.3	-9.0	-6.9	-3.0	1.6	5.5	6.9	6.9	3.9	0.6	-4.0	-7.3	-1.2
Slac	313	-4.0	-1.5	2.8	8.4	13.2	16.8	18.0	17.2	13.2	8.2	3.5	-1.4	7.9
Telgárt	901	-5.4	-4.0	-0.9	4.3	9.3	12.9	14.3	13.6	10.0	5.7	0.6	-3.5	4.7
Viglas-Pstrusa	368	-4.2	-1.6	2.7	8.2	12.8	16.3	17.7	17.0	13.1	8.0	3.4	-1.4	7.7
Ziar n/Hronom	275	-3.0	-0.7	3.3	8.8	13.4	17.0	18.2	17.3	13.4	8.5	3.9	-0.7	8.3
Zeliezovce	137	-2.4	-0.3	4.0	9.7	14.4	18.1	19.3	18.6	14.5	9.2	4.4	-0.2	9.1

Absolute maximum air temperatures [Deg. C] (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12
B.Bystrica	427	12.1	14.6	24.1	28.3	31.1	32.5	36.2	38.4	32.5	26.0	19.5	12.5
Brezno	487	12.8	14.5	23.3	27.1	30.6	32.5	34.5	36.5	32.0	26.5	20.0	13.7
Chopok	2008	4.6	5.9	7.8	14.4	18.8	19.2	19.7	19.4	18.2	13.2	8.5	7.6
Slac	313	12.4	15.4	24.7	28.4	31.4	32.7	35.1	37.2	32.5	26.0	20.4	13.2
Telgárt	901	9.0	13.2	19.4	23.0	26.2	27.3	30.3	32.1	27.0	21.6	16.2	11.7
Viglas-Pstrusa	368	9.2	15.1	25.3	27.0	31.0	32.4	34.2	37.0	32.0	27.0	18.5	13.5

Absolute minimum air temperatures [Deg. C] (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12
B.Bystrica	427	-26.6	-25.8	-21.2	-7.0	-4.0	0.2	2.4	2.0	-2.5	-7.4	-17.0	-22.2
Brezno	487	-32.7	-32.0	-30.0	-9.6	-5.5	-2.2	0.0	-1.0	-5.7	-11.7	-22.7	-30.5
Chopok	2008	-31.5	-27.8	-22.5	-21.5	-14.0	-8.2	-3.8	-4.0	-8.2	-15.1	-24.6	-26.7
Slac	313	-30.0	-29.4	-26.2	-6.0	-4.5	-0.2	2.5	0.7	-4.0	-9.7	-22.6	-26.7
Telgárt	901	-24.9	-25.2	-18.4	-10.1	-5.6	-4.2	1.2	-0.2	-5.1	-9.7	-17.8	-19.6
Viglas-Pstrusa	368	-32.0	-32.1	-29.9	-8.0	-5.1	-1.7	1.5	-0.5	-4.5	-10.0	-23.5	-27.6

Mean monthly and years values of relative air humidity [%] (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12	Year
B.Bystrica	427	84	82	76	68	69	70	70	73	77	80	84	87	77
Brezno	487	86	83	79	72	73	75	75	78	80	81	86	89	80
Chopok	2008	86	82	77	70	71	72	72	74	77	80	85	88	78
Slac	313	82	80	77	73	74	76	75	78	79	79	84	84	79
Telgárt	901	82	81	76	68	70	72	70	73	76	78	83	85	76

Mean monthly and year precipitation totals [mm] (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12	Year
B.Bystrica	427	50	54	47	55	65	93	81	73	55	60	80	73	786
Brezno	487	46	48	42	47	69	103	87	83	57	51	65	60	757
Chopok	2008	87	76	81	75	96	156	139	113	89	59	76	92	1139
Krenovica	593	57	57	52	63	73	103	86	81	60	61	74	73	840
Lubietov	500	47	47	45	52	72	109	96	79	56	53	68	60	783
Pohr. Ruskov	131	35	32	26	43	52	75	53	60	44	41	53	44	558
Polonika	628	48	45	42	52	76	115	99	86	55	55	64	61	796
Slac	313	44	47	43	49	57	94	80	74	52	50	66	59	715
Star. Hory	475	69	71	62	76	88	117	100	86	72	81	102	94	1016
Telgárt	901	36	41	42	62	101	131	109	93	58	64	67	46	851
Viglas-Pstrusa	368	34	35	34	43	56	80	74	60	48	44	53	47	609
Zarnovica	218	45	47	42	51	61	89	74	77	49	52	68	62	718

Mean number of days with precipitation 1,0 mm and more (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12	Year
B.Bystrica	427	8.9	8.1	8.1	8.3	9.2	10.7	8.5	8.9	6.8	7.3	10.0	10.1	104.9
Brezno	487	8.9	8.0	8.3	7.9	10.3	11.7	10.3	9.7	7.0	6.8	9.9	10.3	109.1
Chopok	2008	13.6	13.2	14.9	13.3	14.2	14.9	14.8	12.8	10.0	10.0	13.4	15.6	160.7
Krenovica	593	10.3	9.3	9.6	9.8	10.6	11.9	10.2	9.2	8.0	7.8	11.0	11.1	118.8
Lubietov	500	9.3	8.2	8.8	8.7	10.6	11.6	9.8	9.5	7.0	7.4	10.5	11.0	112.4
Pohr. Ruskov	131	7.4	6.5	5.9	6.6	8.1	9.1	7.2	6.9	5.5	5.5	8.5	7.9	85.1
Slac	313	8.8	7.2	7.9	7.7	9.1	10.7	8.6	8.6	6.6	6.8	9.6	9.3	101.0
Star. Hory	475	11.2	9.7	10.0	9.8	11.1	12.3	11.1	9.4	8.2	8.3	12.0	11.9	125.0
Telgárt	901	11.1	11.7	11.5	13.3	17.2	18.0	15.1	14.9	9.6	9.4	12.3	13.4	157.5
Viglas-Pstrusa	368	7.4	6.5	7.1	7.9	8.6	10.7	8.7	7.8	6.2	6.4	8.8	8.2	94.3
Zarnovica	218	8.2	7.5	7.6	8.4	8.9	10.6	8.4	8.2	6.5	6.4	9.4	9.5	99.6

Mean number of days with snow cover 1 cm and more (Period 1951-1980)

Station/Month	alt(m)	1	2	3	4	5	6	7	8	9	10	11	12	Year
B.Bystrica	427	26.3	20.1	8.8	0.2	0.1						3.4	15.3	74.2
Brezno	487	28.5	22.9	11.7	0.9							5.1	17.9	87.0
Krenovica	598	27.0	22.8	14.2	1.3	0.1					0.2	5.6	18.6	89.8
Lubietov	500	29.0	26.1	16.5	1.2	0.1					0.1	5.3	19.7	98.0
Pohr. Ruskov	131	16.1	8.9	2.6	0.1							1.6	6.6	35.9
Polonika	628	27.8	24.2	13.8	1.0						0.1	5.4	19.8	92.1
Slac	313	25.2	18.1	6.8	0.1							2.8	14.1	67.1
Star. Hory	475	29.7	28.2	21.4	3.2	0.2					0.2	5.4	22.9	111.2
Viglas-Pstrusa	901	23.7	14.1	5.5	0.3							2.8	12.4	58.8
Zarnovica	218	24.1	15.4	4.8	0.1							2.4	12.7	59.5

Source: Based on the Data provided by SHMU

## (2) Precipitation

Spatial and time variations of precipitation is caused by the component characters of relief (altitude, variability of the earth's surface, orientation of the mountains) and the prevailing flow of the air. Influences of the Atlantic and Mediterranean Seas overlap with continental influences. Average annual sum of precipitation in period 1961-1990 were lower in comparison to previous period 1931-1960. In last 8 years an increased variability of rainfalls could be observed and in Nova Bana - Brehy a heavy rainfall could be observed = 146 mm, which caused a local flood. The increased variability has also caused, that in upper part, the precipitation in 90-ties were higher than standard and in lower parts, the precipitation were lower in 90 than standard values. Whereas in October 1995, Sliac had just 1mm of rain, in October 1998 it rained 148 mm, which is 302% of precipitation standard. In lower part of Hron basin in 90-ties was obvious lack of precipitation especially in June and August. In August 1992 was monitored in Zeliezovce 2mm precipitation which presents only 3% of month standard. September 1998 was very humid and in this area was noticed 155mm of precipitation which is 378% of month standard. These data documents that in 90-ties in Hron basin very often occurred extremely dry and extremely humid periods.

### B.4.3 LONG-TERM CHANGE OF PRECIPITATION AND DISCHARGES IN THE HRON BASIN

Table B.4 - 2 shows long - term change of precipitation and discharge in some typical place in the Study area. In spite of year to year variation, decreasing tendency of precipitation is seen both in Banska Bystrica and Banska Stiavnica from 1881 to 1998.

Table B.4 -2 Yearly precipitation and average discharge in Hron River Basin

Calendar year	Yearly precipitation in mm		Calendar year	Yearly precipitation in mm		Yearly average discharge in m <sup>3</sup> /s	Calendar year	Yearly precipitation in mm		Yearly average discharge in m <sup>3</sup> /s
	Dobruša	Slavica		Dobruša	Slavica			Dobruša	Slavica	
	Dobruša	Slavica		Dobruša	Slavica			Dobruša	Slavica	
1881	812	789	1929	764	717	1977	929	729	70005	
1882	1075	978	1930	926	935	1978	704	601	47.725	
1883	758	837	1931	924	909	1979	848	795	56.114	
1884	712	759	1932	703	584	1980	849	771	62.068	
1885	965	899	1933	630	715	1981	901	772.6	44.428	
1886	885	981	1934	824	718	1982	589	511.3	40.902	
1887	939	876	1935	934	799	1983	541	577.4	37.712	
1888	995	878	1936	1132	977	1984	1006.7	878.7	53.658	
1889	1072	936	1937	1388	1119	1985	780.1	695.6	47.945	
1890	814	790	1938	956	921	1986	758.8	708.8	34.003	
1891	931	978	1939	999	1119	1987	681.8	700.8	42.582	
1892	985	947	1940	978	955	1988	801.6	774.5	37.75	
1893	911	884	1941	1086	1167	1989	592.5	623.5	30.764	
1894	822	762	1942	603	606	1990	908	760.8	36.606	
1895	1070	1039	1943	617	610	1991	818	700.7	38.008	
1896	630	863	1944	1180	1087	1992	724.1	560.2	36.43	
1897	637	912	1945	818	800	1993	795.2	648.3	25.095	
1898	279	862	1946	785	792	1994	917.3	929.6	55.892	
1899	679	877	1947	742	694	1995	931.7	793.4	51.815	
1900	735	995	1948	837	835	1996	968.6	804.2	48.425	
1901	967	990	1949	874	763	1997	766	640.8	32.24	
1902	874	924	1950	784	705	1998	828.5	643.7	35.79	
1903	1079	1061	1951	885	891					
1904	749	723	1952	922	842					
1905	661	851	1953	557	591					
1906	636	866	1954	850	803					
1907	848	826	1955	827	828					
1908	523	547	1956	629	599					
1909	845	781	1957	662	695					
1910	947	1061	1958	778	744					
1911	742	681	1959	725	844					
1912	942	1046	1960	900	937					
1913	515	805	1961	732	666					
1914	758	1003	1962	711	774					
1915	1125	1147	1963	833	869					
1916	936	936	1964	786	921					
1917	567	690	1965	1019	1094					
1918	659	860	1966	896	959					
1919	885	716	1967	727	653					
1920	684	803	1968	666	696					
1921	550	587	1969	592	630					
1922	928	911	1970	878	830					
1923	852	757	1971	589	567					
1924	825	824	1972	773	828					
1925	839	805	1973	564	517					
1926	1102	1000	1974	1112	911					
1927	947	876	1975	651	708					
1928	762	735	1976	972	822					

Source: Based on the Data provided by SHMU

## **B.4.2 WIND CHARACTERISTICS**

The following text is extracted from Reference 8 - xx.

### **(1) General Circulation Conditions Above Slovak Territory and the Orographic Influences on Wind Conditions in Hron Basin Region**

The prevailing flux of air is in quadrant from North-East to South-West in the height of 3 km over Slovakia territory. The mean wind speed reaches 10 m/sec in this level. In the annual regime the maximum values are observed in the end of autumn and the beginning of winter (11 to 12 m/sec), the minimum in summer months (7 to 9 m/sec). In the direction to the ground level, the mean speed of wind decreases and the persistence of air flux increases. The influence of complex terrain, namely the West - East direction of the main ridge of Low Tatras massif, which reaches the height 1 800 to 2 000 m a.s.l. is very important. Other mountains surrounding the Hron Basin create with their ridges the borders of area. The directions of axes of their ridges are different. From this reason the East-West direction of the upper part of Hron river swifts to North-South direction. But after leaving the Zvolen basin the river flow takes up the previous direction again. The configuration of surrounding mountains causes the gradual turning with wide bend to the North-South direction in the territory of Podunajská rovina plain. This part of Hron Basin is bordered by decreasing axes of hilly country ridges. The considerable elevation of ridges of surrounding mountains over Hron valley cause the accommodation of prevailing wind direction to the axes of Horn river valley over the whole basin area. The good developed local circulation systems, the frequent causes of stagnation of air and considerable decreasing of wind speed are typical in the Hron basin area. The important effect is the aggravated air pollution conditions.

### **(2) Annual Wind Regime**

The annual wind regime is distinguished by higher frequency of northern components in summer half-year in the higher levels of atmosphere. On the other hand, the southern components occur with higher frequency in the autumn and winter seasons. This tendency is observed in the surface layer of the atmosphere in the Hron Basin.

The most frequent mean annual wind direction is east in the higher part of the Hron River valley, north in the middle part and north-west in the lower part (see Table B.4 -1). The frequency of calm is mostly from 20 to 50%. The second most frequent wind direction is south accommodated to direction of the valley axe. In the higher elevations, prevailing winds are southern or south-western, sometimes being strongly deformed in Low Tatras ridge position.

Table B.4 - 1 Mean Annual Frequency of Wind Direction (in per mill)

Station	N	NE	E	SE	S	SW	W	NW	Calm
Chopok	189	41	32	96	306	52	79	187	18
Telgárt	24	86	198	25	32	212	159	28	236
Sliac	168	47	22	43	48	66	53	70	483
Nový Tekov	55	51	134	59	31	39	143	137	351
Pohronský Ruskov	42	48	30	127	42	76	47	180	408

Table 2.2 - 2 Mean Monthly and Annual Wind Speed When Wind Occurred (m/sec)

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
Chopok	11.6	12.1	10.6	10.3	8.9	8.4	7.8	8.3	9.1	9.8	11.8	11.0	10.0
Telgárt	6.0	5.7	5.5	5.1	4.8	4.5	4.5	4.3	4.5	5.0	5.4	5.8	5.0
Sliac	3.6	3.6	3.6	3.9	3.5	3.5	3.3	3.3	3.1	3.0	3.2	3.2	3.3
Nový Tekov	2.8	2.8	2.6	2.4	2.6	2.6	2.5	2.3	2.5	2.4	2.9	2.6	2.6
Pohronský Ruskov	3.4	3.5	3.5	3.1	2.7	2.8	2.8	2.7	3.0	3.5	3.4	2.9	3.1

Table B.4 - 3 Mean Annual Frequency of Occurrence of Wind Speed Classes (in per mill)

Station	Wind Speed Class (m/sec)						
	Calm	1 - 2	3 - 5	6 - 10	11 - 15	16 - 20	> 20
Chopok	18	96	207	273	211	137	58
Telgárt	236	189	274	274	27	0	
Sliac	483	219	220	75	3	0	
Nový Tekov	351	465	100	72	11	1	
Pohronský Ruskov	408	350	155	77	10	0	0

The annual regime of the mean speed of upper wind is connected with circulation conditions over Central Europe region (see Table B.4 - 2). The monthly mean wind speed reaches to the maximum when the maximum pressure gradient occurs, ie in the end of autumn and in the winter. The monthly mean wind speed is minimum in the end of summer. In the direction to the ground level, the wind speed is modified by the stratification of air temperature. The highest values are observed in months with the most unstable conditions of the atmospheric boundary layer, ie in the end of spring. The lowest values of speed are observed in the most stable conditions, ie in the end of summer and in the beginning of autumn. The maximum frequency of calm is also observed in the low positions in autumn. The most frequent wind speed class in the higher positions of the basin is 6 - 10 m/sec, in the middle positions 3 - 5 m/sec, and in the lower positions 1 - 2 m/sec (see Table B.4 - 3).

### (3) Diurnal Wind Regime

The local circulation systems are well developed in the Horn River valley. There is the katabatic wind blowing down the slopes in the nocturnal hours under the radiative weather. In the diurnal hours, there exists the opposite anabatic wind, blowing up the slopes.

The occurrence of calm is more frequent during the night, when the temperature stratification is more stable. It is the significant characteristics of closed basins and the narrow valleys. Mean speed is lower too. In the diurnal regime, the maximum wind speed occurs around the noon, and the minimum occurs at sunset or sunrise hours when the local circulation systems change between diurnal and nocturnal regimes. This pattern is more remarkable in the summer and the beginning of autumn.

## B.5 HYDROLOGY

Long-term characteristics of discharges and flood discharges of the Hron river and its tributaries are shown in following Tables.

Table B.5 – 1 Long-term average daily discharges of the Hron River and its tributaries

The river Hron basin

Long-term average discharges ( $Q_a$ ) and M-day discharges in  $m^3 \cdot s^{-1}$

(reference period 1931-1980)

No.	Station	River	Area [km <sup>2</sup> ]	$Q_a$	$Q_{30d}$	$Q_{90d}$	$Q_{180d}$	$Q_{270d}$	$Q_{330d}$	$Q_{355d}$	$Q_{364d}$
1.	Telgárt	Hron	36.61	0.679	1.643	0.809	0.455	0.286	0.206	0.170	0.143
2.	Zlatno	Hron	79.28	1.550	3.565	1.907	1.070	0.682	0.473	0.357	0.264
3.	Zlatno	Havraník	16.72	0.265	0.610	0.326	0.183	0.117	0.081	0.061	0.045
4.	Míchalová	Rohozná	59.04	0.771	1.775	0.991	0.528	0.305	0.194	0.149	0.113
5.	Brezno	Hron	582.08	8.120	19.080	9.744	5.278	3.329	2.274	1.705	1.218
6.	Čierny Balog	Čierny Hron	64.61	0.859	2.028	0.987	0.505	0.306	0.179	0.130	0.119
7.	Hronček	Kamenistý p.	48.86	0.778	1.900	0.943	0.522	0.326	0.220	0.172	0.137
8.	Hronec	Čierny Hron	239.41	3.170	7.291	3.646	1.997	1.220	0.840	0.634	0.507
9.	Osrblie	Osrblianka	27.77	0.429	0.922	0.528	0.315	0.206	0.146	0.112	0.077
10.	Bystrá	Bystrianka	36.01	1.010	2.172	1.202	0.737	0.490	0.354	0.263	0.182
11.	Mýto pod Dúbr.	Štiavnička	47.10	1.150	2.507	1.438	0.840	0.535	0.368	0.276	0.196
12.	Dolná Lehota	Vajskovský p.	53.02	1.470	3.234	1.779	1.058	0.706	0.515	0.412	0.323
13.	Lubietová	Hutná	38.99	0.508	1.228	0.579	0.273	0.135	0.074	0.050	0.042
14.	Banská Bystrica	Bystrica	160.37	3.765	7.163	4.411	2.979	2.168	1.659	1.357	1.056
15.	Banská Bystrica	Hron	1766.48	27.990	62.960	34.420	19.870	12.870	9.513	7.555	5.876
16.	Tajovský p.	Banská Bystrica	44.09	0.829	1.907	0.953	0.572	0.385	0.282	0.222	0.158
17.	Hriňová nad VN	Slatina	51.99	0.680	1.666	0.870	0.428	0.224	0.133	0.088	0.061
18.	Hriňová pod VN	Slatina	70.82	0.933	2.286	1.194	0.588	0.308	0.182	0.121	0.084
19.	Môľová	Slatina	411.02	3.350	8.710	3.905	1.770	0.869	0.446	0.264	0.157
20.	Zvolen	Zoľná	200.74	2.420	6.172	2.425	1.307	0.755	0.460	0.291	0.152
21.	Zvolen	Neresnica	139.33	1.160	2.575	0.963	0.400	0.196	0.116	0.078	0.046
22.	Zvolen	Slatina	790.16	7.060	18.360	7.771	3.600	1.905	1.050	0.642	0.361
23.	Žiar nad Hronom	Hron	3310.62	43.560	103.000	52.250	28.650	18.310	13.540	10.920	8.337
24.	Žarnovica	Kľak	131.95	1.850	4.625	2.035	0.962	0.583	0.393	0.277	0.185
25.	Brehy	Hron	3821.38	49.970	117.400	58.970	32.480	21.990	14.990	11.990	8.995
26.	Kamenin	Hron	5149.80	54.710	129.000	64.450	35.170	22.830	16.280	12.920	9.630
27.	Rúbaň	Paňž	81.90	0.150	0.300	0.172	0.108	0.067	0.045	0.028	0.012

Source: Digital data provided by SHMU



Table B.5 - 2 Long-term flood discharges and flood return period probabilities of the Hron river and its tributaries

N-year-flood discharges - the river Hron basin

No.	Station	River	Area [km <sup>2</sup> ]	N-year-flood discharges							
				1	2	5	10	20	50	100	1000
				[m <sup>3</sup> .s <sup>-1</sup> ]							
1.	Telgárt	Hron	36.61	7	10	16	20	24	33	38	50
2.	Zlatno	Hron	79.28	10	15	23	29	37	48	57	85
3.	Zlatno	Havraník	16.72	3	4,5	8	10	14	16	20	30
4.	Michalová	Rohozná	59.04	8	12	21	30	42	58	70	100
5.	Brezno	Hron	582.08	50	70	105	130	160	200	230	330
6.	Čierny Balog	Čierny Hron	64.61	8	13	22	32	44	65	85	135
7.	Hronček	Kamenistý p.	48.86	3	6	11	16	24	35	45	75
8.	Hronec	Čierny Hron	239.41	24	35	55	73	94	130	160	240
9.	Osrblie	Osrblianka	27.77	2	3	5	7	9	12	15	25
10.	Bystrá	Bystrianka	36.01	4	6	8	10	13	17	20	30
11.	Mýto pod Ďumb.	Štiavnička	47.1	5	7	11	14	17	22	25	35
12.	Dolná Lehota	Vajskovský p.	53.02	6	8	11	14	18	24	30	45
13.	Lubietová	Hutná	38.99	5	9	14	21	30	45	59	85
14.	Banská Bystrica	Bystrica	160.37	18	25	35	43	50	60	70	95
15.	Banská Bystrica	Hron	1766.48	150	200	270	330	380	470	540	740
16.	Tajovský p.	Banská Bystrica	44.09	9	14	20	25	29	36	42	60
17.	Hriňová nad VN	Slatina	51.99	7	14	24	32	40	52	60	90
18.	Hriňová pod VN	Slatina	70.82	10	18	29	38	47	61	70	105
19.	Móľová	Slatina	411.02	53	82	115	135	160	185	205	290
20.	Zvolen	Zolná	200.74	28	43	61	76	90	110	130	180
21.	Zvolen	Neresnica	139.33	26	35	48	59	70	86	100	140
22.	Zvolen	Slatina	790.16	100	155	215	260	290	340	375	470
23.	Žiar n/Hronom	Hron	3310.62	280	370	510	620	715	870	1000	1370
24.	Žarnovica	Klak	131.95	23	35	53	67	82	105	125	185
25.	Brehy	Hron	3821.38	310	410	560	680	790	960	1100	1500
26.	Kamenín	Hron	5149.8	310	400	520	600	670	750	800	900
27.	Rúbaň	Paríž	81.9	5	8	13	18	21	26	30	40

Source: Digital data provided by SHMU

Table B.5 - 3 Long-term average water balance characteristics of the Hron Basin in 1931 - 1980

P.C.	HYDROLOG ORDER	FLOW	PROFILE	TYPE OF PROFIL	RIVER KM	AREA OF BASIN A	LONG-TERM AVERAGE YEAR VALUES					
							RAINFA Pa	OUTLET O	DIFFERENC Pa - O	OUTLET SUČIN.	SPECIAL a.	DISCHA O.
						km <sup>2</sup>	mm	mm	mm		mm <sup>-1</sup> km <sup>2</sup>	mm <sup>3</sup> km <sup>-1</sup>
1	1-4-23-01-011	Hron	Zlatno	V	263.9	79.28	1020	617	403	0.6	12.53	1.53
2	1-4-23-01-015	Hron	Valkovňa	K	261.2	107	1003	581	422	0.58	18.4	1.97
3	1-4-23-01-034	Hronec	ústie		0	44.23	850	499	351	0.59	15.82	0.7
4	1-4-23-01-043	Hron	Polonka	V.K	243.4	329.54	1035	486	549	0.47	15.42	5.08
5	1-4-23-01-047	Hron	pod Bacúň		239.6	389.83	1048	491	557	0.47	15.53	6.071
6	1-4-23-01-064	Hron	nad Robozou		226.3	475.98	1050	465	585	0.44	14.72	7.01
7	1-4-23-01-073	Hron	Robozná	ústie	0	90.9	920	347	573	0.38	11	1
8	1-4-23-01-073	Hron	pod Robozou		226.2	565.87	1029	446	573	0.43	14.13	8.01
9	1-4-23-01-076	Hron	Brezno nad	K	224.8	577.19	1028	442	586	0.43	14.01	8.09
10	1-4-23-01-076	Hron	Brezno	V.B	223.3	582.08	1027	440	587	0.43	13.93	8.12
11	1-4-23-01-079	Hron	Valaská	K	217	625.98	1015	428	587	0.42	13.56	8.49
12	1-4-23-01-100	Kamenistý p.	Hronček	V	11.6	48.88	981	502	479	0.51	15.92	0.778
13	1-4-23-01-104	Kamenistý p.	ústie		0	84.48	956	452	504	0.47	14.32	1.21
14	1-4-23-01-105	Cierny Hron	Hronec	V	2.4	239.41	937	418	519	0.45	13.24	3.17
15	1-4-23-01-111	Cierny Hron	ústie	K	0	291.72	940	420	520	0.45	13.22	3.883
16	1-4-23-02-004	Bystrianka	Bystri	V	7	36.01	1511	885	626	0.59	28.05	1.01
17	1-4-23-02-009	Bavnička	Mýto pod D	V	2.9	47.1	1456	771	685	0.53	24.42	1.15
18	1-4-23-02-011	Bystrianka	ústie		0	96.59	1414	755	659	0.53	23.92	2.31
19	1-4-23-02-011	Hron	pod		214.1	1017.71	1017	456	561	0.45	14.45	14.71
20	1-4-23-02-024	Vaiskovský p.	Dolná Lehota	V	2.7	53.02	1472	875	597	0.59	27.73	1.47
21	1-4-23-02-025	Vaiskovský p.	ústie		0	58.85	1466	820	646	0.56	25.98	1.53
22	1-4-23-02-028	Hron	nad		205.3	1141.2	1038	473	563	0.46	15.04	17.16
23	1-4-23-02-036	Jasenianský p.	Jasenie	V	4.2	87.71	1427	723	704	0.51	22.92	2.01
24	1-4-23-02-037	Jasenianský p.	ústie		0	92.32	1407	704	703	0.5	22.31	2.06
25	1-4-23-02-038	Hron	Dubová	V	203.1	1244.12	1066	491	573	0.46	15.56	19.36
26	1-4-23-02-041	Hron	Nemecká	B	202.1	1249.88	1064	491	573	0.46	15.55	19.43
27	1-4-23-02-042	Hron	Nemecká	K	201	1259.94	1062	490	572	0.46	15.52	19.56
28	1-4-23-02-069	Púočica	Slonenská L	V	1.3	39.3	1045	482	563	0.46	15.27	0.6
29	1-4-23-02-079	Hron	Šalková	K.B	181.5	1540.82	1054	481	573	0.46	15.23	23.47
30	1-4-23-02-085	Hron	B.Bystrica nad		175.8	1596.26	1048	477	571	0.46	15.1	24.1
31	1-4-23-02-085	Hron	nad Bystriou		175.4	1596.51	1048	477	571	0.46	15.1	24.1
32	1-4-23-02-109	Starohorský p.	Starý Horv	V	6.1	62.61	1235	766	469	0.62	24.28	1.52
33	1-4-23-02-113	Bystrica	Banská	V.K	2.1	160.37	1197	741	448	0.62	23.48	3.765
34	1-4-23-02-016	Bystrica	ústie	B	0	169.96	1194	722	472	0.6	22.89	3.89
35	1-4-23-02-016	Hron	pod Bystricou	B	175.3	1766.47	1062	500	562	0.47	15.85	27.99
36	1-4-23-02-117	Hron	Banská	V	175.2	1766.48	1062	500	562	0.47	15.85	27.99
37	1-4-23-02-122	Tatovský p.	ústie		0	44.1	1075	593	482	0.55	18.8	0.829
38	1-4-23-02-136	Hron	Sliač	K	161	1939.01	1050	489	561	0.47	15.51	30.07
39	1-4-23-02-142	Hron	nad Slatinou	K.B	153.7	1999.1	1041	483	558	0.46	15.29	30.57
40	1-4-23-03-007	Slatina	Hriňová nad	V	50.8	51.99	938	413	523	0.44	13.08	0.68
41	1-4-23-03-008	Hukava	Hriňová	V	0.3	9.96	1004	468	536	0.47	15.66	0.156
42	1-4-23-03-009	Slatina	Hriňová pod	V.K.B	48	70.82	939	416	523	0.44	13.17	0.933
43	1-4-23-03-046	Slatina	Môťová	V.B	8.1	411.02	900	257	543	0.52	8.15	3.35
44	1-4-23-03-070	Hukava	Hrochol	V.K	13.8	41.45	1003	510	493	0.51	16.16	0.67
45	1-4-23-03-075	Zolná	ústie	K.B	0.2	200.92	845	380	465	0.45	12.04	2.42
46	1-4-23-03-090	Nereznica	ústie	K	0	139.44	767	263	504	0.34	8.32	1.16
47	1-4-23-03-091	Slatina	Zvoten	V	2.1	790.16	809	282	527	0.35	8.93	7.06
48	1-4-23-03-091	Slatina	ústie	K.B	0.1	792.58	809	282	527	0.35	8.92	7.07
49	1-4-23-03-091	Hron	pod Slatinou		153.5	2791.68	975	425	550	0.44	13.48	37.64
50	1-4-23-04-009	Hron	Budča	K.B	148.2	2844.57	970	423	547	0.44	13.41	38.14
51	1-4-23-04-013	Hron	Hr.Breznica	V	146.1	2865.56	969	422	547	0.44	13.38	38.344
52	1-4-23-04-024	Hron	pod Jasenicou		145.7	2948.69	965	418	547	0.43	13.28	39.15
53	1-4-23-04-042	Kremnický p.	ústie	K	0.6	82.8	963	434	529	0.45	13.77	1.14
54	1-4-23-04-043	Hron	pod Kremnick		135.5	3149.73	963	417	546	0.43	13.22	41.64
55	1-4-23-04-045	Hron	nad Lutiským		131.6	3165.25	962	417	545	0.43	13.2	41.72
56	1-4-23-04-060	Lutiský p.	ústie		0	145.27	910	383	527	0.42	12.18	1.77
57	1-4-23-04-060	Hron	pod Lutiským		131.5	3310.52	960	415	545	0.43	13.16	43.56
58	1-4-23-04-061	Hron	Zlatn/Hronom	V.B.K	131.5	3310.62	960	415	545	0.43	13.16	43.56
59	1-4-23-04-083	Vyhnianský p.	ústie		0	37.94	861	366	495	0.43	11.6	0.44
60	1-4-23-04-084	Hron	Zamovica	K	112	3542.91	954	410	544	0.43	12.99	46.01
61	1-4-23-04-084	Hron	nad KTakom		108.3	3560.61	954	409	545	0.43	12.96	46.14
62	1-4-23-04-096	KTak	ústie		0	132.33	956	411	515	0.46	13.98	1.85
63	1-4-23-04-096	Hron	pod KTakom		108.2	3692.94	955	410	545	0.43	13	47.99
64	1-4-23-04-110	Hron	Brhiv	V	93.9	3821.38	954	413	541	0.43	13.08	49.97
65	1-4-23-04-121	Hron	Tekov.Breznica	B.K	88.9	3900.62	950	411	539	0.43	13.02	50.75
66	1-4-23-04-125	Hron	Pajars	V	80.9	3965.56	949	408	541	0.43	12.91	51.2
67	1-4-23-04-127	Hron	Veľ.Kozmá	B	73.4	4015.67	948	408	540	0.43	12.84	51.58
68	1-4-23-05-001	Hron	Kalná	K	63.7	4074.5	944	404	540	0.43	12.71	51.78
69	1-4-23-05-016	Hron	nad Sikeniou		41.5	4263.48	913	388	523	0.43	12.28	52.36
70	1-4-23-05-032	Sikeniou	pod Telenom	K	2.7	271.21	700	142	558	0.2	4.5	1.22
71	1-4-23-05-034	Sikeniou	ústie		0	293.23	690	134	556	0.2	4.23	1.24
72	1-4-23-05-040	Luzianka	ústie		0	98.64	570	54	516	0.09	1.72	0.17
73	1-4-23-05-050	Hron	nad Percom		11	5036.51	890	342	548	0.38	10.83	54.53
74	1-4-23-05-059	Parece	ústie		0	113.29						
75	1-4-23-05-060	Hron	Kamenln	V.B.K	10.9	5149.8	883	335	548	0.38	10.62	54.21
76	1-4-23-05-060	Hron	nad Paňžom		7.2	5152.16	883	335	548	0.38	10.61	54.22
77	1-4-23-05-072	Paňž	ústie		0	232.78	578	52	526	0.09	1.63	0.38
78	1-4-23-05-072	Hron	pod Paňžom		7.1	5391.94	870	322	548	0.37	10.27	55.1
79	1-4-23-05-075	Hron	ústie	B.K	0	5464.56	869	319	550	0.37	10.11	55.2

Source: Data provided by Povodie Hrona in 1999

Table B.5 – 4 Estimated average yearly discharges of the Hron Basin in 1931 - 1980

Flow station	Period	A km <sup>2</sup>	Q <sub>a</sub> m <sup>3</sup> s <sup>-1</sup>	% exceeding									
				1	5	10	20	50	80	90	95	97	99
Hron-Zlatno	1931-80	79,28	1,55	3,07	2,52	2,22	1,94	1,48	1,13	0,97	0,86	0,77	0,68
Hron-Brezno	1931-80	582,08	8,12	14,87	12,72	11,49	10,18	7,90	5,95	5,07	4,41	3,88	3,35
Č.Hron-Hronec	1931-80	239,41	3,17	5,57	4,96	4,56	4,08	3,14	2,25	1,84	1,53	1,28	1,04
Štiavnička-Myto p/Dumb.	1931-80	47,10	1,15	1,66	1,56	1,49	1,39	1,17	0,91	0,78	0,67	0,58	0,49
Vajskovský p.-Dolná Lehota	1931-80	53,02	1,47	2,48	2,15	1,97	1,77	1,44	1,14	1,01	0,91	0,82	0,74
Jasenie-Jaseniánsky p.	1931-80	82,10	1,95	2,99	2,78	2,62	2,42	1,98	1,50	1,26	1,07	0,91	0,76
Starohorský p.-Staré Hory	1931-80	62,61	1,52	2,56	2,25	2,07	1,86	1,49	1,16	1,01	0,89	0,79	0,69
Bystrica-Jakub	1931-80	151,53	3,65	5,73	5,20	4,85	4,43	3,64	2,85	2,46	2,15	1,90	1,64
Hron-B.Bystrica	1931-80	1776,48	27,99	47,08	41,49	38,15	34,42	27,58	21,35	18,41	16,16	14,29	12,42
Slatina-Hriňová	1931-64	70,82	0,93	1,99	1,59	1,38	1,17	0,86	0,62	0,52	0,45	0,40	0,34
Hron-Brehy	1931-80	3821,38	49,97	85,49	75,77	69,69	62,70	49,41	37,03	31,18	26,74	23,12	19,49

Source: Data provided by Povodie Hrona in 1999

Table B.5 – 5 Yearly minimum discharges and its specific outlets of the Hron Basin in 1931 – 1995

N-ročné minimálne prietoky (Q) v m<sup>3</sup> s<sup>-1</sup> a ich špecifické odtoky (q) v L s<sup>-1</sup> km<sup>-2</sup>

no.	flow	Profile	Area of basin [km <sup>2</sup> ]	Q <sub>a</sub> q <sub>a</sub>	Q <sub>min,100</sub> q <sub>min,100</sub>	Q <sub>min,50</sub> q <sub>min,50</sub>	Q <sub>min,20</sub> q <sub>min,20</sub>	Q <sub>min,10</sub> q <sub>min,10</sub>	Period	Q <sub>min,period</sub> q <sub>min,period</sub>	Q <sub>min,abs.1931-95</sub> q <sub>min,abs.1931-95</sub>
1	Hron	Brezno	582,08	8,12	0,969	1,043	1,163	1,281	1931-1980	1,869	1,2
				13,95	1,67	1,79	2	2,2		3,21	
2	Čierny Hron	Hronec	239,41	3,17	0,367	0,385	0,423	0,467	1931-1980	0,722	0,373
				13,24	1,53	1,61	1,77	1,95		3,02	
3	Bystrica	Jakub	151,53	3,65	0,655	0,728	0,844	0,954	1931-1980	1,435	0,412
				(since 1979 Bystrica-B.Bystrica)	24,09	4,32	4,8	5,57		6,3	
4	Hron	B. Bystrica	1766,48	27,99	4,368	4,941	5,434	5,913	1931-1980	8,138	4,8
				15,85	2,63	2,8	3,08	3,35		4,61	
5	Slatina	Hriňová	70,82	0,933	0,039	0,045	0,055	0,067	1931-1964	0,146	0,003
				13,17	0,55	0,64	0,78	0,95		2,06	
6	Hron	Brehy	3821,38	49,97	7,581	8,067	8,856	9,621	1931-1980	13,23	7,7
				13,08	1,98	2,11	2,32	2,52		3,46	

(influenced by offtakes in basin)

(discharges influenced by VN Hriňová)

Source: Data provided by Povodie Hrona in 1999

Table B.5 -- 6 Average daily discharges of the Hron Basin in 1931 -- 1995

Flow Hron		Profile: Brezno						
	Qa	Q30d	Q90d	Q180d	Q270d	Q330d	Q355d	Q364d
Period 1931-80	8.12	19.08	9.744	5.278	3.239	2.274	1.705	1.218
% from Qa 1931-80	100	235	120	65	40	28	21	15
Obdobie 1931-95	7.781	18	9.5	5.2	3.2	2.3	1.68	1.33
% z Qa 1931-95	100	231	122	67	41	30	22	17
Obdobie 1981-95	6.656	15.15	8.217	4.578	2.907	2.058	1.68	1.355
% z Qa 1981-95	100	228	123	69	44	31	25	20
D1 [%]	-4	-6	-3	-1	-1	-1	-1	-2
D2 [%]	-18	-21	-16	-13	-10	-9	-1	11

Flow Hron		Profile: Banská Bystrica						
	Qa	Q30d	Q90d	Q180d	Q270d	Q330d	Q355d	Q364d
Period 1931-80	27.99	62.96	34.42	19.87	12.87	9.513	7.555	5.876
% from Qa 1931-80	100	225	123	71	46	34	27	21
Obdobie 1931-95	26.81	60.08	33.1	18.7	12.1	9	7.419	6
% z Qa 1931-95	100	224	123	70	45	34	28	22
Obdobie 1981-95	22.864	51.43	28.25	15.99	10.58	8.05	7.042	6.03
% z Qa 1981-95	100	225	124	70	46	35	31	26
D1 [%]	-4	-5	-4	-6	-6	-5	-2	2
D2 [%]	-18	-18	-18	-20	-18	-15	-7	3

Vysvetlivky: (explanation)

% z Qa - percentuálny podiel M-denných prietokov k príslušnému priemernému ročnému prietoku (percentage ration of M-daily discharges to determined average year discharge)

D1 [%] - odchýlky M-denných prietokov za obdobie 1931-95 k referenčnému obdobiu 1931-80 (deviation of M-daily discharges per period 1931-95 to determined period 1931-80)

D2 [%] - odchýlky M-denných prietokov za obdobie 1981-95 k referenčnému obdobiu 1931-80 (deviation of M-daily discharges per period 1981-95 to determined period 1931-80)

Source: Data provided by Povodie Hrona in 1999

Table B.5 – 7 Long-term average year and M-daily discharges of the Hron River Basin in 1931 – 1980

No.	Flow	PROFILE	AREA OF BASIN (km <sup>2</sup> )	long-term average monthly discharges								
				Qa	Q304	Q704	Q1804	Q2704	Q3304	Q3554	Q3644	
1	Hron	Zlatno	79.28	1.55	3.565	1.907	1.07	0.682	0.473	0.357	0.264	
2	Hron	Valkovňa	107	1.97	4.535	2.408	1.345	0.855	0.595	0.45	0.327	
3	Hronec	ústie	44.23	0.7	1.544	0.844	0.499	0.319	0.219	0.179	0.144	
4	Hron	Polomka	329.54	5.08	11.84	6.096	3.353	2.123	1.463	1.087	0.792	
5	Hron	pod Bacóšským p.	389.83	5.071	13.96	7.407	4.139	2.612	1.801	1.349	0.985	
6	Hron	nad Rehoznom	475.98	7.01	16.4	8.41	4.556	2.874	1.97	1.472	1.052	
7	Rohozná	ústie	90.9	1	2.303	1.286	0.684	0.396	0.272	0.194	0.147	
8	Hron	pod Rohoznou	566.87	8.01	18.82	9.7	5.24	3.27	2.227	1.666	1.199	
9	Hron	Brezno nad	577.14	8.09	19	9.708	5.258	3.317	2.266	1.699	1.21	
10	Hron	Brezno	582.08	8.12	19.08	9.744	5.278	3.329	2.274	1.705	1.218	
11	Hron	Vlaská	625.98	8.49	19.87	10.19	5.518	3.481	2.377	1.783	1.29	
12	Kamenistý p.	Hlavočok	48.86	0.738	1.9	0.943	0.522	0.326	0.22	0.172	0.137	
13	Kamenistý p.	ústie	84.48	1.21	2.68	1.466	0.812	0.508	0.342	0.267	0.214	
14	Cierny Hron	Hronec	239.41	3.17	7.291	3.646	1.997	1.22	0.84	0.634	0.507	
15	Cierny Hron	ústie	291.72	3.885	8.935	4.524	2.52	1.561	1.082	0.818	0.632	
16	Bystrianka	Bielá	36.01	1.01	2.172	1.202	0.737	0.49	0.354	0.263	0.182	
17	Sivnička	Mýto pod Dumb.	47.1	1.15	2.507	1.438	0.84	0.535	0.368	0.276	0.196	
18	Bystrianka	ústie	26.59	2.31	3.005	2.76	1.732	1.177	0.824	0.599	0.438	
19	Hron	pod Bystriankou	1017.21	14.71	33.65	18.26	10.139	6.409	4.569	3.389	2.633	
20	Vaškovský p.	Dolná Lúča	53.02	1.47	3.234	1.779	1.058	0.706	0.515	0.412	0.323	
21	Vaškovský p.	ústie	58.85	1.53	3.366	1.852	1.101	0.735	0.536	0.429	0.336	
22	Hron	nad Jasenián p.	1141.2	17.16	39.125	21.622	11.84	7.465	5.337	4.125	3.242	
23	Jaseniánský p.	Jasenie	87.71	2.01	4.463	2.453	1.387	0.884	0.624	0.463	0.332	
24	Jaseniánský p.	ústie	92.32	2.06	4.573	2.513	1.421	0.906	0.639	0.474	0.34	
25	Hron	Dubová	1244.12	19.36	43.765	24.307	13.355	8.43	6.042	4.635	3.726	
26	Hron	Nemecká	1249.8	19.43	44.125	24.399	13.406	8.462	6.065	4.653	3.74	
27	Hron	Nemecká	1259.94	19.56	44.471	24.562	13.495	8.518	6.106	4.684	3.763	
28	Eupica	Slovenká Eupica	39.3	0.6	1.332	0.732	0.414	0.264	0.186	0.138	0.099	
29	Hron	Salková	1540.82	23.47	53.042	29.337	16.353	10.352	7.595	5.993	4.606	
30	Hron	B. Bystriica nad	1596.26	24.1	54.48	29.89	16.796	10.633	7.801	6.155	4.787	
31	Hron	nad Bystriicou	1596.51	24.1	54.48	29.89	16.796	10.633	7.801	6.155	4.787	
32	Starohorský p.	Staré Hory	62.61	1.52	3.04	1.824	1.186	0.79	0.578	0.448	0.322	
33	Bystriica	Banská Bystriica	160.37	3.765	7.163	4.411	2.979	2.168	1.659	1.357	1.056	
34	Bystriica	ústie	169.96	3.89	7.391	4.552	3.074	2.237	1.712	1.4	1.089	
35	Hron	nad Bystriicou	1766.47	27.99	62.96	34.42	19.87	12.87	9.513	7.555	5.876	
36	Hron	Banská Bystriica	1766.48	27.99	62.96	34.42	19.87	12.87	9.513	7.555	5.876	
37	Tajovský p.	ústie	44.1	0.879	1.907	0.953	0.572	0.385	0.282	0.222	0.158	
38	Hron	Sliac	1939.01	30.07	67.64	36.98	21.35	13.83	10	8.1	6.313	
39	Hron	nad Slatinou	1999.1	30.57	68.76	37.59	21.7	14.06	10.17	8.235	6.418	
40	Slatina	Hriňová nad VN	51.99	0.68	1.666	0.87	0.428	0.224	0.133	0.088	0.061	
41	Hukava	Hriňová	2.96	0.156	0.382	0.2	0.096	0.051	0.03	0.02	0.014	
42	Slatina	Hriňová pod VN	70.82	0.923	2.286	1.194	0.588	0.308	0.182	0.121	0.084	
43	Slatina	Máľová	411.02	3.35	8.71	3.905	1.77	0.869	0.446	0.264	0.157	
44	Húčava	Hrochot	41.45	0.67	1.708	0.771	0.362	0.209	0.127	0.08	0.05	
45	Zolná	ústie	200.92	2.42	6.172	2.425	1.307	0.755	0.46	0.291	0.152	
46	Nerensica	ústie	139.44	1.16	2.575	0.963	0.4	0.196	0.116	0.078	0.046	
47	Slatina	Zvolen	790.16	7.06	18.36	7.771	3.6	1.903	1.05	0.642	0.361	
48	Slatina	ústie	792.58	7.07	18.38	7.782	3.606	1.909	1.053	0.643	0.361	
49	Hron	pod Slatinou	2791.68	37.64	88.45	45.54	25.41	16.19	12.05	9.786	7.528	
50	Hron	Rucká	2844.57	38.14	90	46.15	25.36	16.41	12.21	9.915	7.628	
51	Hron	H. Breznica	2865.56	38.344	90.42	46.4	25.96	16.5	12.27	9.97	7.67	
52	Hron	pod Jaseniicou	2948.69	39.15	92.08	47.37	26.23	16.84	12.53	10.177	7.83	
53	Kremnický p.	ústie	82.8	1.14	2.85	1.237	0.598	0.359	0.242	0.173	0.114	
54	Hron	pod Kremnickým p.	3149.73	41.64	98.14	50.14	27.62	17.69	13.12	10.63	8.132	
55	Hron	nad Lužiským p.	3165.25	41.79	98.49	50.32	27.72	17.75	13.16	10.65	8.16	
56	Lužiský p.	ústie	145.27	1.77	4.425	1.921	0.93	0.558	0.376	0.27	0.177	
57	Hron	pod Lužiským p.	3210.52	43.26	103	52.25	28.65	18.31	13.54	10.92	8.337	
58	Hron	Zier n/Hronom	3310.62	43.56	103	52.25	28.65	18.31	13.54	10.92	8.337	
59	Vyhnianský p.	ústie	37.94	0.44	1.064	0.501	0.236	0.117	0.064	0.043	0.035	
60	Hron	Zámořica	3542.91	46.01	108.9	55.1	30.14	19.21	14.18	11.41	8.63	
61	Hron	nad Klakom	3560.61	46.14	109.2	55.25	30.22	19.27	14.22	11.45	8.65	
62	Klak	ústie	132.33	1.85	4.625	2.035	0.962	0.583	0.393	0.277	0.185	
63	Hron	pod Klakom	3692.94	47.99	114	57.29	31.18	19.85	14.61	11.73	8.835	
64	Hron	Brehv	3821.38	49.97	117.4	58.97	32.48	21.99	14.99	11.99	8.995	
65	Hron	Ľakov Breznica	3900.62	50.75	119.3	59.85	32.89	22.26	15.18	12.13	9.084	
66	Hron	Psiara	3965.56	51.2	120.35	60.36	33.177	22.342	15.31	12.241	9.165	
67	Hron	Vel. Kozmál nad	4015.67	51.58	121.2	60.81	33.42	22.43	15.42	12.33	9.233	
68	Hron	Kalná n/Hronom	4074.3	51.78	121.7	61.03	33.55	22.52	15.48	12.38	9.27	
69	Hron	nad Sikenicou	4263.48	52.36	123.297	61.935	34.057	22.525	15.681	12.55	9.355	
70	Sikenica	pod Teľcom	271.21	1.22	3.349	1.06	0.405	0.195	0.115	0.077	0.053	
71	Sikenica	ústie	283.23	1.24	3.4	1.08	0.412	0.2	0.116	0.079	0.054	
72	Lužianka	ústie	98.64	0.17	0.34	0.2	0.125	0.075	0.051	0.032	0.015	
73	Hron	nad Percom	3036.51	54.33	128.7	64.24	35.09	22.76	16.19	12.82	9.584	
74	Perco	ústie	113.29									
75	Hron	Kamenin	5149.8	54.71	129	64.45	35.17	22.83	16.28	12.92	9.63	
76	Hron	nad Paňom	5159.16	54.72	129	64.46	35.18	22.83	16.28	12.92	9.63	
77	Paň	ústie	232.78	0.38	0.76	0.437	0.274	0.171	0.114	0.072	0.031	
78	Hron	pod Paňom	5291.94	55.1	130	64.9	35.45	23	16.4	13	9.66	
79	Hron	ústie	5464.56	55.2	130	65	35.5	23	16.4	13	9.66	

Source: Data provided by Povodie Hrona in 1999

Table B.5 – 8 Long-term average yearly and monthly discharges of the Hron River Basin in 1931 – 1980

P.C.	FLOW	Profile	Area of basin (km <sup>2</sup> )	Average monthly discharges												
				On	XI.	XII.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.
1	Hron	Zlatno	79.28	1.55	1.54	1.23	0.847	0.869	1.77	2.89	2.43	1.94	1.64	1.23	1.03	1.18
2	Hron	Valcovňa	107	1.97	1.986	1.554	1.034	1.084	2.366	3.834	3.06	2.408	2.002	1.495	1.287	1.532
3	Hron	ústie	44.23	0.7	0.747	0.56	0.438	0.406	0.678	1.271	1.03	0.944	0.779	0.546	0.488	0.521
4	Hron	Polonka	329.3	3.08	4.96	4.37	3.06	3.24	6.33	10.34	7.72	5.91	4.71	3.42	2.96	3.92
5	Hron	pod Bacúšskym p.	389.8	6.071	5.902	5.254	3.739	3.913	7.466	12.15	9.154	7.129	5.679	4.205	3.603	4.635
6	Hron	nad Rohoznou	476	7.01	6.528	5.871	4.338	5.026	9.098	13.97	10.82	8.065	6.551	4.842	3.919	5.033
7	Hron	Rohozná	90.9	1	0.939	1.005	0.693	0.774	1.388	1.921	1.297	1.178	0.877	0.702	0.559	0.691
8	Hron	pod Rohoznou	566.9	8.01	7.467	6.876	5.031	5.8	10.49	15.96	12.11	9.243	7.428	5.544	4.478	5.643
9	Hron	Brezo nad	577.1	8.09	7.542	6.944	5.081	5.858	10.59	16.12	12.24	9.335	7.502	5.599	4.523	5.699
10	Hron	Brezo	582.1	8.12	7.57	6.97	5.1	5.88	10.63	16.18	12.28	9.37	7.53	5.62	4.54	5.72
11	Hron	Valaška	676	8.49	7.916	7.289	5.333	6.149	11.12	16.92	12.84	9.799	7.875	5.877	4.748	5.982
12	Hron	Hronček	48.86	0.778	0.695	0.671	0.529	0.601	0.981	1.732	1.083	0.877	0.712	0.553	0.429	0.471
13	Kamenický p.	ústie	84.48	1.21	1.083	1.043	0.873	0.935	1.527	2.695	1.685	1.365	1.108	0.861	0.658	0.733
14	Hron	Hronec	239.4	3.17	2.76	2.74	1.98	2.4	4.75	7.05	4.26	3.37	2.67	2.16	1.71	2.23
15	Čierny Hron	ústie	291.7	3.885	3.42	3.314	2.453	2.895	5.789	8.998	5.182	4.144	3.299	2.653	2.154	2.721
16	Bvatrianka	Batrň	36.01	1.01	0.887	0.711	0.533	0.531	0.782	1.74	2.12	1.34	1.06	0.847	0.748	0.819
17	Štavnica	Míto pod Damb.	47.1	1.15	1.03	0.884	0.614	0.615	1.05	2.38	2.16	1.39	1.08	0.905	0.78	0.876
18	Bvatrianka	ústie	96.59	2.31	2.051	1.708	1.277	1.226	1.964	4.419	4.57	2.916	2.285	1.872	1.632	1.811
19	Hron	pod Bvatriankou	1018	14.71	13.41	12.33	9.029	10.79	18.9	29.99	22.63	16.89	13.47	10.42	8.547	10.53
20	Vajskovský p.	Dolná Lehota	53.02	1.47	1.39	1.08	0.757	0.777	1.25	2.76	2.97	1.89	1.42	1.14	1.01	1.15
21	Vajskovský p.	ústie	58.85	1.53	1.449	1.126	0.789	0.811	1.303	2.876	3.095	1.97	1.48	1.188	1.053	1.198
22	Hron	nad Jaseniou p.	1141	17.16	15.66	14.17	10.72	11.68	21.27	34.57	27.07	19.84	15.74	12.21	10.09	13.3
23	Hron	Jaseniansky p.	87.71	2.01	1.885	1.576	1.071	1.011	1.241	3.945	4.089	2.688	1.874	1.452	1.287	1.423
24	Hron	Jaseniansky p.	92.32	2.06	1.93	1.613	1.097	1.035	1.282	4.039	4.186	2.752	1.919	1.487	1.318	1.529
25	Hron	Dubová	1244	19.36	17.76	15.95	11.56	12.86	23.32	39.05	31.38	22.84	17.86	13.85	11.54	14.02
26	Hron	Nemecká	1230	19.43	17.82	16.01	11.6	12.91	23.41	39.2	31.69	22.92	17.92	13.9	11.58	14.07
27	Hron	Nemecká	1260	19.56	17.94	16.12	11.68	13	23.56	39.46	31.9	23.07	18.03	13.99	11.66	14.17
28	Lupčica	Slovenská Lupča	29.3	0.6	0.562	0.47	0.319	0.302	0.519	1.176	1.219	0.802	0.599	0.433	0.384	0.443
29	Hron	Šalková	1541	23.47	22.23	20.08	14.74	16.43	31.04	48.25	36.83	26.42	20.21	15.88	13.58	16.38
30	Hron	B. Bvatrica nad	1596	24.1	22.97	20.73	14.56	16.88	32.13	49.58	37.78	27.08	20.61	16.21	13.87	16.8
31	Hron	nad Bvatricou	1597	24.1	22.97	20.73	14.56	16.88	32.13	49.58	37.78	27.08	20.61	16.21	13.87	16.8
32	Starohorský p.	Staré Horv	62.61	1.52	1.46	1.42	1.12	1.11	1.8	3.1	2.04	1.64	1.24	1.05	1.04	1.19
33	Bvatrica	Banská Bvatrica	160.4	3.765	3.6	3.59	2.837	3.033	4.755	7.396	4.9	3.868	3.156	2.661	2.496	2.857
34	Bvatrica	ústie	170	3.89	3.723	3.714	2.935	3.138	4.92	4.652	5.069	4.002	3.244	2.753	2.582	2.926
35	Hron	pod Bvatricou	1766	27.99	26.69	24.44	17.49	20.02	37.05	57.23	42.85	31.08	23.85	18.96	16.45	19.76
36	Hron	Banská Bvatrica	1766	27.99	26.69	24.44	17.49	20.02	37.05	57.23	42.85	31.08	23.85	18.96	16.45	19.76
37	Tatovský p.	ústie	44.1	0.829	0.863	0.781	0.581	0.819	1.26	1.74	0.945	0.723	0.588	0.531	0.487	0.644
38	Hron	Sliač	1939	30.07	28.54	25.89	18.49	22.22	40.72	61.54	46.05	33.18	25.37	20.03	17.47	21.31
39	Hron	nad Slatinou	1999	30.57	28.9	26.1	18.61	22.79	41.76	62.56	47.04	33.77	25.74	20.21	17.66	21.67
40	Slatina	Hráčová nad VN	51.99	0.68	0.661	0.677	0.508	0.578	1.041	1.355	0.896	0.765	0.502	0.411	0.36	0.411
41	Hukava	Hráčová	9.96	0.156	0.136	0.127	0.095	0.123	0.29	0.361	0.24	0.167	0.111	0.077	0.071	0.076
42	Slatina	Hráčová pod VN	70.82	0.933	0.907	0.93	0.698	0.794	1.43	1.86	1.23	1.05	0.689	0.564	0.495	0.564
43	Slatina	Mérová	411	3.35	3.26	3.845	3.679	3.503	6.425	6.381	3.566	2.753	1.898	1.416	1.67	1.582
44	Hukava	Hračov	41.45	0.67	0.72	0.645	0.496	0.757	1.228	1.107	0.807	0.695	0.387	0.395	0.384	0.434
45	Zolná	ústie	200.9	2.42	2.602	2.328	1.792	2.733	4.434	3.999	2.915	2.511	1.397	1.427	1.387	1.569
46	Nerzavica	ústie	139.4	1.16	0.834	1.19	0.797	1.89	3.4	2.15	1.04	0.745	0.574	0.46	0.379	0.497
47	Slatina	Zyden	790.2	7.06	7.11	7.546	6.482	8.287	14.57	12.78	7.616	6.06	3.917	3.323	3.492	3.68
48	Slatina	ústie	792.6	7.07	7.12	7.557	6.492	8.299	14.59	12.8	7.627	6.069	3.923	3.328	3.497	3.685
49	Hron	pod Slatinou	2792	37.64	36.02	33.65	25.1	31.09	56.35	75.36	54.67	39.84	29.66	23.54	21.16	23.55
50	Hron	Buša	2845	38.14	36.39	33.86	25.21	31.67	57.38	76.39	55.67	40.43	30.04	23.72	21.35	25.71
51	Hron	Hr. Breznica	2866	38.34	36.54	33.95	25.26	31.91	57.8	76.81	56.08	40.67	30.19	23.8	21.43	25.86
52	Hron	pod Jaseniou	2949	39.15	37.12	34.78	25.45	32.84	59.48	78.47	57.69	41.61	30.8	24.1	21.74	26.43
53	Kremnický p.	ústie	82.8	1.14	1.141	1.475	0.839	1.375	2.171	2.048	1.11	0.974	0.74	0.548	0.488	0.843
54	Hron	pod Kremnickým	3150	41.64	39.52	37.07	27.11	35.73	64.17	83.05	60.52	43.88	32.48	25.29	22.83	28.23
55	Hron	pod Lubilákovým p.	3165	41.79	39.66	37.18	27.21	35.85	64.38	83.36	60.76	44.04	32.6	25.39	22.91	28.35
56	Lubiláky p.	ústie	145.3	1.77	1.951	2.37	1.793	2.568	4.09	3.53	1.204	1.102	0.791	0.69	0.538	0.746
57	Hron	pod Lubilákovým p.	3311	43.56	41.61	39.55	28.94	38.41	68.48	86.89	61.96	45.15	33.39	26.08	23.45	29.09
58	Hron	Zier n/Hronom	3311	43.56	41.61	39.55	28.94	38.41	68.48	86.89	61.96	45.15	33.39	26.08	23.45	29.09
59	Vyhnianský p.	ústie	37.94	0.44	0.485	0.589	0.431	0.638	1.017	0.877	0.299	0.274	0.197	0.172	0.134	0.185
60	Hron	Zamerica	3543	46.01	44.21	42.83	31.34	41.97	74.14	91.78	63.63	46.67	34.48	27.04	24.2	30.13
61	Hron	nad Kľakom	3561	46.18	44.45	43.01	31.47	42.16	74.44	92.04	63.72	46.76	34.54	27.09	24.23	30.18
62	Kľak	ústie	132.3	1.85	1.85	2.31	1.36	2.23	3.52	3.32	1.8	1.58	1.2	0.889	0.791	1.37
63	Hron	pod Kľakom	3693	47.99	46.3	45.32	32.81	44.39	77.96	95.36	65.32	48.33	35.74	27.98	25.03	31.55
64	Hron	Břehv	3821	49.97	48.49	47.98	34.76	47.27	87.54	99.31	66.86	49.57	36.62	28.75	25.62	32.39
65	Hron	Tekov Breznica	3901	50.75	49.26	48.89	35.33	48.15	83.97	100.8	67.7	50.26	37.15	29.14	25.98	32.94
66	Hron	Páre	3966	51.2	49.7	49.32	35.65	48.58	84.71	101.7	68.3	50.71	37.48	29.4	26.21	33.23
67	Hron	Vač. Kozmál nad	4016	51.58	50.06	49.69	35.91	48.94	85.34	102.4	68.81	51.08	37.76	29.62	26.4	33.48
68	Hron	Kalná v/Hronom	4074	51.78	50.26	49.88	36.05	49.13	85.67	102.8	69.08	51.28	37.9	29.73	26.51	33.61
69	Hron	nad Sikeňicou	4263	52.36	50.82	50.52	36.53	49.92	86.93	103.9	69.73	51.74	38.22	29.48	26.74	33.92
70	Sikeňica	pod Telerom	271.2	1.18	1.106	1.429	1.134	2.115	3.132	1.823	1.083	0.731	0.437	0.36	0.355	0.515
71	Sikeňica	ústie	293.2	1.24	1.162	1.502	1.191	2.222	3.29	1.916	1.14	0.768	0.459	0.378	0.373	0.541
72	Luzianka	ústie	98.64	0.17	0.133	0.119	0.154	0.268	0.181	0.191	0.185	0.223	0.162	0.175	0.096	0.159
73	Hron	nad Percom	5037	54.53	52.81	52.86	38.49	53.41	91.73	107.2	71.95	53.48	39.37	31.02	27.57	35.13
74	Perec	ústie	113.3													
75	Hron	Kamenin	5150	54.71</												

Table B.5 – 8 Yearly Maximum discharges of the Hron River Basin in 1931 – 1980

P.Č.	Flow	PROFILE	TYPE OF RIVER PROFIL	RIVER KM	AREA BASIN $m^2$	N-ROČN - YEAR MAXIMAL DISCHARGES									
						1	2	5	10	20	50	100			
1	Hron	Zlatno	V	263.9	79.28	10	15	23	29	37	48	57			
2	Hron	Valkovňa	K	261.2	107	11	17	27	35	44	56	67			
3	Hronec	ústie		0	44.23	7	10	16	21	26		40			
4	Hron	Polonka	V.K	243.4	329.54	29	42	63	80	100	130	150			
5	Hron	pod Decútskym		239.6	389.83	35	50	75	96	120	150	175			
6	Hron	nad Rohoznou		226.3	475.98	40	57	86	110	135	170	195			
7	Rohozná	ústie		0	90.9	10	16	27	39	54	75	90			
8	Hron	pod Rohoznou		226.2	566.87	50	70	105	130	160	200	230			
9	Hron	Brezno nad	K	224.8	577.14	50	70	105	130	160	200	230			
10	Hron	Brezno	V.B	223.3	582.08	50	70	105	130	160	200	230			
11	Hron	Valaská	K	217	625.98	51	71	110	135	165	205	235			
12	Kamenistý p.	Hronická	V	11.6	48.86	3	6	11	16	24	35	45			
13	Kamenistý p.	ústie		0	84.48	5	8	16	23	32	47	60			
14	Čičmav Hron	Hronec	V	2.4	239.41	24	35	55	73	94	130	160			
15	Čičmav Hron	ústie	K	0	291.72	25	37	58	77	100	140	170			
16	Bystrianka	Bystřa	V	7	36.01	4	6	8	10	13	17	20			
17	Šačvnička	Mýto pod Dumb.	V	2.9	47.1	5	7	11	14	17	22	25			
18	Bystrianka	ústie		0	96.59	8	13	18	23	28	37	42			
19	Hron	pod Bystriankou		214.1	1017.71	87	120	170	210	255	320	365			
20	Vajskovský p.	Doľná Lehota	V	2.7	53.02	6	8	11	14	18	24	30			
21	Vajskovský p.	ústie		0	58.85	6	9	12	15	19	26	32			
22	Hron	nad Jasen p.		205.5	1141.2	97	135	190	235	280	345	395			
23	Jasenianský n.	Jasenie	V	4.2	87.71	5	7	10	12	15	19	22			
24	Jasenianský n.	ústie		0	92.32	9	12	17	21	27	37	45			
25	Hron	Dubová	V	203.1	1244.12	105	145	200	245	295	365	420			
26	Hron	Nemecká	B	202.1	1249.8	105	145	200	245	295	365	420			
27	Hron	Nemecká	K	201	1259.94	105	145	200	245	295	365	420			
28	Byvčica	Slovenská Byvča	V	1.3	39.3	3	5	8	11	15	21	26			
29	Hron	Salková	K.B	181.5	1540.82	135	180	242	292	345	425	490			
30	Hron	B.Bystřica nad	K	175.8	1596.26	135	180	245	300	350	435	500			
31	Hron	nad Bystřicou		175.4	1596.51	135	180	245	300	350	435	500			
32	Starohorský p.	Staré Horv	V	6.1	62.61	8	12	16	22	27	35	42			
33	Bystřica	B.Bystřica	V.K	2.1	160.37	18	25	35	43	50	60	70			
34	Bystřica	ústie	B	0	169.96	18	26	36	44	51	62	72			
35	Hron	pod Bystřicou	B	175.3	1766.47	150	200	270	330	380	470	540			
36	Hron	B.Bystřica	V	175.2	1766.48	150	200	270	330	380	470	540			
37	Talovský p.	ústie		0	44.1	9	14	20	25	29	36	42			
38	Hron	Sliač	K	161	1939.01	165	220	295	360	415	505	585			
39	Hron	nad Slatinou	K.B	153.7	1999.1	170	225	300	365	425	520	600			
40	Slatina	Háňová nad VN	V	50.8	51.99	7	14	24	32	40	52	60			
41	Hukava	Háňová	V	0.3	9.96	2	3	5	7	9	14	20			
42	Slatina	Háňová pod VN	V.K.B	48	70.82	10	18	29	38	47	61	70			
43	Slatina	Mérová	V.B	8.1	411.02	53	82	115	135	160	185	205			
44	Hucava	Frochoť	V.K	13.8	41.45	15	23	31	39	49	59	69			
45	Zobná	ústie	K.B	0.2	200.97	28	43	61	76	90	110	130			
46	Nerečnica	ústie	K	0	139.44	26	35	48	59	70	86	100			
47	Slatina	Zvoten	V	2.1	790.16	100	155	215	260	290	340	375			
48	Slatina	ústie	K.B	0.1	792.58	100	155	215	260	290	340	375			
49	Hron	pod Slatinou		153.5	2791.68	240	325	440	535	610	740	855			
50	Hron	Budča	K.B	148.2	2844.57	240	330	445	540	620	750	865			
51	Hron	Hr.Breznica	V	146.1	2865.56	240	330	450	545	625	755	870			
52	Hron	pod Jasenicou		145.7	2948.69	250	340	460	560	640	780	900			
53	Kremnický p.	ústie		0.6	82.8	13	23	35	45	54	69	82			
54	Hron	pod Kremnickým		135.5	3149.73	260	355	485	585	675	820	940			
55	Hron	nad Lutiským		131.6	3165.23	260	360	485	585	675	820	945			
56	Lutiský p.	ústie		0	145.27	20	32	44	58	79	97	115			
57	Hron	pod Lutiským		131.5	3310.52	280	370	510	620	715	870	1000			
58	Hron	Zár n/Hronom	V.B.K	131.5	3310.62	280	370	510	620	715	870	1000			
59	Vyhnaný p.	ústie		0	37.94	7	12	24	33	38		60			
60	Hron	Zamezica	K	112	3542.91	290	385	530	640	740	900	1035			
61	Hron	nad KTakom		108.3	3560.61	290	385	530	640	740	900	1040			
62	Klak	ústie		0	132.33	23	35	53	67	82	105	125			
63	Hron	pod KTakom		108.2	3692.94	300	400	545	660	770	930	1070			
64	Hron	Brehy	V	93.9	3821.38	310	410	560	680	790	960	1100			
65	Hron	Takov.Breznica	B.K	88.9	3900.62	320	420	570	690	810	980	1125			
66	Hron	Palara	V	80.9	3963.56	320	420	570	690	810	985	1130			
67	Hron	Ved.Kozmál nad	B	73.4	4015.67	320	420	575	695	815	990	1135			
68	Hron	Kalná n/Hronom	K	63.7	4074.3	320	420	570	690	810	980	1120			
69	Hron	nad Sikenicou		41.5	4263.48	320	415	560	670	770	920	1035			
70	Sikenica	pod Telerom	K	2.7	271.21	19	31	46	58	71	88	105			
71	Sikenica	ústie		0	293.23	19	31	46	58	71	88	105			
72	Lúča	ústie		0	98.64	8	13	17	21	25	32	38			
73	Hron	nad Percom		111	5036.51	310	400	520	600	675	760	815			
74	Perec	ústie		0	113.29										
75	Hron	Kamenín	V.B.K	10.9	5149.8	310	400	520	600	670	750	800			
76	Hron	nad Pařížom		7.2	5159.16	310	400	520	600	670	750	800			
77	Paříž	ústie		0	232.78	11	18	28	35	42	53	63			
78	Hron	pod Pařížom		7.1	5391.94	310	400	520	600	670	750	800			
79	Hron	ústie	B.K	0	5464.56	310	400	520	600	670	750	800			

Legenda: V - vodomerňa stanica s limnigrafom; K - ŠVHB, kvalita; B - ŠVHB, kvantita  
 LEGEND: V - WATER MERIT STATION WITH LIMNIGRAPH; K - SVHB QUALITY; B - SVHB QUANTITY

Source: Data provided by Povodie Hrona in 1999

## **B.6 GEOLOGY**

Table B.6 - 1 through B.6 - 3 show the legend for the Maps of Geology and Hydrogeology.



Table B.6 - 1(1/2) Legend for the Geological Map of the Hron Region

Permeability interval (m <sup>2</sup> /s)	From (m <sup>2</sup> /s)	To (m <sup>2</sup> /s)	HIGH LEVEL STRATIGRAPHY	LITHOLOGY				
1	3.0E-03		P11	Quaternary	travertines and calcareous tufa			
			P2	Quaternary	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy loams			
			P46	Triassic	limestones			
			P47	Triassic	dolomites			
2	1.0E-03	3.0E-03	P1	Quaternary	anthropogenous deposits, mining dumps and tailings			
			P2	Quaternary	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy loams			
			P4	Quaternary	fluvioglacial deposits mostly sandy gravels with boulders			
			P46	Triassic	limestones			
			P47	Triassic	dolomites			
3	3.0E-04	1.0E-03	P7	Quaternary	deluvial loams, slope scées, block fields, landslide deposits (loamy with rock fragments)			
			P13	Quaternary	alkali basalts and basanite pyroclastics mostly einder and spatter			
			P14	Pliocene	fluvial deposits mostly gravels and sandy gravels			
			P16	Late Miocene	mostly gravels and sands with silt and clay intercalations			
			P2	Quaternary	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy loams			
			P24	Middle Miocene	mostly breccias and conglomerates of px, hb-px andesites			
			P25	Middle Miocene	mostly epiclastic sandstones of px and hb-px andesites			
			P3	Quaternary	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams			
			P44	Jurassic	middle - late jurassic: radiolarian cherts, radiolarian and nodular limestones, siliceous limestones, marly limestones			
			P8	Quaternary	eolian sands			
4	1.0E-04	3.0E-04	P12	Quaternary	alkali olivine basalts and nepheline basanites			
			P15	Pliocene	limnic/lacustrine deposits freshwater clays, silts and sands with rare gravel beds			
			P17	Late Miocene	mostly clays, silts and sands with rare lignite seams			
			P19	Late Miocene	calc-alkali basalts and basaltic andesites and pyroclastic rocks			
			P2	Quaternary	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy loams			
			P20	Middle Miocene	mostly gravels and sandy gravels (conglomerates)			
			P23	Middle Miocene	pyroxene and hornblende-pyroxene andesites, rare basaltic andesites			
			P26	Middle Miocene	mostly pumiceous tuffs and reworked tuffs of px and hb-px andesites			
			P28	Middle Miocene	rhyodacite and rhyolite breccias/conglomerates			
			P29	Middle Miocene	rhyodacite and rhyolite tuffs, reworked tuffs and epiclastic sandstones/siltstones			
			P3	Quaternary	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams			
			P36	Early Miocene	conglomerates, sandstones and sandy limestones			
			P38	Paleogene	Borové and Terchová formations mostly carbonate breccias, conglomerates, sandstones and limestones			
			P5	Quaternary	proluvial deposits in (alluvial) fans mostly loamy with gravels and rock fragments			
			P50	Triassic	Lužna and Beňkovo beds: quartzites, quartz sandstones, subordinate siliceous shales, rauwackes			
			P6	Quaternary	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks			
			P7	Quaternary	deluvial loams, slope scées, block fields, landslide deposits (loamy with rock fragments)			
			5	3.0E-05	1.0E-04	P2	Quaternary	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy loams
						P21	Middle Miocene	mostly sands with clay, silt and gravel intercalations, often tuffaceous (sandstones), clays, silts and sands with lignite seams
P27	Middle Miocene	rhyodacites and rhyolites						
P3	Quaternary	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams						
P30	Middle Miocene	granodiorite, diorite						
P31	Middle Miocene	granodiorite, quartz-diorite and diorite porphyry						
P34	Middle Miocene	argillites (mostly with disseminated pyrite)						
P39	Paleogene	Huty formation claystones with rare sandstone intercalations						
P40	Paleogene	Zuberec formation flysch - sandstones and claystones						
P48	Triassic	Keuper facies, Lunz beds, Werfen sandstones, shales, dolomites						
P49	Triassic	rhyolite volcanics						
P5	Quaternary	proluvial deposits in (alluvial) fans mostly loamy with gravels and rock fragments						
P53	Permian	basalts, andesites, dacites, rhyolites including volcanoclastic rocks						
P54	Carboniferous	conglomerates, sandstones, arkoses and gray shales						
P55	Hercyan basement	granitic rocks						
P58	Hercyan basement	metavolcanic rocks						
6	1.0E-05	3.0E-05				P6	Quaternary	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks
			P7	Quaternary	deluvial loams, slope scées, block fields, landslide deposits (loamy with rock fragments)			
			P41	Cretaceous	late cretaceous breccias, conglomerates, limestones and marly shales			
			P42	Cretaceous	middle cretaceous sandstones, shales, marly shales			
			P43	Cretaceous	early cretaceous limestones, marly limestones			
			P45	Jurassic	early jurassic marly shales, calcareous sandstones, sandy limestones, limestones			
			P52	Permian	mostly arkoses, sandstones and conglomerates			
			P56	Hercyan basement	crystalline schists (migmatites, gneisses, amphibolites)			
			P9	Quaternary	eolian /deluvial deposits loess and loess loams			
			P10	Quaternary	peat and peat (boggy) loams			
			P32	Middle Miocene	propylitized complexes of px and hb-px andesites and andesite porphyry			
			P33	Middle Miocene	chlorite-quartz-sericite-pyrite metasomatites, quartz-adularia metasomatites and metasomatic quartzites			
			7	1.0E-06	1.0E-05	P51	Permian	mostly variegated shales and sandstones
P57	Hercyan basement	chlorite-muscovite phyllites						
P10	Quaternary	peat and peat (boggy) loams						
8	1.0E-06		P32	Middle Miocene	propylitized complexes of px and hb-px andesites and andesite porphyry			
			P33	Middle Miocene	chlorite-quartz-sericite-pyrite metasomatites, quartz-adularia metasomatites and metasomatic quartzites			
			P51	Permian	mostly variegated shales and sandstones			
			P57	Hercyan basement	chlorite-muscovite phyllites			
			P18	Late Miocene	limnic/lacustrine (silica deposits)			
P22	Middle Miocene	limnic/lacustrine cherts (silica deposits)						

Table B.6 - 1(2/2) Legend for the Geological Map of the Hron Region

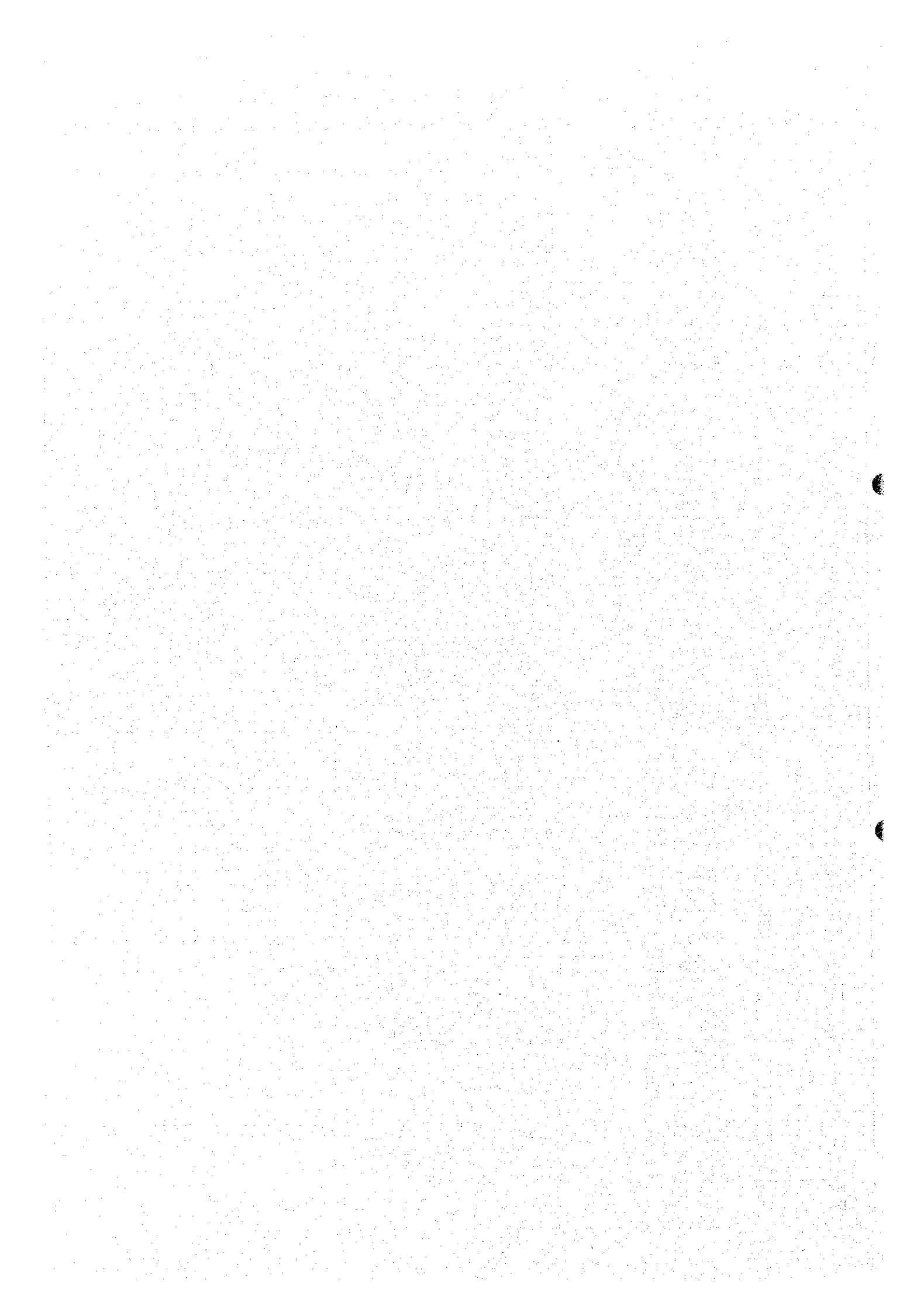
IG-LEVEL	IG-STRATIGRAPHY	IG-LITHOLOGY	IG-INTERVAL	IG-TRANSMISSIVITY (m/s)
P1	Quaternary	anthropogenous deposits, mining dumps and tailings	2	1.E-03 - 3.E-03
P2	Quaternary	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy loams	1-5	<3.E-05
P3	Quaternary	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams	3-5	3.E-5 - 1.E-03
P4	Quaternary	fluvioglacial deposits mostly sandy gravels with boulders	2	1.E-03 - 3.E-03
P5	Quaternary	proluvial deposits in (alluvial) fans mostly loamy with gravels and rock fragments	4-5	3.E-05 - 3.E-04
P6	Quaternary	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks	4-5	3.E-05 - 3.E-04
P7	Quaternary	deluvial loams, slope scree, block fields, landslide deposits (loamy with rock fragments)	4-5	3.E-05 - 3.E-04
P8	Quaternary	aeolian sands	3	3.E-04 - 1.E-03
P9	Quaternary	aeolian /deluvial deposits loess and loess loams	6	1.E-05 - 3.E-05
P10	Quaternary	peat and peat (boggy) loams	7	1.E-06 - 1.E-05
P11	Quaternary	travertines and calcareous tufa	1	<3.E-03
P12	Quaternary	alkali olivine basalts and nepheline basanites	4	1.E-04 - 3.E-04
P13	Quaternary	alkali basalts and basanite pyroclastics mostly cinder and spatter	3	3.E-04 - 1.E-03
P14	Pliocene	fluvial deposits mostly gravels and sandy gravels	3	3.E-04 - 1.E-03
P15	Pliocene	limnic/lacustrine deposits freshwater clays, silts and sands with rare gravel beds	4	1.E-04 - 3.E-04
P16	Late Miocene	mostly gravels and sands with silt and clay intercalations	3	3.E-04 - 1.E-03
P17	Late Miocene	mostly clays, silts and sands with rare lignite seams	4	1.E-04 - 3.E-04
P18	Late Miocene	limnic/lacustrine (silica deposits)	8	>1.E-06
P19	Late Miocene	calc-alkali basalts and basaltic andesites and pyroclastic rocks	4	1.E-04 - 3.E-04
P20	Middle Miocene	mostly gravels and sandy gravels (conglomerates)	4	1.E-04 - 3.E-04
P21	Middle Miocene	mostly sands with clay, silt and gravel intercalations, often tuffaceous (sandstones), clays, silts and sands with lignite seams	5	3.E-05 - 1.E-04
P22	Middle Miocene	limnic/lacustrine cherts (silica deposits)	8	>1.E-06
P23	Middle Miocene	pyroxene and hornblende-pyroxene andesites, rare basaltic andesites	4	1.E-04 - 3.E-04
P24	Middle Miocene	mostly breccias and conglomerates of px, hb-px andesites	3	3.E-04 - 1.E-03
P25	Middle Miocene	mostly epiclastic sandstones of px and hb-px andesites	3	3.E-04 - 1.E-03
P26	Middle Miocene	mostly pumiceous tuffs and revorked tuffs of px and hb-px andesites	4	1.E-04 - 3.E-04
P27	Middle Miocene	rhyodacites and rhyolites	5	3.E-05 - 1.E-04
P28	Middle Miocene	rhyodacite and rhyolite breccias/conglomerates	4	1.E-04 - 3.E-04
P29	Middle Miocene	rhyodacite and rhyolite tuffs, reworked tuffs and epiclastic sandstones/siltstones	4	1.E-04 - 3.E-04
P30	Middle Miocene	granodiorite, diorite	5	3.E-05 - 1.E-04
P31	Middle Miocene	granodiorite, quartz-diorite and diorite porphyry	5	3.E-05 - 1.E-04
P32	Middle Miocene	propylitized complexes of px and hb-px andesites and andesite porphyry	7	1.E-06 - 1.E-05
P33	Middle Miocene	chlorite-quartz-sericite-pyrite metasomatites, quartz-adularia metasomatites and metasomatic quartzites	7	1.E-06 - 1.E-05
P34	Middle Miocene	argillites (mostly with disseminated pyrite)	5	3.E-05 - 1.E-04
P35	Middle Miocene	ore veins, seams	4	1.E-04 - 3.E-04
P36	Early Miocene	conglomerates, sandstones and sandy limestones	4	1.E-04 - 3.E-04
P38	Paleogene	Borové and Terchová formations mostly carbonate breccias, conglomerates, sandstones and limestones	4	1.E-04 - 3.E-04
P39	Paleogene	Hury formation claystones with rare sandstone intercalations	5	3.E-05 - 1.E-04
P40	Paleogene	Zuberec formation flysch - sandstones and claystones	5	3.E-05 - 1.E-04
P41	Cretaceous	late cretaceous breccias, conglomerates, limestones and marly shales	6	1.E-05 - 3.E-05
P42	Cretaceous	middle cretaceous sandstones, shales, marly shales	6	1.E-05 - 3.E-05
P43	Cretaceous	early cretaceous limestones, marly limestones	6	1.E-05 - 3.E-05
P44	Jurassic	middle - late jurassic: radiolarian cherts, radiolarian and nodular limestones, siliceous limestones, marly limestones	3	3.E-04 - 1.E-03
P45	Jurassic	early jurassic marly shales, calcareous sandstones, sandy limestones, limestones	6	1.E-05 - 3.E-05
P46	Triassic	limestones	1-2	<3.E-03
P47	Triassic	dolomites	1-2	<3.E-03
P48	Triassic	keuper facies, lünz beds, werfen sandstones, shales, dolomites	5	3.E-05 - 1.E-04
P49	Triassic	rhyolite volcanics	5	3.E-05 - 1.E-04
P50	Triassic	lúžna and Beňkovo beds: quartzites, quartz sandstones, subordinate siliceous shales, rauwackes	4	1.E-04 - 3.E-04
P51	Permian	mostly variegated shales and sandstones	7	1.E-06 - 1.E-05
P52	Permian	mostly arkoses, sandstones and conglomerates	6	1.E-05 - 3.E-05
P53	Permian	basalts, andesites, dacites, rhyolites including volcanoclastic rocks	5	3.E-05 - 1.E-04
P54	Carboniferous	conglomerates, sandstones, arkoses and gray shales	5	3.E-05 - 1.E-04
P55	Hercyan basement	granitic rocks	5	3.E-05 - 1.E-04
P56	Hercyan basement	crystalline schists (migmatites, gneisses, amphibolites)	6	1.E-05 - 3.E-05
P57	Hercyan basement	chlorite-muscovite phyllites	7	1.E-06 - 1.E-05
P58	Hercyan basement	metavolcanic rocks	5	3.E-05 - 1.E-04

Table B.6 - 2 Legend of Hydrogeological Map with Estimated Transmissivity

GIS DEVEL	HTG ZONE	STRATIGRAPHY	LITHOLOGY
P67	P36	Early Miocene	conglomerates, sandstones and sandy limestones
P68	P37	Early Miocene	mostly fine sandstones, siltstones and marly claystones
P69	P38	Paleogene	conglomerates and sandstones with claystone intercalations
P70	P39	Paleogene	mostly claystones, marls and sandstones with rare limestones and coal intercalations
P71	P40	Paleogene	Zuberec formation flysch - sandstones and claystones
P72	P39	Paleogene	Huty formation claystones with rare sandstone intercalations
P73	P38	Paleogene	Borové and Terchová formations mostly carbonate breccias, conglomerates, sandstones and limestones
P74	P41	Cretaceous	Late Cretaceous breccias, conglomerates, limestones and marly shales
P75	P42	Cretaceous	Middle Cretaceous sandstones, shales, marly shales
P76	P43	Cretaceous	Early Cretaceous limestones, marly limestones
P77	P44	Jurassic	Middle - Late Jurassic: radiolarian cherts, radiolarian and nodular limestones, siliceous limestones, marly limestones
P78	P45	Jurassic	Early Jurassic marly shales, calcareous sandstones, sandy limestones, limestones
P79	P46	Triassic	limestones, marly limestones
P80	P47	Triassic	dolomites
P81	P48	Triassic	Keuper facies quartzites, variegated shales, dolomites, evaporites
P82	P48	Triassic	Lunz beds shales and sandstones
P83	P48	Triassic	Werfen and Campil beds variegated shales, marly shales, sandy shales, subordinate sandstones
P84	P49	Triassic	rhyolite volcanics
P85	P50	Triassic	Lúžna and Beňkovo beds: quartzites, quartz sandstones, subordinate siliceous shales
P86	P50	Triassic	rauwackes
P87	P51	Permian	mostly variegated shales and sandstones
P88	P52	Permian	mostly arkoses, sandstones and conglomerates
P89	P53	Permian	tholeiitic basalts and andesites, including volcanoclastic rocks and intrusive equivalents
P90	P53	Permian	dacites and rhyolites, including volcanoclastic rocks
P91	P54	Late Carboniferous	conglomerates, sandstones, arkoses and gray shales
P92	P55	Hercynian basement	large pegmatite veins
P93	P55	Hercynian basement	leucocrate (aplitic) granites
P94	P55	Hercynian basement	mostly granodiorites and granites
P95	P55	Hercynian basement	tonalites with subordinate granodiorites
P96	P55	Hercynian basement	diorites
P97	P56	Hercynian basement	migmatites and orthogneisses
P98	P56	Hercynian basement	biotite-muscovite and muscovite paragneisses
P98A	P56	Hercynian basement	quartz-gneisses and metaquartzites
P99	P56	Hercynian basement	hornblende gneisses and amphibolites
P100	P57	Hercynian basement	chlorite-muscovite phyllites and mica schists
P101	P57	Hercynian basement	chlorite and/or graphite-chlorite phyllites
P102	P57	Hercynian basement	phyllites with metavolcanic intercalations
P103	P58	Hercynian basement	mafic metavolcanic rocks
P104	P58	Hercynian basement	siliceous metavolcanic rocks

Table B.6 - 3 Transmissivity Interval with Corresponding Hydrogeological Units

GIS LEVEL	ICG LEVEL	STRATIGRAPHY	LITHOLOGY
P1	P1	Quaternary Holocene	anthropogenous deposits
P2	P1	Quaternary Holocene	mining dumps and tailings
P3	P2	Quaternary Würm/Holocene	fluvial deposits of alluvial plains (including lowermost terrace) mostly sandy gravel with cover of flood-plain sandy lo
P4	P3	Riss	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams
P5	P3	Mindel	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams
P6	P3	Pre-Mindel	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams
P6a	P3	Pleistocene undivided	fluvial deposits in terraces mostly sandy gravel, sometimes with cover of flood-plain sandy loams
P7	P4	Quaternary Würm	fluvioglacial deposits mostly sandy gravels with boulders
P8	P4	Riss	fluvioglacial deposits mostly coarse gravels with boulders
P9	P4	Mindel	fluvioglacial deposits mostly coarse gravels with boulders
P10	P4	Pre-Mindel	fluvioglacial deposits mostly coarse gravels with boulders
P10a	P4	Pleistocene undivided	fluvioglacial deposits mostly coarse gravels with boulders
P11	P5	Quaternary Würm/holocene	proluvial deposits in (alluvial) fans mostly loamy with gravels and rock fragments
P12	P5	Riss	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks
P13	P5	Mindel	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks
P14	P5	Pre-Mindel	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks
P15	P5	Pleistocene undivided	proluvial deposits in (alluvial) fans mostly loamy gravels with rock fragments and blocks
P16	P6	Quaternary undivided	deluvial/proluvial deposits in fans loamy to sandy rock-fragment accumulations
P17	P6	Quaternary undivided	deluvial/fluvial wash-out loams mostly sandy loams with variable amount of rock fragments
P18	P4	Quaternary undivided	glacial moraine deposits boulder and block accumulations with coarse sandy matrix
P19	P7	Quaternary undivided	cluvial/deluvial loams - products of local weathering
P20	P7	Quaternary undivided	deluvial loams and sandy loams with rare rock fragments
P21	P7	Quaternary undivided	deluvial slope scree (talus) rock fragments with variable proportion of loamy matrix
P22	P7	Quaternary undivided	stony talus accumulations and block fields
P23	P7	Quaternary undivided	landslide deposits mostly loamy/stony accumulations with boulders and blocks
P24	P8	Quaternary undivided	colian sands
P25	P9	Quaternary undivided	colian /deluvial deposits loess and loess loams
P26	P10	Quaternary undivided	peat and peat (boggy) loams
P27	P11	Quaternary undivided	travertines and calcareous tufa
P28	P12	Quaternary-Pliocene	alkali olivine basalts and nepheline basanites
P29	P13	Quaternary-Pliocene	alkali basalts and basanite pyroclastics mostly cinder and spatter
P30	P14	Pliocene	fluvial deposits mostly gravels and sandy gravels
P31	P14	Pliocene	fluvial/limnic/lacustrine deposits interstratified gravels, sands, clays and lignite seams
P32	P15	Pliocene	limnic/lacustrine deposits freshwater clays, silts and sands with rare gravel beds
P33	P16	Late Miocene	mostly gravels and sands with silt and clay intercalations
P34	P17	Late Miocene	mostly clays, silts and sands with rare lignite seams
P35	P18	Late Miocene	limnic/lacustrine (silica deposits)
P36	P19	Late Miocene	calc-alkali basalts and basaltic andesites
P37	P19	Late Miocene	mostly basalt and basaltic andesite pyroclastic rocks - agglomerates, agglomerates and pumiceous tuffs, rare phreatic
P38	P20	Middle Miocene	mostly gravels and sandy gravels (conglomerates)
P39	P21	Middle Miocene	mostly sands with clay, silt and gravel intercalations, often tuffaceous (sandstones)
P40	P21	Middle Miocene	clays, silts and sands with lignite seams and diatomaceous earth, rare calcareous clays and limestones
P41	P22	Middle Miocene	limnic/lacustrine cherts (silica deposits)
P42	P23	Middle Miocene	pyroxene and hornblende-pyroxene andesites, rare basaltic andesites
P43	P24	Middle Miocene	mostly breccias of px and hb-px andesites (autoclastic, hyaloclastite, pyroclastic and epiclastic breccias)
P44	P24	Middle Miocene	mostly epiclastic conglomerates of px and hb-px andesites
P45	P25	Middle Miocene	mostly epiclastic sandstones of px and hb-px andesites
P46	P26	Middle Miocene	mostly pumiceous tuffs and reworked tuffs of px and hb-px andesites
P47	P23	Middle Miocene	pyroxene-hornblende, hornblende and biotite-hornblende andesites
P48	P24	Middle Miocene	mostly coarse breccias of px-hb, hb and bi-hb andesites (autoclastic, pyroclastic and epiclastic breccias)
P49	P24	Middle Miocene	mostly epiclastic conglomerates of px-hb, hb and bi-hb andesites
P50	P25	Middle Miocene	mostly epiclastic sandstones of px-hb, hb and bi-hb andesites
P51	P26	Middle Miocene	mostly pumiceous tuffs and reworked tuffs of px-hb, hb and bi-hb andesites
P52	P27	Middle Miocene	irhyodacites and rhyolites
P53	P28	Middle Miocene	rhyodacite and rhyolite breccias/conglomerates
P54	P29	Middle Miocene	rhyodacite and rhyolite tuffs, reworked tuffs and epiclastic sandstones/siltstones
P55	P30	Middle Miocene	granodiorite
P56	P30	Middle Miocene	diorite
P57	P31	Middle Miocene	granodiorite porphyry
P58	P31	Middle Miocene	quartz-diorite porphyry
P59	P31	Middle Miocene	diorite porphyry
P60	P32	Middle Miocene	propylitized complexes of px and hb-px andesites and andesite porphyry
P61	P33	Middle Miocene	chlorite-quartz-sericite-pyrite metasomatites
P62	P34	Middle Miocene	argillites (mostly with disseminated pyrite)
P63	P33	Middle Miocene	quartz-adularia metasomatites
P64	P33	Middle Miocene	metasomatic quartzites
P65	P35	Middle Miocene	ore veins
P66	P35	Middle Miocene	skarns



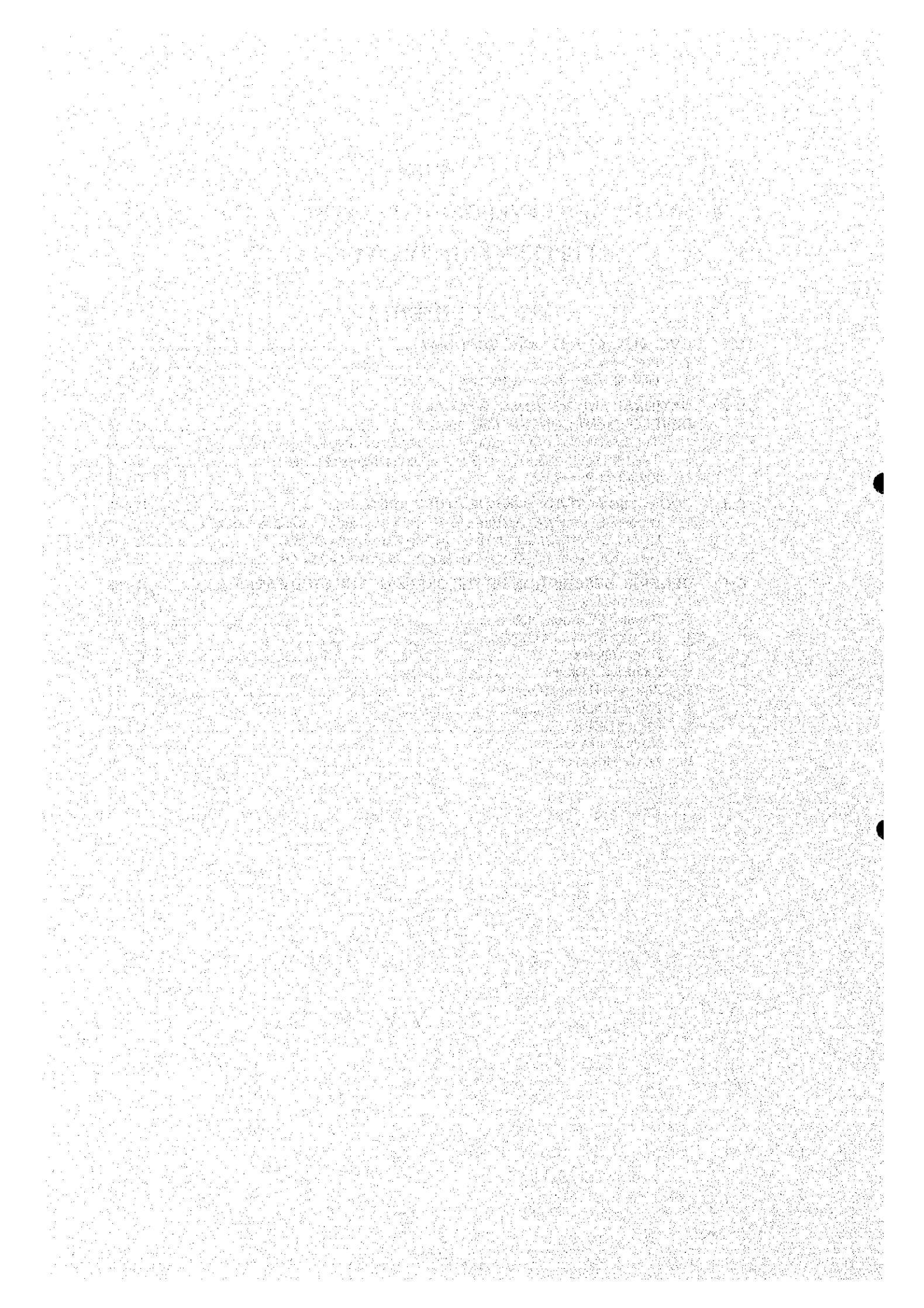
## ANNEX C

### ECONOMY AND DEVELOPMENT (NATIONAL AND LOCAL)

#### - SUPPLEMENTARY INFORMATION

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## **C.1 OVERVIEW OF NATIONAL ECONOMY**

### **1. POPULATION**

#### **1.1 Population of SR**

Table C.1-1 shows the historical evolution of national population of the Slovak Republic 1960 – 1997. The total population of the country was 5 383 thousand in 1997 with a low growth rate of 0.17 from the previous year.

The number of productive age population was 3 283 thousand in 1997, which shares 61 % against the total population, with a growth rate of more than 1 % since 1992.

#### **1.2 Life Expectancy**

The life expectancies for both male and female have favourable up-trend to the present, 68.9 for male and 76.7 for female in 1997. However, if it is compared with that in EU countries, those figures are still in lower level.

#### **1.3 Regional Distribution**

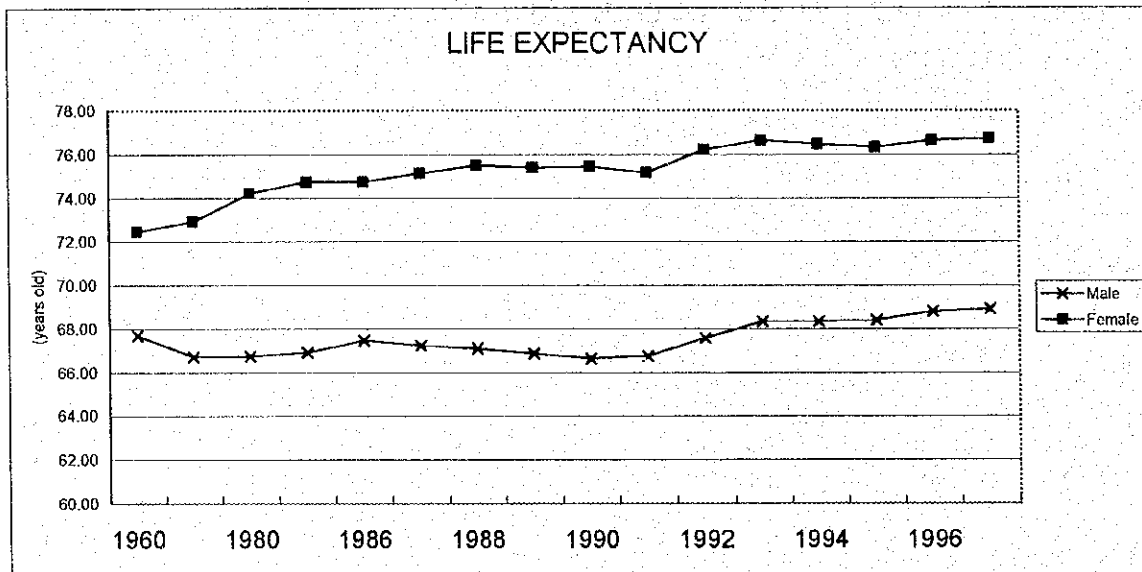
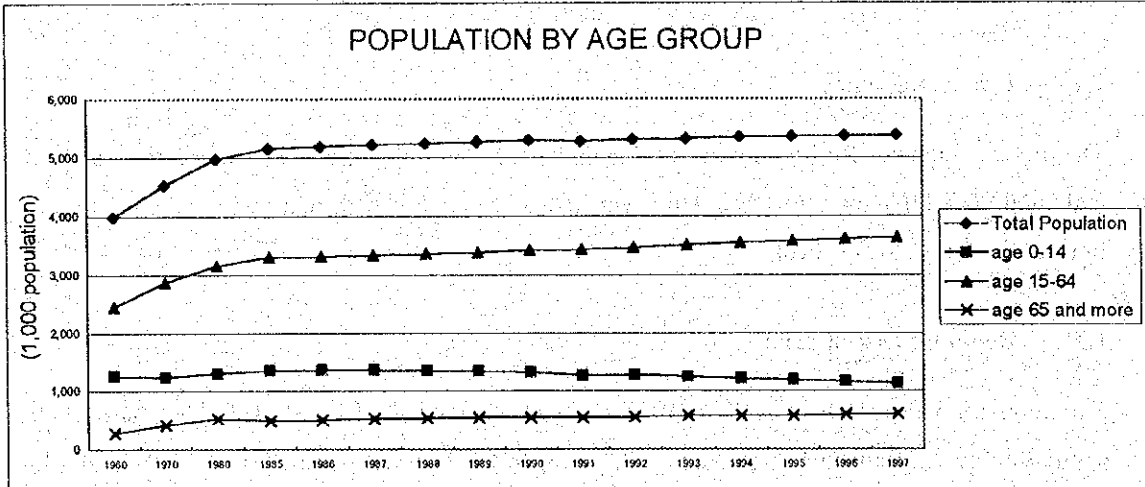
The population distribution by Kraj 1995 to 1997 is shown in Table C.1-2. The share of the population of the Banska Bystrica and Nitra Kraj to the national population are 12% and 13% respectively in 1997. Both Kraj have trends on downward of the population in their territory during 1995 to 1997.



	1960	1970	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997
Total population(1,000)	3,994	4,528	4,984	5,162	5,298	5,283	5,307	5,325	5,347	5,364	5,374	5,383
Productive age(1,000)	2,192	2,547	2,874	2,924	3,042	3,057	3,083	3,119	3,173	3,213	3,248	3,283
0-14(%)	31.6	27.3	26.1	26.4	25.0	24.1	24.1	23.5	22.9	22.3	21.7	21.1
15-64(%)	61.4	63.5	63.5	64.1	64.6	65.0	65.4	65.8	66.3	66.8	67.2	67.7
65 and more(%)	7.0	9.2	10.4	9.5	10.4	10.4	10.5	10.7	10.8	10.9	11.1	11.2
Life expectancy(male)	67.70	66.73	66.75	66.92	66.64	66.75	67.56	68.35	68.34	68.40	68.80	68.91
Life expectancy(female)	72.47	72.92	74.25	74.74	75.44	75.17	76.22	76.66	76.48	76.33	76.65	76.73
Birth rate (per 1,000)	22.1	17.8	19.1	17.5	15.1	14.9	14.1	13.8	12.4	11.4	11.2	11.0
Death rate (per 1,000)	7.9	9.3	10.2	10.2	10.3	10.3	10.1	9.9	9.6	9.8	9.5	9.7
Natural increase per 1,000	14.2	8.5	8.9	7.3	4.8	4.6	4.0	3.9	2.8	1.6	1.7	1.3

Annual average increase ratio(%)

	1960-70	1970-80	1980-85	1985-90	1990-95	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Total population(1,000)	1.26	0.96	0.70	0.52	0.25	-0.28	0.45	0.34	0.41	0.32	0.19	0.17
Productive age(1,000)	1.51	1.22	0.35	0.79	1.10	0.49	0.85	1.17	1.73	1.26	1.09	1.08
Life expectancy(male)	-0.14	0.00	0.05	-0.08	0.52	0.17	1.21	1.17	-0.01	0.09	0.58	0.16
Life expectancy(female)	0.06	0.18	0.13	0.19	0.23	-0.36	1.40	0.58	-0.23	-0.20	0.42	0.10
Birth rate (per 1,000)	-2.14	0.71	-1.73	-2.91	-5.47	-1.32	-5.37	-2.13	-10.14	-8.06	-1.75	-1.79
Death rate (per 1,000)	1.64	0.93	0.00	0.20	-0.99	0.00	-1.94	-1.98	-3.03	2.08	-3.06	2.11



Source; Statistical Yearbook of the SR 1998, p.33.

Table C.1 - 1

National Population of the SR 1960-1997

Table C.1-2 Population by Kraj 1995 - 1997 (as of Dec. 31)

Kraj	1995	1996	1997	Share	Increase ratio
Banska Bystrica	663 992	664 024	663 845	12 %	- 0.01 %
Nitra	717 624	717 585	717 241	13 %	- 0.03 %
Bratislava	618 290	618 904	618 673	11 %	0.03 %
Trnav	547 967	548 898	549 621	10 %	0.15 %
Trencian	609 828	610 135	610 349	11 %	0.04 %
Zilina	685 365	687 771	689 504	13 %	0.30 %
Presov	768 719	773 121	777 301	14 %	0.56 %
Kosice	756 005	758 494	761 116	14 %	0.34 %
SR	5 367 790	5 378 932	5 387 650	100 %	0.18 %

Source: Statistical Yearbook of the SR 1998; Statistical Office of the SR.(Ref. 14-23)

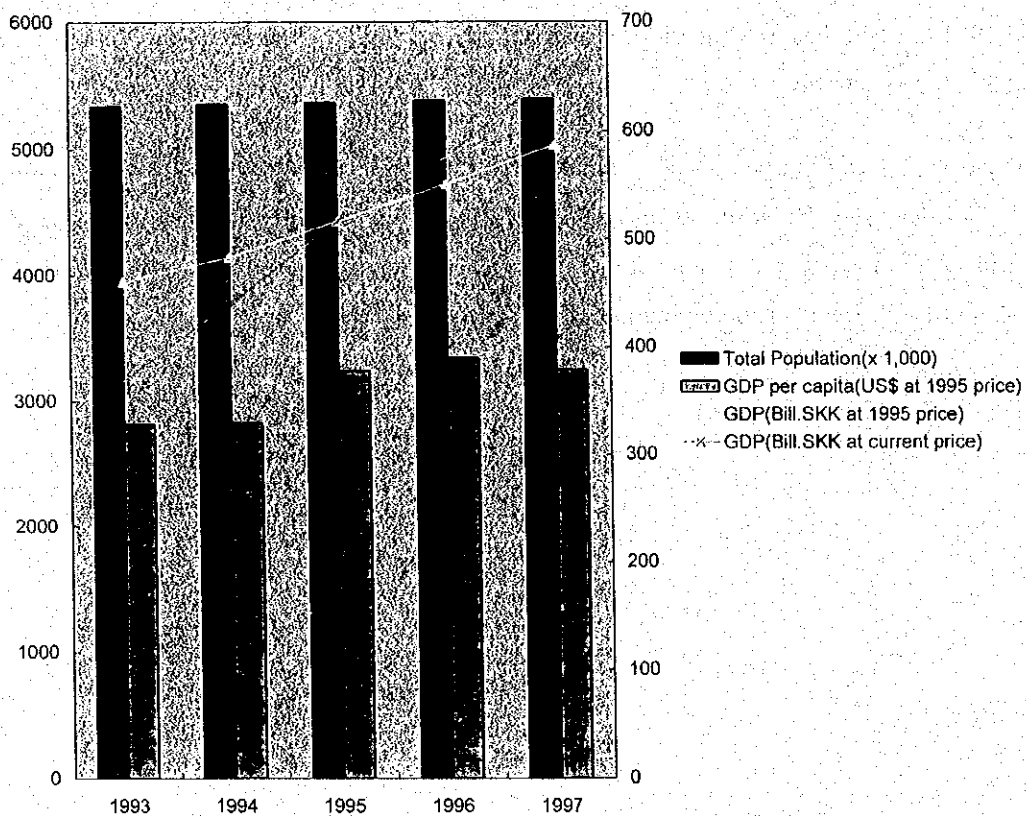
## 2. GDP AND ECONOMIC ACTIVITIES

### 2.1 GDP in Total

The Slovak GDP at current price amounted to US\$ 19 452 million (653.9 billion SK) in 1997, increasing at an average annual rate of 5.3 % between 1991 and 1993 and 12.9 % between 1993 and 1997 (on US\$ base), while the real increase ratios of GDP during same periods were -7.1 % and 3.9 % respectively.

The per capita GDP at current price reached US\$ 3 613 in 1997 at an annual average ratio of 12.6 % from 1993. However, at real increasing, the per capita GDP at 1995 price was US\$ 3 243 in 1996, increasing at an annual rate of -7.5 % between 1991 and 1993 and 3.6 % between 1993 and 1997. Details is presented in Table C.1-3.

						Annual average increase ratio(%)			
	1993	1994	1995	1996	1997	1993-94	1994-95	1995-96	1996-97
GDP(Bill.SKK at current price)	369.1	440.5	516.8	575.7	653.9	19.3	17.3	11.4	13.6
GDP(Mill.US\$ at current price)	11,988	13,749	17,380	18,785	19,452	14.7	26.4	8.1	3.6
Rate of exchange SKK/US\$	30.8	32.0	29.7	30.6	33.6	3.9	-7.2	3.0	9.8
GDP(Bill.SKK at 1995 price)	460.8	483.4	516.8	550.8	586.8	4.9	6.9	6.6	6.5
GDP(Mill. US\$ at 1995 price)	14,966	15,088	17,380	17,972	17,456	0.8	15.2	3.4	-2.9
GDP per capita(SKK at 1995 price)	86,542	90,399	96,351	102,474	109,000	4.5	6.6	6.4	6.4
GDP per capita(US\$ at current price)	2,251	2,571	3,240	3,495	3,613	14.2	26.0	7.9	3.4
GDP per capita(US\$ at 1995 price)	2,811	2,822	3,240	3,344	3,243	0.4	14.8	3.2	-3.0
Total Population(x 1,000)	5,336	5,356	5,368	5,379	5,388	0.4	0.2	0.2	0.2



Note: years 1996 and 1997 are preliminary data

Source: Statistical Yearbook of the Slovak Republic 1998, p.63; Statistical Office of the Slovak Republic

Table C.1 - 3

GDP and GDP per capita of the SR 1985 - 1997

The regional contribution to the GDP of SR is shown in Table C.1-4. According to the figures of gross output by Kraj, the shares of Banska Bystrica and Nitra Kraj were 9.3 % and 9.7 %, respectively in 1997.

Table C.1-4 GDP of SR by Kraj 1996 - 1997

Name of Kraj	Gross output		Inter-consumption		Value added	
	1996	1997	1996	1997	1996	1997
Banskobystricky	136 785	150 930	80 966	88 064	55 819	62 866
(share in SR)	9.3%	9.3%	8.7%	8.8%	10.3%	10.1%
Nitransky	142 668	150 929	89 341	92 067	53 327	58 862
(share in SR)	9.7%	9.3%	9.6%	9.2%	9.9%	9.5%
Bratislavsky	441 243	524 196	268 956	322 235	172 287	201 961
(share in SR)	30.0%	32.3%	28.9%	32.2%	31.9%	32.5%
Trnavsky	133 844	142 815	89 342	86 063	44 502	56 752
(share in SR)	9.1%	8.8%	9.6%	8.6%	8.2%	9.1%
Trenciansky	135 515	149 307	84 688	89 065	50 627	60 242
(share in SR)	9.2%	9.2%	9.1%	8.9%	9.4%	9.7%
Zilinsky	145 610	154 175	93 064	99 072	52 546	55 103
(share in SR)	9.9%	9.5%	10.0%	9.9%	9.7%	8.9%
Presovsky	111 781	121 717	68 867	74 054	42 914	47 663
(share in SR)	7.6%	7.5%	7.4%	7.4%	7.9%	7.7%
Kosicky	223 563	228 829	155 417	150 109	68 146	78 720
(share in SR)	15.2%	14.1%	16.7%	15.0%	12.6%	12.7%
Total SR	1 471 009	1 622 898	930 641	1 000 729	540 168	622 169
(share in SR)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Statistical Yearbook of the SR 1998 (Ref. 14-23), p.567

## 2.2 GDP in Economic Sectors

Table C.1-5 shows the GDP by economic activities of the Slovak Republic Slovak between 1987 and 1997.

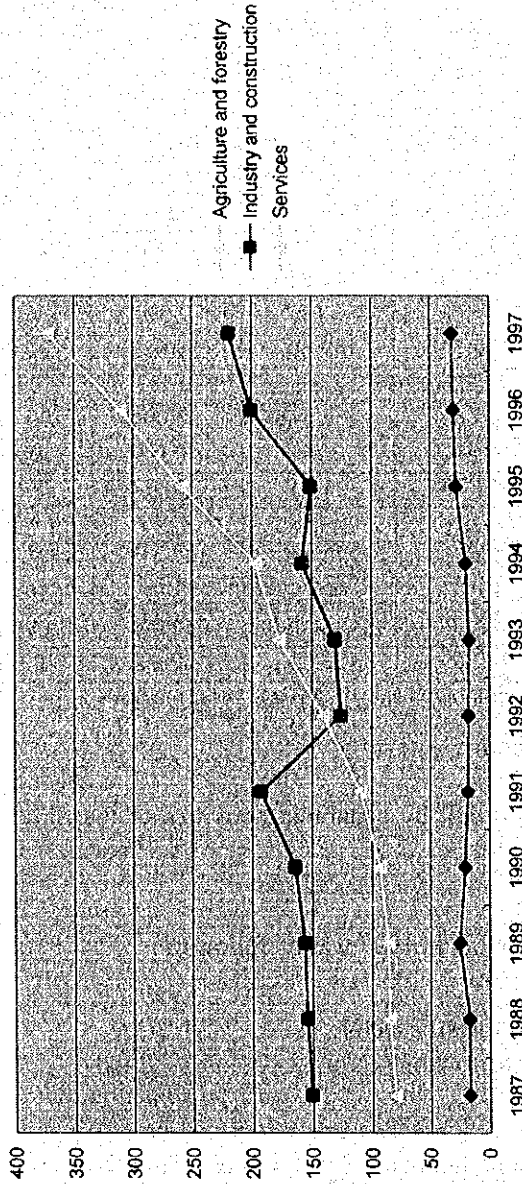
The share of GDP by sectors in 1997 was as follows;

- Agriculture and forestry sector.....5.1 %
- Industry and construction sector.....35.1 %, and
- Service sector.....59.8 %

The service sector became dominant sectors to contribute to GDP of SR since 1992. The share of the sector was 59.8 % in 1997, and the annual average increase ratio has been kept at higher rate of 20.3 %, since 1993 to the present, at current price basis.

The share of agriculture and forestry sector has been decreased its share in total GDP year by year. The sector has been kept at 16.3 % annual average increase ratio since 1993, which is slightly higher than that of total GDP.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Absolute											
Total	247.7	256.9	267.3	278.0	319.7	332.3	369.1	440.5	516.8	575.7	653.9
Agriculture and forestry	17.2	17.2	25.0	20.5	18.2	17.7	17.3	19.7	27.7	29.9	31.6
Industry and construction	150.4	154.4	156.3	164.4	192.1	126.1	130.6	158.1	150.4	200.2	218.6
Services	80.1	85.2	86.1	93.1	109.4	140.7	177.3	196.7	258.7	310.1	371.9
Percentage											
Agriculture and forestry	6.9%	6.7%	9.3%	7.4%	5.7%	6.2%	5.3%	5.3%	6.3%	5.5%	5.1%
Industry and construction	60.7%	60.1%	58.5%	59.1%	60.1%	44.3%	40.2%	42.2%	34.4%	37.1%	35.1%
Services	32.3%	33.2%	32.2%	33.5%	34.2%	49.5%	54.5%	52.5%	59.2%	57.4%	59.8%



Note: years 1996 and 1997 are preliminary data  
Source: Statistical Yearbook of the Slovak Republic 1998, p.67; Statistical Office of the Slovak Republic

Table C.1 - 5 GDP by Sectors 1987 - 1997 (Bill.SKK at current price)

However, the contribution of the industrial and construction sector has tendency to drop its share in GDP, which was 35.1 % in 1997, and the increase ratio was lowest among the sector, which was 13.7 % annual.

## 2.3 Economic Activities

### (1) Industry

Table C.1-6 shows the evolution of industrial production from 1960 to the present.

It can be broadly divided the historical stages of the production of industry and construction sector as follows;

- The golden age: 1985 to 1989
- The depression age: 1990 to 1993

Most of products except electricity, gas and water supply decreased during this period.

- The recovery age: since 1994 to the present

The following products increased rapidly during 1994 and 1996;

- Leather and its products
- Wood and its products
- Pulp, paper and its products and publishing and printing
- Coke, refined petroleum products and nuclear fuel
- Chemical and its products and manmade fabric (incl. nitrogenous fertilizer)
- Rubber and plastic products (incl. tires for vehicles)
- Machinery and equipment N.E.C. (incl. wood and metal working machines)
- Electrical and optical equipment (incl. cables and wires)
- Transport equipment (incl. passenger's car and pick-up)
- Manufacturing N.E.C.

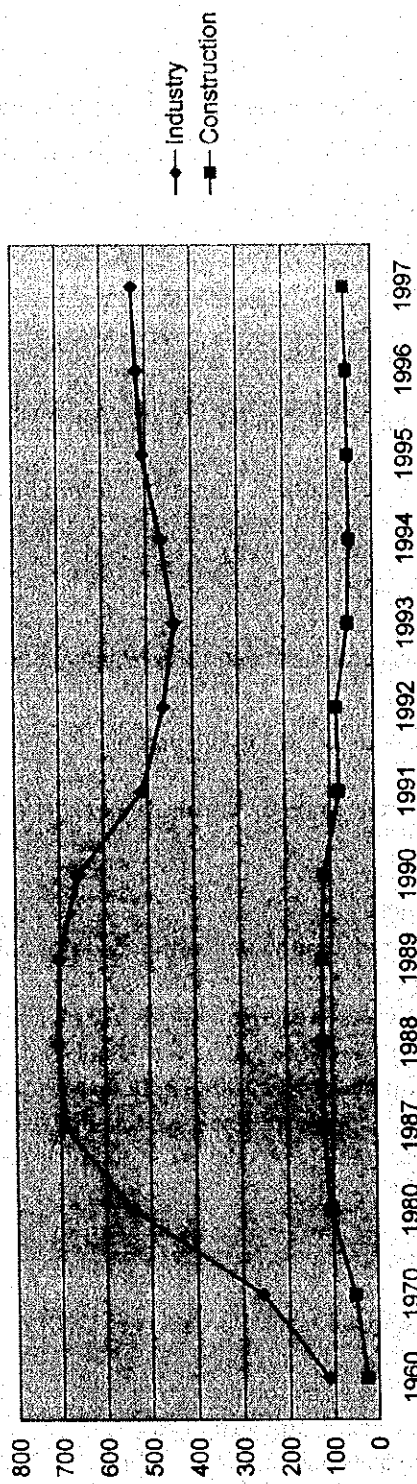
The major industrial products in 1996 were as follows;

- Basic metals and fabricated metal products (15.5 % of the total industrial production at 1996 price)
- Food products, beverages and tobacco (14.2 %)
- Electricity, gas and water supply (10.7 %)
- Chemicals, their products and manmade fabric (8.6 %)
- Transport equipment (7.7 %)
- Coke, refined petroleum products and nuclear fuel (7.7 %)
- Machinery and equipment N.E.C.

### (2) Agriculture and Forestry

Table C.1-7 shows the evolution of the agricultural productions from 1960 to the present.

	1960	1970	1980	1987	1988	1989	1990	1991	1992	1993	1994	1994
Absolute	112.2	257.5	537.2	690.6	705.6	700.9	659.2	512.5	463.2	438.4	468.1	468.1
Industry	25.4	51.6	105.0	119.1	120.0	120.4	113.7	79.1	83.8	56.7	52.9	52.9
Construction												
Increase ratio												
Period	1960-70	1970-80	1980-90	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94		
Industry	8.7%	7.6%	2.5%	2.2%	-0.7%	-6.0%	-22.3%	-9.6%	-5.4%	6.8%		
Construction	7.4%	7.4%	1.3%	0.8%	0.4%	-5.5%	-30.5%	6.0%	-32.3%	-6.8%		

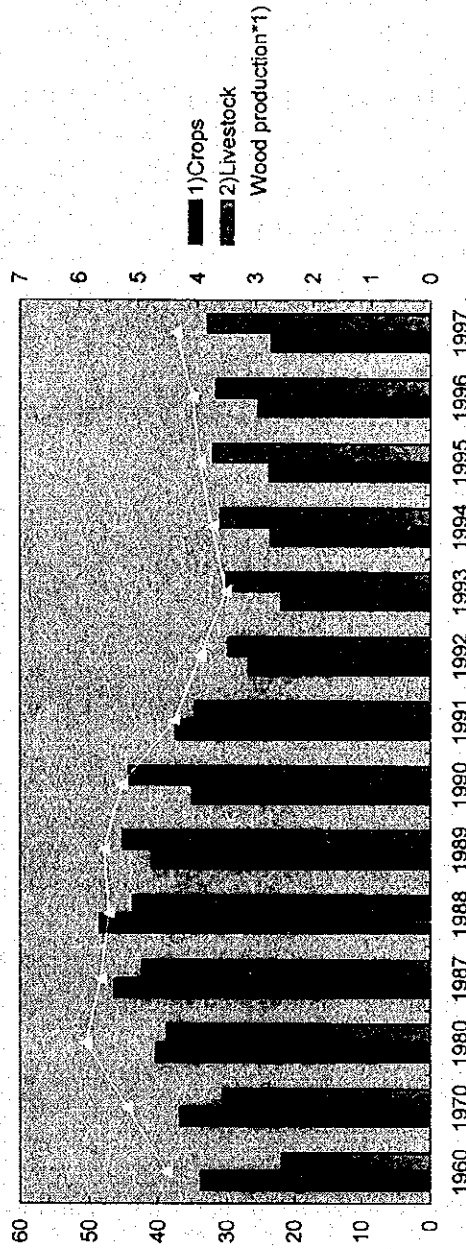


Note: at constant price of 1995 in billion SK.  
Source: Statistical Yearbook of the Slovak Republic 1998, p. 43.

Table C.1 - 6 Productions of Industry and Construction at Constant Price 1995 <sup>(1)</sup>

	1960	1970	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Agriculture	55.4	67.1	78.8	88.4	91.9	85.7	79.1	71.9	56.3	51.8	54.3	55.5	56.6	56.0
1) Crops	33.7	36.7	40.1	46.2	48.4	40.7	34.9	37.4	26.6	21.8	23.4	23.6	25.2	23.3
2) Livestock	21.7	30.4	38.7	42.2	43.5	45.0	44.1	34.5	29.7	30.0	30.9	31.9	31.4	32.7
Wood production*1)	4.5	5.2	5.9	5.6	5.5	5.6	5.3	4.4	4.0	3.5	3.8	4.0	4.1	4.4

Period	1960-70	1970-80	1980-90	1990-97	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Agriculture	1.9%	1.6%	1.1%	-4.8%	4.0%	-6.7%	-7.8%	-9.0%	-21.7%	-8.1%	4.8%	2.3%	2.0%	-1.0%
1) Crops	0.9%	0.9%	1.4%	-5.6%	4.8%	-15.9%	-14.3%	7.1%	-28.9%	-18.1%	7.4%	0.9%	6.7%	-7.4%
2) Livestock	3.4%	2.4%	0.9%	-4.2%	3.1%	3.5%	-1.9%	-21.7%	-14.0%	0.9%	3.0%	3.4%	-1.5%	4.1%
Wood production*1)	1.4%	1.3%	0.4%	-2.7%	-2.5%	1.6%	-5.4%	-16.6%	-10.1%	-11.4%	6.7%	5.7%	3.1%	6.8%



Notes: \*1) at constant price of 1995 and \*2) Unit: 1 000 m<sup>3</sup>  
Source: Statistical Yearbook of the Slovak Republic 1998, p. 41.

Productions Agriculture and Forestry \*1)

Table C.1 - 7



It can be broadly divided the historical stages of the production of agriculture and forestry sector as follows;

- The golden age: 1985 to 1989 (communist period)
- The depression age: 1990 to 1993 (reformation period)

Most of products except some crop products of potato and flax were decreased during these periods.

- The recovery age; since 1994 to the present

The following products increased rapidly during 1994 and 1996;

- oil seed rape
- grapes
- sugar beet
- poultry and livestock

The major agricultural products in 1996 were as follows;

Crop Production;

- wheat (11.6 % of the total agricultural production at 1996 price)
- grain maize (5.0 %)
- barley (4.0 %)
- sugar beet (3.7 %)
- potatoes (2.8 %)

Livestock Production;

- pigs(19.0 % of the gross agricultural production)
- cattle (12.8 %)
- milk (15.0 %)
- poultry (4.7 %)
- eggs (3.3 %)

The forestry production also has similar trends in the past as follows;

- The golden age; 1980 to 1989 (communist period); 5 to 6 millions m<sup>3</sup> w.b. of wood
- The depression age; 1990 to 1993 (reformation period); Down to 3.5 million m<sup>3</sup> w.b. of wood
- The recovery age; since 1994 to the present; 4.0 m<sup>3</sup> w.b. in 1996

## 2.4 Employment and Household Income

### (1) Employment

Table C.1-8 shows the employment structure of the Slovak Republic since 1960 to the present. The number of employees was 2 059 thousand persons in 1997. There is a tendency to decrease the number of employees since 1988 to the present in general. However, if it is compared with the increase ratio of the productive age, 1.36 %, it is still low growth rate. The number of employees in the productive age was 66.2 % in 1996, which is 13 % lower than 79 % during the communist period of 1985 and 1989.

More than 90 % of the employees were engaged in the public sector until 1989. After the collapse of communist government, privatization has been rapidly promoted, the number of employees engaged in the private sector outran the public sector since 1994. The shares of employees in public and private sectors were 35 : 65 in 1997.

The share of women in employment had its peak in 1987 – 1989 (45.5 %), then it has been kept a downward trend until 1996 (41.2 %). In 1997 the share was bit increased to 41.6 %.

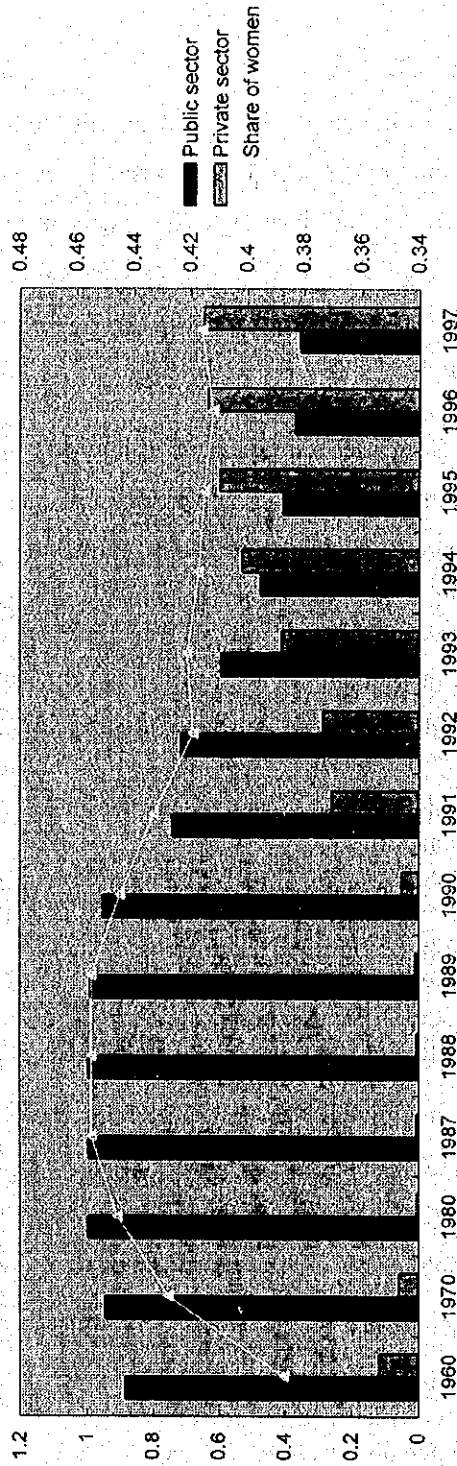
- The number of employees in the agriculture sector (9.0 % in 1997) kept a downward trend to the present.
- The number of industrial sector employees peaked in 1987 and 1988, (33.8 %), and also kept a downward trend to the present (29.6 % in 1997)
- The number of employees in the construction sector peaked in 1991 (11.2 %), and also kept a downward trend to the present (67.5 % in 1997)
- On the other hand, the number of employees in the other sectors (mostly services sector) kept an upward trend since 1960 to the present and its share was 54.0 % in 1997.

Unemployment emerged as a new phenomenon of the political transformation. In 1990, only 39 603 were reported unemployed, and this had rapidly risen to 301 951 in 1991. The unemployment problem still continued to the present. The number of unemployed persons (and unemployment rate) since 1993 has decreased gradually as shown below;

- 368 095 persons (14.4 %) in 1993
- 371 481 persons (14.8 %) in 1994
- 331 481 persons (13.1 %) in 1995
- 329 749 persons (12.8 %) in 1996
- 347 753 persons (12.9 %) in 1997

Table C.1-9 shows the number of employees and unemployees and its rate by Kraj.

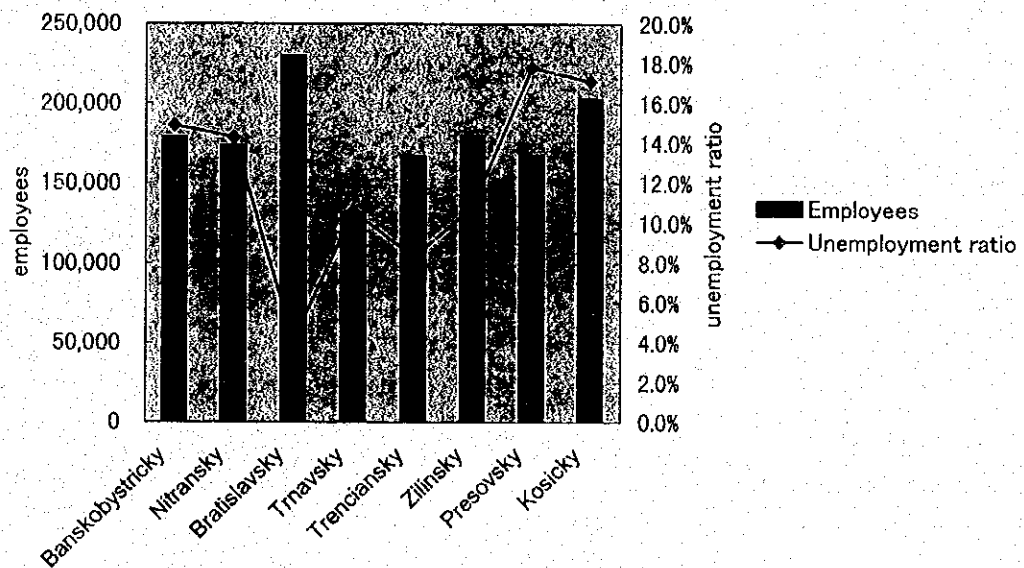
	1960	1970	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Labour force resources(1,000 persons)	2,265	2,677	3,072	3,136	3,162	3,188	3,208	3,155	3,148	3,143	3,211	3,250	3,317	3,350
Employees(1,000 persons)	1,551	1,973	2,285	2,490	2,510	2,504	2,459	2,152	2,175	2,118	2,096	2,147	2,117	2,059
(share in total labour force)	68.5%	73.7%	75.9%	79.4%	79.4%	78.5%	76.7%	68.2%	69.1%	67.4%	65.3%	66.1%	63.8%	61.5%
By sectors														
Share of public sector in employees	88.4%	94.4%	99.6%	99.5%	99.4%	99.0%	98.0%	74.2%	71.6%	59.2%	47.2%	40.4%	36.9%	35.4%
Share of private sector in employees	11.6%	5.6%	0.4%	0.5%	0.6%	1.0%	5.0%	25.8%	28.4%	40.8%	52.8%	59.6%	63.1%	64.6%
Share of women in employees	38.7%	42.8%	44.6%	45.5%	45.5%	45.5%	44.5%	43.3%	41.9%	42.1%	41.7%	41.5%	41.2%	41.6%
By economic sectors														
1)agriculture	33.7%	22.9%	14.5%	13.0%	12.6%	12.1%	12.0%	12.6%	11.8%	9.4%	10.2%	9.4%	9.0%	8.9%
2)industry	26.6%	31.3%	33.6%	33.5%	33.8%	33.4%	33.1%	32.8%	30.3%	29.6%	29.3%	29.3%	29.5%	29.6%
3)construction	8.8%	9.4%	10.4%	10.4%	10.2%	10.3%	10.2%	11.2%	9.1%	8.2%	7.6%	7.2%	7.5%	7.5%
4)service and others	30.9%	36.4%	41.5%	42.8%	43.4%	44.2%	44.7%	43.4%	48.8%	52.8%	52.9%	54.1%	54.0%	54.0%
Registered unemployed(persons)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	39,603	301,951	260,274	366,095	371,481	333,291	329,749	347,753
Average monthly wage(SKK)	1,330	1,910	2,606	2,941	3,020	3,142	3,278	3,770	4,543	5,379	6,292	7,195	8,154	9,226
Nominal wage index(1970=100)	-	100.0	136.4	154.0	158.1	164.5	171.6	197.4	237.9	281.6	329.5	376.7	424.9	483.0
Real wage index(1970=100)	-	100.0	122.7	125.7	128.6	132.0	124.5	91.8	100.0	96.1	99.0	103.3	110.1	117.8



Source: Statistical Yearbook of the Slovak Republic 1998, p. 43.

Table C.1 - 8 Employment and Wages of SR 1960 - 1998

Name of Kraj	Number of employees	Share by sectors			Unemployment	
		Agriculture	Industry	Services	Number	Ratio <sup>2)</sup>
Banskobystricky	178,687	10.7%	36.7%	52.5%	52,888	14.9%
Nitransky	173,372	14.4%	33.4%	52.2%	52,268	14.3%
Bratislavsky	229,916	2.6%	20.1%	77.3%	14,615	4.1%
Trnavsky	131,818	13.9%	37.4%	48.6%	31,233	10.6%
Trenciansky	166,594	6.1%	51.5%	42.5%	26,676	8.3%
Zilinsky	179,444	7.3%	38.3%	54.4%	38,551	10.8%
Presovsky	167,114	11.6%	31.1%	57.2%	67,077	17.8%
Kosicky	202,855	8.3%	31.4%	60.2%	64,445	17.1%
Total SR	1,429,800	9.0%	34.2%	56.8%	347,753	12.5%



Notes: <sup>1)</sup> For companies with 20 and more employees without employees whose working place is located in abroad.

<sup>2)</sup> Unemployment rate is calculated as the ratio of disposable number of the unemployment in the number of economically active people for 1996

Source; Statistical Yearbook of the SR 1998, p.571 (original source; National Labour Office)

Table C.1 - 9

Employment and Unemployment as of Dec. 31, 1997 <sup>1)</sup>

(2) Wages and Household Income

Table C.1-9 also shows the average monthly wage since 1960 to the present. The average wage was 9 226 SK per month in 1997, which was nearly 3 times the wage in 1989 and 1.7 times the wage in 1993 in normal term. The real wage increases from 1970 to 1997 were:

- 1970 = 100.0
- 1989 = 132.0 (annual increase ratio 1970-1989 was +7.2%)
- 1993 = 96.1 (annual increase ratio 1989-1993 was -7.6%)
- 1997 = 117.8 (annual increase ratio 1993-1997 was +5.2%)