3.2.3 Living standard

Economic growth would rise up the people's family income and people would improve their living conditions in accordance with their family income. They enhance not only their houses but their assets holdings. From this point of view, living standard is one of essential factors to estimate an enhanced benefit of a flood control project in the future.

Family income would increase in proportion to economic growth, especially to GRDP per capita, in general. On this assumption of the relationship between family income and GRDP per capita, the average monthly family income in the basin is projected at Cz$15,542 in the year 2000 at 1986 constant prices and at Cz$21,487 in 2020 respectively, according to GRDP projection and family income of Cr$20,748 in 1980, i.e., Cz$8,015 in 1986 prices.

As for household expenditure, its distribution seems to change with regard to growth of family income. According to Table IV.2.16, expenditure for housing accounts for 7.7% of the total expenditure. Although correlation between two expenditures is not available in Brazil, elasticity of this expenditure to the total is almost 1.0, based on the Japanese statistical data. On this assumption, the expenditure for housing would increase corresponding to the growth of family income, that is, GRDP per capita. Furthermore, expenditure for personal property accounts for 17.0% of the total expenditure. This expenditure would also increase corresponding to the growth of GRDP per capita, as well.

3.2.4 Budgetary allocation

One of the biggest constraints for implementation of projects is often budgetary restriction. Since flood control facilities are constructed by DNOS in Brazil, the budget of DNOS is quite significant for promotion of this project. The budget for flood control is closely related to the national economy, as mentioned in Section 2.3.4. Moreover, it is assumed that the past tendency of the national investment will be kept hereafter. Thus, the budget projection is estimated on the basis of following assumptions:

(1) The revenue of the federal government accounts for 9.9% of GDP and the national disbursement equals to the revenue;

(2) The national total investment for flood control facilities accounts for 0.5% to 1.0% (average 0.62%) of the national disbursement; and

(3) The regional share to Santa Catarina accounts for 1.5% to 2.7% (average 1.96%) of the national investment.

Table IV.3.4 shows projected annual investment for flood control projects in the state of Santa Catarina. According to the table, the projected investment in Santa Catarina in 1990 becomes to between $Cz\$17 \times 10^9$ in high scenario and $Cz\$5 \times 10^9$ in low scenario and to $Cz\$8 \times 10^9$ on an average at 1986 constant prices. In the same manner as in 1990, the investment in the year 2000 will reach to between $Cz\$30 \times 10^9$ in high and $Cz\$8 \times 10^9$ in low, and $Cr\$14 \times 10^9$ on an average. For the Itajai river basin, some percentage of the foregoing investment would be used for the local portion of the total investment expenses to the proposed plan.

3.3 Land Use Plan

3.3.1 General

The national government has released national development plans since it started in March 1985, as mentioned Section 3.1.1. The state and municipal governments, however, have not officially presented any regional development plans and/or land use plans yet so far. Although some of municipal governments are trying to formulate land use plans in urban areas and to promote making some regulations and guidelines for land conservation in rural areas, land use policy or development plan all over the entire basin is not available at the present time. Hence, a land use plan in this section is only restricted to propose its development tendency in the basin, referring to the national development policy and an empirical expanding trend of both the basin itself and other areas related to the basin.

3.3.2 Land use plan

For a master plan study, a land use plan is one of fundamental works. A land use plan must conform to regional development policy and have no discrepancy among land use categories. It must also keep flexibility and soundness with regard to utilization of land resources. Concurrently, a land use plan generally intends to construct a city so as to withstand various natural disaster. In particular, in order to control a flood losses, a land use policy should contain an urban area to sprawl and restrict ungraceful building coverage in an urban area, in addition to establishment of flood control facilities.

Industrialization is given a top priority by the national development plan, "I. PND". Accordingly, the industrial sector, especially manufacturing industry in the basin, will be promoted more than before. The services' sector will be accompanied with this policy, as well. Consequently, urban centralization of population is inevitable. Cities will have to produce new subdivisions for coming industries and new people.

In the year 2020, following municipalities will have urban population of more than 20,000 and 80% of urban population to total municipal population, as shown in Table IV.3.5: Itajai, Navegantes, Blumenau, Brusque, Gaspar, Indaial, Pomerode, Timbo and Rio do Sul. Among these municipalities, six municipalities, i.e., Itajai, Blumenau, Gaspar, Pomerode, Timbo and Rio do Sul, have an urban density of more than 60 persons/ha, if the urban areas in 2020 are assumed to keep the same acreage as those in 1980. This density, 60 persons/ha, is almost equal to an average density of densely inhabited districts in Aomori prefecture, a sister state of Japan. This density might be a limitation of population density. Since the six municipalities have urban population of 794x10^3 in 2020, their urban areas expand to about 13.2x10^3 ha from 8.5x10^3 if the density is led to keep in 60 persons/ha. These urban areas are 1.6 times of existing urban areas. As a result, urban areas in the basin grow at least to 20.2x10^3 ha in 2020.

Population density of existing urban areas in the basin area still less than 60 persons/ha. Accordingly, increment of urban population will be absorbed into existing urban areas in early stage. Industrialization makes urban population increase more rapidly than before. Excessive urban population in the future will be not absorbed in the existing urban areas and causes to spread their urban areas out to surroundings of existing urban areas. Since there is little room for expansion of urban areas in flood vulnerable areas, new urban areas will be developed in hinterlands of existing urban areas. Therefore, municipal authorities concerned should

lead urban development into hinterlands of towns by development guidelines to maintain environmental soundness and to avoid urban disaster.

In order to avoid sprawling urban areas and flood disaster in these cities, urban residential areas should be established in line with the following points:

- Establishment of land use zoning to avoid urban disasters such as flood;

- Creation of zoning permit in terms of building restrictions such as use district, coverage and floor-area ratio, to avoid environmental pollution;

and

- Pre-investment in physical infrastructure in accordance with land use zoning plan.

The national development plan promotes to cultivate new arable lands to increase agricultural production in the country and announces the agrarian reform to modernize the agricultural structure. In spite of depopulation in rural areas in the basin, agricultural lands such as crop and pasture land will increase by farm mechanization and technical innovation, so lots of not utilized areas and unidentified areas as of 1980 will be put to practical use for agricultural activity such as farming and stock raising in the future. Moreover, unit yield will improved by technical innovation such as improvement of both planting and breeding, and fertilization, and by the agrarian reform. Even in agricultural lands in flood vulnerable areas where agricultural activity is developed, a transition of agricultural structure will be executed in the same way. Agricultural lands there will not be converted into industrial and/or urban areas in the future, because urbanization will be concentrated in the existing major cities mentioned above. Therefore, agricultural lands in flood vulnerable areas will be kept in the same land use pattern until 2020 as before, though their productivity will be highly improved.

Deforestation should be kept in control with more rigor in the future, so natural forest will be maintained in some level. On the other hand, reforestation would be promoted to keep an ecological balance in the basin and to retard rainfall to runoff. Thus, forest lands including both natural and artificial lands will also increase in the basin.

Land area in the basin will be utilized as follows in the future, in order to attain an expected economic growth and to keep soundness in environmental balance:

(1) Urban areas will increase at least 4.7×10^3 ha and grow up to 20.0×10^3 ha or 1.3% of the total area by the year 2020. Incremental portion of urban areas is mainly centralized into major municipalities located in the flood vulnerable areas. However, it will be led to expand to hinterlands of existing urban areas. Thus, existing urban areas in the flood vulnerable areas will be kept in the same situation as before, though population density will increase more than the present one; and

(2) Since agricultural lands in flood vulnerable areas have highly been developed as compared with other area, development of agricultural activities will be executed in rural areas in the basin to avoid a flood damage. Thus, not utilized areas and unidentified area as of

1980 will be put into practical use for agriculture and agricultural lands in flood vulnerable areas will be kept in the same land use pattern until 2020 as before.

Tables

Table IV.2.1 POPULATION BY SEX, URBAN/RURAL RESIDENT AND LABOR FORCE IN BRAZIL

Item	Number of Persons			Percentage Distribution (%)			Average Annual Growth Rate(%)		
	1960	1970	1980	1960	1970	1980	'60-70	'70-80	'60-80
1. Population	70,191,370	93,139,037	119,002,706	100.0	100.0	100.0	2.87	2.48	2.67
2. Male	35,059,546	46,331,343	59,123,361	49.9	49.7	49.7	2.83	2.47	2.65
3. Female	35,131,824	46,807,694	59,879,345	50.1	50.3	50.3	2.91	2.59	2.70
4. Urban	31,303,034 /2	52,084,984	80,436,409	44.6/2	55.9	67.6	-	4.44	-
5. Rural	38,767,423 /2	41,054,053	38,566,297	55.2/2	44.1	32.4	-	-0.62	-
6. 10 Year & over/1	48,740,564	65,683,745	87,677,224	69.4	70.5	73.6	3.03	2.93	2.98
7. Labor Force	-	29,557,224	43,235,712	-	31.7	36.3	-	3.88	-
8. Labor Participation Rate(%)	-	45.0	49.3	-	-	-	-	-	-
9. Gainful Worker	22,750,028	29,060,714	42,271,156	32.4	31.7	36.3	2.65	3.88	3.26
10. Employment Rate(%)/3	-	98.3	97.8	-	-	-	-	-	-
11. Unemployment	-	496,510/5	964,186	-	0.5	0.8	-	6.86	-
12. Unemployment Rate(%)/4	-	1.7	2.2	-	-	-	-	-	-

Notes: /1 Persons whose ages are unknown are not included.
/2 Population inhabited
/3 (9)/(7)
/4 (11)/(7)
/5 Including the number of non-declared reasons

Sources: E022, E036, E042, E043, and E049

Table IV.2.2 POPULATION BY SEX, URBAN/RURAL RESIDENT AND LABOR FORCE IN SANTA CATARINA

Item	Number of Persons			Percentage Distribution (%)			Average Annual Growth Rate(%)		
	1960	1970	1980	1960	1970	1980	'60-70	'70-80	'60-80
1. Population	2,118,116	2,901,734	3,627,933	100.0	100.0	100.0	3.20	2.26	2.73
2. Male	1,074,254	1,462,702	1,830,199	50.7	50.4	50.4	3.13	2.27	2.70
3. Female	1,043,862	1,439,032	1,797,734	49.3	49.6	49.6	3.26	2.25	2.76
4. Urban	673,981	1,246,043	2,154,238	31.8	42.9	59.4	6.34	5.63	5.98
5. Rural	1,444,135	1,655,691	1,473,695	68.2	57.1	40.6	1.38	-1.15	0.10
6. 10 years & over/1	1,334,483	1,990,306	2,715,519	63.0	68.6	74.9	4.08	3.16	3.62
7. Labor Force	-	82,229	1,356,186	-	30.4	37.4	-	4.39	-
8. Labor Participation Rate(%)	-	44.3	49.9	-	-	-	-	-	-
9. Gainful Worker	641,195	867,529	1,330,802	30.3	29.9	37.4	3.24	4.39	3.82
10. Employment Rate (%)/2	-	98.3	98.1	-	-	-	-	-	-
11. Unemployment	-	14,700 /4	25,384	-	0.5	0.7	-	5.61	-
12. Unemployment Rate (%)/3	-	1.7	1.9	-	-	-	-	-	-

Notes: /1 Not including persons whose ages are unknown.

/2 (9)/(7)

/3 (11)/(7)

/4 Including the number of non-declared persons

Sources: E024, E034, E035 and E049

Table IV.2.3 POPULATION BY MUNICIPALITY IN THE ITAJAI RIVER BASIN

Micro-Region / Municipality	1970 Urban	1970 Rural	1970 Total	1980 Urban	1980 Rural	1980 Total	Area in the Basin (km²)	Density in 1980 (Persons/km²)
Camboriu	0	1,551	1,551	0	831	831	29	29
Ilhota	1,220	7,315	8,535	1,406	6,645	8,051	263	31
Itajai	54,073	9,066	63,139	78,779	7,681	86,460	304	284
Navegantes	5,536	3,340	8,876	8,381	3,810	12,191	72	170
Litoral de Itajai	60,829	21,273	82,102	88,566	18,968	107,534	668	161
(Percentage Distribution)	(74.1%)	(25.9%)	(100.0%)	(82.4%)	(17.6%)	(100.0%)		
Asucurra	1,049	2,561	3,970	3,736	1,678	5,414	119	45
Benidito Novo	1,638	9,999	11,637	3,767	6,945	10,712	744	14
Blumenau	85,740	9,574	95,314	144,683	7,835	152,518	410	372
Botuvera	409	3,353	3,762	472	3,110	3,582	184	19
Brusque	32,380	2,820	35,200	37,923	3,301	41,224	401	103
Gaspar	4,453	13,964	18,417	13,725	11,881	25,606	336	76
Guabiruba	3,546	2,735	6,281	4,239	2,909	7,148	178	40
Indaial	7,133	15,216	22,349	18,263	10,311	28,574	951	30
Luis Alves	551	7,100	7,651	1,037	5,442	6,479	253	26
Massaranduba	0	3,435	3,435	0	2,859	2,859	121	24
Pomerode	4,157	7,913	12,070	8,924	5,447	14,371	211	68
Presidente Nereu	539	3,499	4,038	646	2,542	3,188	274	12
Rio dos Cedros	1,544	8,174	9,718	1,884	6,584	8,468	475	18
Rodeio	2,149	5,806	7,955	4,643	3,334	7,977	135	59
Timbo	6,731	5,098	11,829	14,459	3,465	17,924	161	111
Vidal Ramos	500	7,140	7,640	982	7,709	8,691	427	20
Colonial de Blumenau	152,879	108,388	261,267	259,383	85,352	344,735	5,380	65
(Percentage Distribution)	(58.5%)	(41.5%)	(100.0%)	(75.2%)	(24.8%)	(100.0%)		
Dona Emma	167	3,715	3,882	811	2,667	3,478	154	23
Ibirama	4,180	16,828	21,008	8,230	15,292	23,522	1,061	22
Presidente Getulio	2,452	6,947	9,399	4,780	5,329	10,109	323	31
Witmarsum	265	3,429	3,694	328	2,990	3,318	132	25
Colonial do Itajai do Norte	7,064	30,919	37,983	14,149	26,278	40,427	1,670	24
(Percentage Distribution)	(18.6%)	(81.4%)	(100.0%)	(35.0%)	(65.0%)	(100.0%)		

(To be Continued)

(Continuation)

Micro-Region / Municipality	1970 Urban	1970 Rural	1970 Total	1980 Urban	1980 Rural	1980 Total	Area in the Basin (km²)	Density in 1980 (Persons/km²)
Agrolandia	976	4,800	5,776	1,266	4,872	6,138	198	31
Agronomica	499	4,276	4,775	511	4,039	4,550	130	35
Atalanta	558	2,916	3,474	620	2,870	3,490	149	23
Aurora	298	5,315	5,613	408	4,870	5,278	198	27
Imbuia	530	2,179	2,709	921	2,658	3,579	92	39
Ituporanga	3,312	11,822	15,134	5,305	11,834	17,139	495	35
Laurentino	1,013	2,968	3,981	1,595	2,419	4,014	82	49
Lontras	1,678	5,328	7,006	3,789	3,535	7,324	230	32
Petrolandia	670	4,395	5,065	934	5,971	6,905	265	26
Pouso Redondo	1,476	9,190	10,666	3,189	7,585	10,774	412	26
Rio do Campo	563	5,515	6,078	1,054	4,744	5,798	377	15
Rio do Oeste	1,507	5,933	7,440	1,549	5,851	7,400	246	30
Rio do Sul	6,010	21,528	27,538	33,362	2,878	36,240	177	205
Salete	1,229	3,650	4,879	1,869	3,669	5,538	210	26
Teio	3,189	15,522	18,711	6,234	12,369	18,603	1,001	19
Trombudo Central	1,705	5,626	7,331	2,292	4,801	7,093	204	35
Colonial do Alto Itajai	25,213	110,963	136,176	64,898	84,965	149,863	4,466	34
(Percentage Distribution)	(18.5%)	(81.5%)	(100.0%)	(43.3%)	(56.7%)	(100.0%)		
Alfredo Wagner	0	8,069	8,069	0	7,383	7,383	840	9
Colonial Serrana Catarinense	0	8,069	8,069	0	7,383	7,383	840	9
(Percentage Distribution)	(0.0%)	(100.0%)	(100.0%)	(0.0%)	(100.0%)	(100.0%)		
Bom Retiro	0	654	654	0	418	418	164	3
Otacilio Costa	0	143	143	0	209	209	146	1
Campos de Lages	0	797	797	0	627	627	310	2
(Percentage Distribution)	(0.0%)	(100.0%)	(100.0%)	(0.0%)	(100.0%)	(100.0%)		
Itaiopolis	0	12,517	12,517	0	12,425	12,425	1,413	9
Monte Castelo	0	582	582	0	557	557	60	9
Papanduva	0	3,924	3,924	0	5,031	5,031	414	12
Planalto de Canoinhas	0	17,023	17,023	0	18,013	18,013	1,887	10
(Percentage Distribution)	(0.0%)	(100.0%)	(100.0%)	(0.0%)	(100.0%)	(100.0%)		
Total	245,985	297,431	543,416	426,996	241,586	668,582	15,221	44
(Percentage Distribution)	(45.3%)	(54.7%)	(100.0%)	(63.9%)	(36.1%)	(100.0%)		

Sources : E024 and E034

Table IV.2.4 NUMBER OF PERSONS ECONOMICALLY ACTIVE (10 YEARS OLD AND OVER) BY INDUSTRIAL GROUP IN BRAZIL

Industrial Group	Number of Persons			Percentage Distribution (%)			Average Annual Growth Rate(%)	
	1960	1970	1980	1960	1970	1980	'60-'70	'70-'80
Agriculture	12,408,299	13,090,358	12,661,017	54.5	44.3	29.3	0.54	-0.33
Industry	2,809,317	5,295,427	10,772,463	12.4	17.9	24.9	6.54	7.36
- Manufacturing	-	-	6,939,421	-	-	16.1	-	-
- Construction	-	-	3,171,046	-	-	7.3	-	-
- Others	-	-	661,996	-	-	1.5	-	-
Services	7,532,412	11,171,439	18,838,046	33.1	37.8	43.6	4.02	5.36
- Commerce	1,486,797	2,263,539	4,037,917	6.5	7.7	9.3	4.29	5.96
- Transportation & Communication	1,056,227	1,244,395	1,800,243	4.6	4.2	4.2	1.65	3.76
- Other Services	4,989,388	7,663,505	12,999,886	21.9	25.9	30.1	4.38	5.43
Not specified	-	-	964,186	-	-	2.2	-	-
Total	22,750,028	29,557,224	43,235,712	100.0	100.0	100.0	2.65	3.88

Source: EC037, E042 and E043

Table IV.2.5 NUMBER OF PERSONS ECONOMICALLY ACTIVE (10 YEARS OLD AND OVER) BY INDUSTRIAL GROUP IN SANTA CATARINA

Industrial Group	Number of Persons			Percentage Distribution (%)			Average Annual Growth Rate(%)		% Share to Brazil
	1960	1970	1980	1960	1970	1980	'60-'70	'70-'80	in 1980(%)
Agriculture	402,149	451,697	418,249	62.7	51.2	30.8	1.17	-0.77	3.3
Industry	70,300	174,020	428,392	11.0	19.7	31.6	9.49	9.43	4.0
- Manufacturing	-	-	319,323	-	-	23.5	-	-	4.6
- Construction	-	-	80,799	-	-	6.0	-	-	2.5
- Others	-	-	28,270	-	-	2.1	-	-	4.2
Services	168,746	256,512	484,161	26.3	29.1	35.7	4.28	6.55	2.6
- Commerce	32,202	48,742	110,004	5.0	5.5	8.1	4.23	8.48	2.7
- Transportation & Communication	27,219	31,286	50,377	4.2	3.5	3.7	1.40	4.88	2.8
- Other Services	109,325	176,484	323,780	17.1	20.0	23.9	4.91	6.26	2.5
Not specified	-	-	25,384	-	-	1.9	-	-	2.6
Total	641,195	882,229	1,356,186	100.0	100.0	100.0	3.24	4.39	3.1

Sources: E026, E034 and E035

Table IV.2.6 NUMBER OF PERSONS ECONOMICALLY ACTIVE (10 YEARS OLD AND OVER) BY INDUSTRIAL GROUP IN THE BASIN

Industrial Group	Number of Perons		Percentage distribution(%)		Average Annual Growth Rate (%)	Percentage Share to SC in 1980(%)
	1970	1980	1970	1980		
Agriculture	81,744	72,996	44.7	25.6	-1.13	17.4
Industry	47,351	113,318	25.9	39.8	9.12	26.5
- Manufacturing	-	95,745	-	33.6	-	30.0
- Construction	-	14,842	-	5.2	-	18.4
- Others	-	2,731	-	1.0	-	9.7
Services	53,734	94,040	29.4	33.0	5.76	19.4
- Commerce	11,945	24,033	6.5	8.4	7.24	21.8
- Transportation & Communication	5,992	9,647	3.3	3.4	4.88	19.1
- Other Services	35,797	60,360	19.6	21.2	5.36	18.6
Not specified	-	4,536	-	1.6	-	17.9
Total	182,829	284,890	100.0	100.0	4.54	21.0

Sources: E026 and E034

Table IV.2.7 POPULATION DISTRIBUTION BY COLOR : 1980

Item	Brazil	Santa Catarina	Itajai River Basin
Population			
White	64,540,467	3,317,656	649,409
Black	7,046,906	75,007	8,355
Yellow	672,251	2,592	126
Brown	46,233,531	219,911	14,343
Not declared	517,897	13,126	1,765
Total	119,011,052	3,628,292	673,998
Percentage Distribution (%)			
White	54.2	91.4	96.4
Black	5.9	2.1	1.2
Yellow	0.6	0.0	0.0
Brown	38.9	6.1	2.1
Not declared	0.4	0.4	0.3
Total	100.0	100.0	100.0

Note : Number is not present population but resident population.
Sources : E025 and E038

Table IV.2.8 ACADEMIC CAREER OF PERSONS 10 YEARS OLD AND OVER BY AREA : 1980

Grade	Brazil	Santa Catarina	Itajai River Basin
Number of Person			
Elementary (4 years)	26,506,591	1,235,485	264,939
First Grade (8 years)	7,416,682	301,831	58,696
Second Grade (3 years)	5,425,665	138,966	26,704
College/University	1,809,518	38,445	6,517
Master/Doctor Course	63,537	1,162	151
Total	41,221,993	1,715,889	357,007
Percentage Distribution (%)			
Elementary	64.3	72.0	74.2
First Grade	18.0	17.6	16.4
Second Grade	13.2	8.1	7.5
College/University	4.3	2.2	1.8
Master/Doctor Course	0.2	0.1	0.1
Total	100.0	100.0	100.0

Sources : E025 and E039

Table IV.2.9 POPULATION DISTRIBUTION BY RELIGION : 1980

Item	Brazil	Santa Catarina	Itajai River Basin
Population			
Roman Catholic	105,861,113	3,209,497	541,249
Traditional Protestant	4,022,343	284,621	109,900
Pentecostal Protestant	3,863,503	80,437	11,800
Kardecist Spritualism	859,516	10,574	899
Afro-Brazilian Spiritualism	678,714	3,649	537
Oriental Religions	257,006	745	63
Judaism	91,795	244	36
Other Religions	1,124,280	21,881	7,485
No Religions	1,953,096	10,020	1,106
Not Specified	299,686	6,624	923
Total	119,011,052	3,628,292	673,998
Percentage Distribution (%)			
Roman Catholic	89.0	88.5	80.3
Traditional Protestant	3.4	7.8	16.3
Pentecostal Protestant	3.2	2.2	1.8
Kardecist Spritualism	0.7	0.3	0.2
Afro-Brazilian Spiritualism	0.6	0.1	0.0
Oriental Religions	0.2	0.0	0.0
Judaism	0.1	0.0	0.0
Other Religions	0.9	0.6	1.1
No Religions	1.6	0.3	0.2
Not Specified	0.3	0.2	0.1
Total	100.0	100.0	100.0

Note : Number is not present population but resident population.
Sources : E025 and E038

Table IV.2.10 GROSS DOMESTIC PRODUCT AT CURRENT PRICES

Year	Gross Domestic Product				Gross Regional Domestic Product(SC)				Percentage Share of Santa Catarina to Brazil	Differnece of Per Capita (Cr$)	Ratio of Per Capita
	GDP		GDP Per Capita		GRDP		GRDP Per Capita				
	Amount(Cr$10^6)	GR(%)	Amount(Cr$)	GR(%)	Amount(Cr$10^6)	GR(%)	Amount(Cr$)	GR(%)			
1970	196,110	-	2,106	-	5,231	-	1,803	-	2.67	-303	0.856
1971	261,102	33.1	2,735	30.0	6,912	32.1	2,329	29.2	2.65	-406	0.852
1972	345,001	32.1	3,527	29.0	9,721	40.6	3,204	37.6	2.82	-323	0.908
1973	483,340	40.1	4,821	36.7	14,198	46.1	4,576	42.8	2.94	-245	0.949
1974	707,978	42.6	6,890	42.9	22,214	56.5	7,001	53.0	3.16	111	1.016
1975	1,009,674	43.6	9,588	39.2	31,508	41.8	9,711	38.7	3.12	123	1.013
1976	1,625,134	61.0	15,059	57.1	49,393	56.8	14,887	53.3	3.04	-172	0.989
1977	2,486,770	53.0	22,484	49.3	73,826	49.5	21,760	46.2	2.97	-724	0.968
1978	3,763,867	51.4	33,205	47.7	108,111	46.4	31,161	43.2	2.87	-2,044	0.938
1979	6,311,762	67.7	54,333	63.6	188,011	73.9	52,994	70.1	2.98	-1,339	0.975
1980	13,163,818	108.6	110,568	103.5	400,105	112.8	110,286	108.1	3.04	-282	0.997
1981	25,631,772	94.7	210,062	90.9	873,924^P	118.4	234,907^P	113.0	3.41	33,845	1.118
1982	50,815,295	92.3	406,330	93.4	1,821,296^P	108.4	479,844^P	104.3	3.58	73,513	1.181
1983	120,267,535^P	136.7	938,322	130.2	4,456,449^P	144.7	1,151,656^P	140.0	3.71	46,334	1.227
1984	386,967,409^P	221.8	2,945,742	213.9	14,855,372^P	233.3	3,768,188^P	217.2	3.84	822,446	1.279

Notes: P - Preliminary Estimation

Sources: E004, E007 and Magazine "Conjuntura" by FGV

Table IV.2.11 GROSS DOMESTIC PRODUCT AT 1970 CONSTANT PRICES

Year	Gross Domestic Product				Gross Regional Domestic Product(SC)				Percentage Share of Santa Catarina to Brazil	Difference of Per Capita (Cr$)	Ratio of Per Capita
	GDP		GDP Per Capita		GRDP		GRDP Per Capita				
	Amoumt(Cr$10^6)	GR(%)	Amount(Cr$)	GR(%)	Amount(Cr$10^6)	GR(%)	Amount(Cr$)	GR(%)			
1970	196,110	-	2,106	-	5,231	-	1,803	-	2.67	-303	0.856
1971	219,703	12.0	2,302	9.3	5,898	12.8	1,988	10.3	2.68	-314	0.864
1972	244,099	11.1	2,495	8.4	6,717	13.9	2,214	11.4	2.75	-281	0.887
1973	277,222	13.6	2,765	10.8	7,361	9.6	2,372	7.1	2.65	-393	0.858
1974	304,148	9.7	2,960	7.1	8,413	14.3	2,651	11.8	2.43	-309	0.896
1975	320,621	5.4	3,045	2.9	9,363	11.3	2,886	8.9	2.92	-159	0.948
1976	351,802	9.7	3,260	7.1	10,663	13.9	3,214	11.4	3.03	-46	0.986
1977	372,002	5.7	3,363	3.2	11,450	7.4	3,375	5.0	3.08	12	1.004
1978	390,632	5.0	3,446	2.5	12,271	7.2	3,537	4.8	3.14	91	1.026
1979	415,597	6.4	3,578	3.8	13,873	13.1	3,910	10.5	3.34	332	1.093
1980	445,524	7.2	3,742	4.6	16,006	15.4	4,412	10.0	3.59	670	1.179
1981	438,531	-1.6	3,594	-4.0	16,403^P	2.5	4,409^P	-0.2	3.74	815	1.227
1982	442,660	0.9	3,540	-1.5	17,526^P	6.8	4,618^P	4.7	3.96	1,078	1.305
1983	428,658^P	-3.2	3,344	-5.5	16,857^P	-3.8	4,356^P	-5.7	3.93	1,012	1.303
1984	447,955^P	4.5	3,411	2.0	17,526^P	4.0	4,446^P	2.1	3.91	1,035	1.303

Note: P - Preliminary estimation

Sources: E004, E007 and Magazine "Conjuntura" by FGV

Table IV.2.12 GROSS DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN AT CURRENT PRICES

Economic Sector	GDP (in Cr$10⁶)					Percentage Distribution(%)				
	1970	1975	1980	1981	1982	1970	1975	1980	1981	1982
Agriculture	20,157	107,349	1,649,091	3,118,596	5,320,637	12.2	12.0	13.8	13.6	11.6
Industry	61,029	347,325	4,294,867	8,067,612	16,063,568	37.0	38.9	36.0	34.9	35.1
- Mining	1,350	6,022	77,154	167,751	366,093	0.8	0.7	0.6	0.7	0.8
- Manufacturing	46,619	263,087	3,412,793	6,361,960	12,396,214	28.2	29.5	27.5	27.5	27.1
- Construction	9,658	61,661	628,446	1,209,909	2,487,617	5.9	6.9	5.3	5.2	5.4
- Public Utilities	3,402	16,555	176,474	327,992	813,644	2.1	1.9	1.5	1.4	1.8
Services	91,175	489,757	6,646,870	13,532,941	27,244,453	55.2	54.9	55.7	58.5	59.6
- Commercial	29,902	160,839	2,129,038	4,082,091	7,687,005	18.1	18.0	17.8	17.7	16.8
- Transportation & Communication	7,679	40,321	575,139	1,273,391	2,658,352	4.7	4.5	4.8	5.5	5.8
- Financial	7,212	53,383	766,080	1,777,402	3,205,248	4.4	6.0	6.4	7.7	7.0
- Government	16,117	74,918	812,547	1,583,119	3,223,798	9.8	8.4	6.8	6.8	7.1
- Real Estate	16,794	70,607	1,102,087	2,235,472	5,277,959	10.2	7.9	9.2	9.7	11.5
- Others	13,471	89,689	1,262,979	2,581,466	5,192,100	8.2	10.1	10.6	11.2	11.4
- Imputed Interest of Financial Service	-7,286	-52,381	-661,179	-1,599,072	-2,914,976	-4.4	-5.9	-5.5	-6.9	-6.4
GDP at Factor Cost	165,075	892,050	11,929,649	23,120,077	45,713,682	100.0	100.0	100.0	100.0	100.0
Net Indirect Tax	31,035	117,624	1,234,169	2,511,695	5,101,613	-	-	-	-	-
GDP at Market Price	196,110	1,009,674	13,163,818	25,631,772	50,815,295	-	-	-	-	-

Sources: E007

Table IV.2.13 GROSS REGIONAL DOMESTIC PRODUCT BY INDUSTRIAL ORIGIN AT CURRENT PRICES

Economic Sector	GRDP of Santa Catarina (in Cr$10⁶)					Percentage Distribution(%)				
	1970	1975	1980	1981/1	1982/1	1970	1975	1980	1981	1982
Agriculture	1,176	6,793	64,028	139,828	291,407	22.5	21.6	16.0	16.0	16.0
Industry	1,536	10,745	151,485	331,217	690,271	29.4	34.1	37.9	37.9	37.9
- Mining	80	286	4,463	-	-	1.5	0.9	1.1	-	-
- Manufacturing	1,196	9,125	131,321	-	-	22.9	29.0	32.8	-	-
- Construction	230	1,046	13,405	-	-	4.4	3.3	3.4	-	-
- Public Utilitie	30	288	2,296	-	-	0.6	0.9	0.6	-	-
Services	2,519	13,970	184,592	402,879	839,617	48.1	44.3	46.1	46.1	46.1
- Commercial	821	3,171	41,636	-	-	15.7	10.1	10.4	-	-
- Transportation & Communication	240	2,049	33,090	-	-	4.6	6.5	8.3	-	-
- Financial	259	2,475	38,901	-	-	5.0	7.9	9.7	-	-
- Government	308	1,525	15,294	-	-	5.9	4.8	3.8	-	-
- Real Estate	496	1,776	12,068	-	-	9.5	5.6	3.0	-	-
- Others	395	2,974	43,603	-	-	7.5	9.4	10.9	-	-
GDP at Market Price	5,231	31,508	400,105	873,924	1,821,296	100.0	100.0	100.0	100.0	100.0

Note: /1 After 1981, GRDP is preliminarily estimated and GVA is alocated in proportion to the result of 1980.

Source: E008

Table IV.2.14 GDP GROWTH BY INDUSTRIAL SECTOR

Year	GDP	Primary Sector	Secondary Sector					Tertiary Sector		
			Total	Mining	Manufacturing	Construction	Utility	Total	Transportation & Commercial	Communication
Ammual Growth Rate										
1971	12.1	11.3	12.0	3.6	12.1	12.5	12.4	12.2	13.1	10.1
1972	11.2	4.0	13.0	2.2	14.2	8.6	11.9	11.6	11.4	13.4
1973	13.6	3.6	16.3	9.8	16.9	15.1	14.5	13.9	12.9	21.1
1974	9.7	8.2	9.2	23.2	8.0	12.1	12.1	10.3	9.8	17.5
1975	5.4	4.8	5.9	3.0	4.1	13.3	10.4	5.2	2.7	13.7
1976	9.7	2.9	12.4	1.0	13.0	10.8	14.3	9.1	7.3	14.5
1977	5.7	11.8	3.9	-4.9	2.9	6.6	12.8	6.2	4.7	9.5
1978	5.0	-2.6	7.2	6.6	7.0	7.0	11.4	4.8	4.2	9.6
1979	6.4	5.0	6.4	10.0	6.6	3.5	12.6	6.6	5.4	13.9
1980	7.2	6.3	7.9	12.6	7.6	7.8	10.5	6.9	6.8	10.1
1981	-1.6	6.4	-5.5	0.2	-6.5	-4.2	3.4	0.0	-2.8	0.2
1982	0.9	-2.5	0.6	6.7	0.2	0.2	6.3	1.9	1.0	5.6
1983P	-3.2	2.2	-6.8	14.5	-6.3	-15.0	7.8	-1.5	-3.5	0.1
1984P	4.5	3.2	6.0	-	-	-	-	3.5	2.4	6.6
1985P	8.3	8.8	9.0	-	-	-	-	7.7	-	-
Index Number of Real Production										
1970	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1971	112.0	111.3	112.0	103.6	112.1	112.5	112.4	112.2	113.1	110.1
1972	124.5	115.8	126.5	105.9	128.0	122.2	125.8	125.1	126.0	124.9
1973	141.4	120.0	147.0	116.3	149.6	140.6	144.1	142.5	142.3	151.2
1974	155.1	129.8	160.6	143.3	161.5	157.6	161.6	157.2	156.2	177.7
1975	163.5	136.0	170.1	147.6	168.2	178.5	178.4	165.3	160.4	202.0
1976	179.4	139.9	191.2	149.1	190.0	197.8	203.9	180.3	172.1	231.2
1977	189.7	156.4	198.7	141.8	195.6	210.9	230.0	191.2	180.2	253.1
1978	199.2	152.4	213.1	151.2	209.3	225.7	256.2	200.3	187.7	277.3
1979	211.9	160.0	226.7	166.3	223.2	233.6	288.5	213.6	197.9	316.0
1980	227.2	170.0	244.6	187.3	240.2	251.9	318.8	228.3	211.4	348.1
1981	223.6	180.8	231.2	187.7	224.7	241.2	329.6	228.4	205.5	348.9
1982	225.7	176.3	232.5	200.2	225.1	241.6	350.4	232.6	207.5	368.4
1983P	218.6	180.2	216.8	229.2	211.0	205.4	377.7	229.1	200.2	368.6
1984P	228.4	188.0	229.6	-	-	-	-	237.3	-	-
1985P	247.4	204.5	250.3	-	-	-	-	255.6	-	-

Note : P - Preliminary estimation
Sources : E003, E007, E010 and E011

Table IV.2.15 GRDP GROWTH BY INDUSTRIAL SECTOR

Year	GRDP	Primary Sector	Secondary Sector					Tertiary Sector		
			Total	Mining	Manufacturing	Construction	Utility	Total	Transportation & Commercial	Communication
Annual Growth Rate										
1971	12.7	2.5	23.0	8.8	26.7	25.8	28.8	10.5	5.7	19.7
1972	13.9	8.6	16.2	5.4	19.6	84.7	81.3	14.4	13.7	27.2
1973	9.6	-0.5	15.2	1.6	18.1	7.3	11.9	9.4	9.0	13.3
1974	14.3	29.4	10.2	17.2	11.3	6.1	7.2	11.9	15.9	0.3
1975	11.3	11.7	10.8	-1.4	11.7	17.9	17.6	11.5	10.8	15.0
1976	13.9	1.3	20.1	18.1	23.9	-5.3	-1.8	14.5	12.1	26.6
1977	7.4	-0.1	9.7	7.7	7.6	3.8	5.1	8.4	9.4	16.7
1978	7.2	-1.2	7.9	24.7	3.3	50.5	44.6	9.6	20.8	11.3
1979	13.1	13.0	12.7	20.0	13.1	-6.6	-0.9	13.4	17.8	13.5
1980	15.4	22.3	11.3	-1.6	15.9	15.4	16.6	16.6	16.3	16.8
1981P	2.5	-	-	-	-	-	-	-	-	-
1982P	6.9	-	-	-	-	-	-	-	-	-
1983P	-3.9	-	-	-	-	-	-	-	-	-
1984P	4.0	-	-	-	-	-	-	-	-	-
1985P	11.0	-	-	-	-	-	-	-	-	-
Index Number of Real Production										
1970	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1971	112.7	102.5	123.0	108.0	126.7	125.8	128.8	110.5	105.7	119.7
1972	128.4	111.3	142.9	114.7	151.6	232.3	233.5	126.4	120.1	152.3
1973	140.7	110.8	164.6	116.4	179.0	249.2	261.4	138.3	130.9	172.5
1974	160.8	143.4	181.4	136.5	199.1	164.3	280.1	154.7	151.8	173.1
1975	179.0	160.2	201.0	134.6	222.5	311.7	329.4	172.5	168.2	199.0
1976	203.8	162.2	241.4	159.0	275.6	295.3	323.5	197.4	188.5	252.0
1977	218.9	162.0	264.8	171.2	296.5	306.7	340.0	214.0	206.2	294.0
1978	234.6	159.9	285.7	213.5	306.1	461.5	491.5	234.6	249.1	327.1
1979	265.2	180.8	322.0	256.2	346.2	431.1	487.1	266.0	293.4	371.1
1980	306.0	221.1	358.2	252.2	401.3	497.7	568.0	310.2	341.3	433.3
1981P	313.6	-	-	-	-	-	-	-	-	-
1982P	335.2	-	-	-	-	-	-	-	-	-
1983P	322.3	-	-	-	-	-	-	-	-	-
1984P	335.1	-	-	-	-	-	-	-	-	-
1985P	372.0	-	-	-	-	-	-	-	-	-

Note : P - Preliminary estimation
Sources : E009

Table IV.2.16 AVERAGE FAMILY EXPENDITURE BY EXPENDITURE GROUP IN FLORIANOPOLIS : 1981

Expenditure Group	Percentage Distribution (%)
Food e Beverage	47.4
Clothing & Other Wear	11.5
Household Furnish e Equipment	3.3
Household Operation	3.0
Hygiene & Medical Care	6.6
Personal Care	9.4
Public Utilities	4.2
Transportation	1.9
Housing	7.7
Personal Effects	2.2
Miscellaneous Services	2.8
Total	100.0

Source : E046

Table IV.2.17 PRICE INDEX : 1972 TO 1985

Year	Price Inflation/1				Implicit Price Index	
	Annual Rate		Price Index			
	Brazil	Santa Catarina/2	Brazil	Santa Catarina/2	Brazil	Santa Catarina
1972	15.7	18.8	100.0	100.0	100.0	100.0
1973	15.5	16.7	115.5	116.7	123.4	133.3
1974	34.5	33.4	155.3	155.6	164.8	182.4
1975	29.4	31.6	201.0	204.8	222.9	232.6
1976	46.3	39.0	294.1	284.7	328.9	320.1
1977	38.8	43.5	408.2	408.5	473.1	445.6
1978	40.8	41.7	574.7	578.8	681.9	608.8
1979	77.2	80.0	1,018.4	1,041.7	1,074.8	936.6
1980	110.2	108.1	2,140.8	2,166.6	2,091.1	1,727.5
1981	95.2	100.1	4,178.8	4,334.6	4,136.5	3,682.0p
1982	99.7	106.7	8,345.1	8,959.6	8,124.2	7,181.8p
1983	211.0	182.7	25,953.1	25,330.5	19,856.2p	18,270.0p
1984	238.8	205.4	87,929.2	77,364.3	61,136.1p	58,577.7p
1985	235.1	255.9	294,650.8	275,661.1	-	190,681.0p

Notes : /1 At the end of the year.
/2 Consumer Price in Florianopolis enumerated by ITAG.
p Preliminary estimation.
Sources : E007, E008 and E117

Table IV.2.18 RELATION BETWEEN GDP AND FEDERAL REVENUES

(Unit : Cr$ 10^6)

Year	Revenue of the Federal Government/1 (A)	GDP (B)	A/B (%)
1970	17,698	196,110	9.02
1971	24,842	261,102	9.51
1972	37,760	345,001	10.94
1973	50,705	483,340	10.49
1974	75,279	707,978	10.63
1975	103,271	1,009,674	10.23
1976	174,590	1,625,134	10.74
1977	260,107	2,486,770	10.46
1978	388,702	3,763,867	10.33
1979	575,653	6,311,762	9.12
1980	1,284,271	13,163,818	9.76
1981	2,480,049	25,631,772	9.68
1982	5,130,183	50,815,295	10.10
1983	12,016,596	120,267,535	9.99
1984	38,140,496	386,967,409	9.86

Note : /1 The amount comes from Banco Central do Brazil which estimates it at account day of December 31, so it is different from the actual revenue of the Federal Government.

Source : E009

Table IV.2.19 ACTUAL DISBURSEMENT FOR FLOOD CONTROL BY FEDERAL GOVERNMENT

(Unit : Cr$10^6)

Item	1980	1981	1982	1983	1984
1) Federal Government	1,190,994	2,254,896	4,619,772	11,104,582	33,817,216
2) Department concerned to physical infrastructure					
- DNOCS	5,344	14,452	22,743	132,529	227,385
- DNOS	9,130	18,453	30,467	56,818	221,855
- SUDENE	20,909	55,467	72,441	316,124	590,735
Total	35,383	88,372	125,651	505,471	1,039,975
· Percentage to the total(%)	3.0	3.9	2.7	4.6	3.1
3) Department in charge of flood control					
· DNOCS etc.	5,459	11,739	22,189	115,119	215,893
· Percentage to the total(%)	0.5	0.5	0.5	1.0	0.6
(Reference)					
4) Transference to local Government	216,429	431,665	920,052	2,064,176	6,849,703
· Percentage to the total(%)	18.2	19.1	19.9	18.6	20.3
5) Transference to the state Government of SC	3,273	6,689	24,681	44,594	130,745
· Percentage to the total(%)	0.3	0.3	0.5	0.4	0.4
· Percentage to (4) (%)	1.5	1.5	2.7	2.2	1.9

Sources : E021, E022 and Centro de Estudos Fiscais by IBRE/DCS/FGV

Table IV.2.20 VALUE OF PRODUCTION IN PRIMARY SECTOR IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

(Unit : Cr$10^3)

Description	Itajai River Basin	Santa Catarina
Crops	8,022,967	44,749,764
Livestock	2,917,129	39,619,412
Fishery	1,077,448	2,142,886
Forestry	751,084	6,744,508
Rural Industry	571,187	3,311,981
Total	13,339,815	96,568,551

Table IV.2.21 HARVESTED AREA, UNIT YIELD AND PRODUCTION OF CROPS IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

Description	Itajai River Basin			Santa Catarina		
	Harvested Area (ha)	Unit Yield (tons/ha)	Production (tons)	Harvested Area (ha)	Unit Yield (tons/ha)	Production (tons)
Rice	30,512	3.4	104,754	153,521	2.8	428,868
Maize	87,151	2.6	226,620	1,127,461	2.7	3,009,995
Cassava	18,694	20.1	374,896	60,995	16.3	995,195
Beans	25,802	0.8	21,245	238,359	0.5	119,972
Onion	9,066	8.8	79,823	12,248	8.5	103,605
Sugar cane	4,123	63.9	263,387	22,632	51.7	1,170,361
Tobacco	31,469	1.6	49,862	76,642	1.7	127,401
Others	20,973	-	-	623,977	-	-

Source : E053

Table IV.2.22 HARVESTED AREA, UNIT YIELD AND PRODUCTION OF CROPS IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1984

Description	Itajai River Basin			Santa Catarina		
	Harvested Area (ha)	Unit Yield (tons/ha)	Production (tons)	Harvested Area (ha)	Unit Yield (tons/ha)	Production (tons)
Rice	26,992	4.2	113,793	139,281	3.3	453,057
Maize	66,881	2.5	167,167	937,731	2.5	2,345,207
Cassava	22,459	15.2	340,813	83,102	13.1	1,090,368
Beans	48,716	0.9	44,089	393,891	0.8	310,439
Onion	8,897	9.5	84,539	12,157	9.1	111,116
Sugar cane	4,222	56.9	240,123	20,454	47.7	976,487
Tobacco	35,472	1.6	57,867	91,325	1.7	151,650
Others	21,121	-	248,993	550,406	-	2,558,657

Source : E070

Table IV.2.23 VALUE OF CROP PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

(Unit : Cr$10^3)

Description	Itajai River Basin	Santa Catarina
Rice	1,065,303	4,087,450
Maize	1,159,074	17,115,283
Cassava	1,020,246	2,964,057
Beans	400,762	2,358,310
Onion	1,552,986	2,059,141
Sugarcane	168,318	792,445
Tabacco	1,907,369	4,306,178
Others	748,909	11,066,900
Total	8,022,967	44,749,764

Source : E053 and E065

Table IV.2.24 LIVESTOCK PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

Description	Unit	Itajai River Basin	Santa Catarina
Cattle	heads	58,197	383,283
Pig	heads	225,639	4,385,089
Chicken	heads	7,574,927	156,227,579
Horse	heads	2,042	5,963
Sheep	heads	3,098	23,893
Caprine	heads	1,052	10,181
Milk	kl	66,372	534,157
Wool	ton	11	151
Egg	10^3 dozen	7,617	54,878
Bee products	ton	104	831

Source : E052

Table IV.2.25 VALUE OF LIVESTOCK PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

(Unit : Cr$$10^3$)

Description	Itajai River Basin	Santa Catarina
Cattle	582,944	5,318,473
Pig	636,774	13,914,905
Chicken	753,188	10,027,079
Milk	655,449	5,555,776
Egg	202,383	1,741,817
Others	86,391	3,061,362
Total	2,917,129	39,619,412

Source : E052

Table IV.2.26 FISHERY PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

Description	Itajai River Basin	Santa Catarina
Fish	79,742	103,595
Crustacean	1,276	9,997
Mollusk	4,217	4,513
Total	85,235	118,105

Source : E068

Table IV.2.27 VALUE OF FISHERY PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

(Unit : Cr$10^3)

Description	Itajai River Basin	Santa Catarina
Fish	766,795	1,350,782
Crustacean	199,115	677,232
Mollusk	111,538	114,872
Total	1,077,448	2,142,886

Source : E068

Table IV.2.28 FORESTRY PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

Description	Unit	Itajai River Basin	Santa Catarina
1. Natural Production			
Mate	tons	5,219	50,345
Firewood	10^3m^3	1,201	4,117
Timber	10^3m^3	307	1,538
Cabbage Palm	tons	253	873
2. Forested Production			
Firewood	10^3m^3	6	406
Timber	10^3m^3	5	376
Timber for paper	10^3m^3	14	3,690
Seedings	10^3	1,679	13,630

Source : E052

Table IV.2.29 VALUE OF FORESTRY PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

(Unit : $Cr\$10^3$)

Description	Itajai River Basin	Santa Catarina
1. Natural Production		
Mate	93,569	679,247
Firewood	188,509	697,117
Timber	433,743	2,820,356
Cabbage Palm	9,133	19,425
Sub-total	724,954	4,216,145
2. Forested Production		
Firewood	1,846	100,580
Timber	6,776	626,097
Timber for paper	11,786	1,769,139
Seedings	5,722	32,547
Sub-total	26,130	2,528,363
Total	751,084	6,744,508

Source : E052

Table IV.2.30 VALUE OF RURAL INDUSTRY PRODUCTION IN THE ITAJAI RIVER BASIN AND SANTA CATARINA : 1980

(Unit : Cr$10³)

Description	Itajai River Basin	Santa Catarina
Sugar	2,515	19,087
Spilit sugar cane	4,193	30,224
Syrup	26,214	87,927
Custard	37,350	61,123
Butter	14,174	43,390
Cheese	103,129	774,424
Cassva-related	33,813	368,636
Grape-related	3,601	87,590
Rice	2,062	25,824
Tabacco	41,007	97,796
Coffee	1,519	4,492
Corn-meal	988	12,395
Lard	102,796	522,887
Meat	161,841	714,188
Sausage	23,718	432,391
Bacon	12,267	29,607
Total	571,187	3,311,981

Source : E052

Table IV.2.31 PRODUCTION OF MANUFACTUREING ESTABLISHMENTS BY TYPE OF INDUSTRY : 1980

Industrial Type	Brazil		Santa Catarina			Itajai River Basin/1		
	Receipts (Cr$10⁶)	Distribution (%)	Receipts (Cr$10⁶)	Distribution (%)	Share to Brazil(%)	Receipts (Cr$10⁶)	Distribution (%)	Share to SC(%)
Mining	136,392	1.4	7,411	1.9	5.4	196	0.2	2.6
Non-metallic Products	403,070	4.1	20,290	5.3	5.0	3,518	3.0	17.3
Metallurgy	1,317,926	13.5	23,026	6.0	1.7	3,807	3.3	16.5
Machinery	728,711	7.5	26,993	7.1	3.7	3,472	3.0	12.9
Electric and Communication Products	498,274	5.1	9,006	2.4	1.8	1,256	1.1	14.0
Vehicles	752,698	7.7	8,235	2.2	1.1	1,100	0.9	13.4
Timber	194,762	2.0	33,566	8.8	17.2	5,241	4.5	15.6
Furniture	141,348	1.5	10,810	2.8	5.6	684	0.6	6.3
Paper	258,132	2.7	18,801	4.9	7.3	2,336	2.0	12.4
Rubber	143,701	1.5	593	0.2	0.4	55	0.0	9.2
Leather	46,766	0.5	1,197	0.3	2.6	15	0.0	1.2
Chemistry	1,850,310	19.0	22,372	5.9	1.2	3,306	2.8	14.8
Medicine	105,512	1.1	480	0.1	0.5	0	0.0	0.0
Soap, Perfume	78,019	0.8	388	0.1	0.5	0	0.0	0.0
Plastic Products	194,409	2.0	19,216	5.0	9.9	678	0.6	3.5
Textile	616,334	6.3	53,881	14.1	8.7	42,135	36.2	78.2
Clothing	369,936	3.8	34,335	9.0	9.3	21,544	18.4	62.7
Food Products	1,332,500	13.7	72,813	19.1	5.5	9,061	7.8	12.4
Beverage	101,083	1.0	1,891	0.5	1.9	285	0.2	15.1
Tabacco	52,391	0.5	6,552	1.7	12.5	25	0.0	0.4
Printing	154,715	1.6	1,669	0.5	1.1	366	0.3	21.9
Other Manufacturing	261,351	2.7	8,002	2.1	3.1	3,425	3.0	42.8
						14,032/2	12.1	
Total	9,738,340	100.0	381,526	100.0	3.9	116,537	100.0	26.7

Notes : /1 A figure of a specific industrial type does not include figures which are not identified as a certain industrial type.
/2 An industrial type is not identified.

Sources : E028 and E039

Table IV.2.32 NUMBER OF MANUFACTUREING ESTABLISHMENTS BY TYPE OF INDUSTRY : 1980

Industrial Type	Brazil		Santa Catarina			Itajai River Basin		
	No.	Distribution (%)	No.	Distribution (%)	Share to Brazil(%)	No.	Distribution (%)	Share to SC(%)
Mining	4,541	2.0	196	1.7	4.3	71	2.6	36.5
Non-metallic Products	43,170	20.2	1,596	14.0	3.7	362	13.4	22.7
Matallurgy	14,407	6.7	629	5.5	4.4	163	6.0	25.9
Machinery	9,748	4.6	499	4.4	5.1	100	3.7	20.2
Electric and Communication Products	3,337	1.6	114	1.0	3.4	33	1.2	29.7
Vehicles	3,983	1.9	247	2.2	6.2	57	2.1	23.2
Timber	21,018	9.8	3,158	27.8	15.0	684	25.4	21.7
Furniture	12,667	5.9	946	8.3	7.5	232	8.6	24.6
Paper	1,704	0.8	111	1.0	6.5	18	0.7	16.2
Rubber	1,273	0.6	57	0.5	4.5	6	0.2	11.1
Leather	1,635	0.8	36	0.3	2.2	10	0.4	27.8
Chemistry	3,419	1.6	99	0.9	2.9	31	1.1	31.3
Medicine	492	0.2	6	0.1	1.2	2	0.1	33.3
Soap, Perfume	929	0.4	24	0.2	2.6	9	0.3	37.5
Plastic Products	2,651	1.2	77	0.7	2.9	17	0.6	22.1
Textile	6,062	2.8	338	3.0	5.6	187	7.0	55.5
Clothing	15,338	7.2	545	4.8	3.6	199	7.4	36.5
Food Products	49,366	23.1	2,003	17.6	4.1	379	14.1	19.0
Beverage	2,925	1.4	153	1.3	5.2	16	0.6	11.0
Tabacco	219	0.1	23	0.2	10.5	9	0.3	43.4
Printing	8,328	3.9	235	2.1	2.8	57	2.1	24.2
Other Manufacturing	6,946	3.1	279	2.4	4.0	55	2.1	19.7
Total	214,158	100.0	11,371	100.0	5.3	2,697	100.0	23.5

Sources : E028 and E039

Table IV.2.33 NUMBER OF EMPLOYEES BY MANUFACTUREING ESTABLISHMENTS BY TYPE OF INDUSTRY : 1980

Industrial Type	Brazil		Santa Catarina			Itajai River Basin/1		
	No.	Distribution (%)	No.	Distribution (%)	Share to Brazil(%)	No.	Distribution (%)	Share to SC(%)
Mining	86,313	1.7	9,962	3.6	11.5	237	0.3	2.4
Non-metallic Products	437,405	8.7	27,862	10.1	6.3	5,512	6.5	19.8
Metallurgy	531,729	10.6	16,507	6.0	3.1	4,058	4.8	24.6
Machinery	538,146	10.8	20,409	7.4	3.8	3,711	4.4	18.2
Electric and Communication Products	243,494	4.9	5,169	1.9	2.1	1,021	1.2	19.8
Vehicles	281,272	5.6	4,855	1.7	1.7	1,262	1.5	26.0
Timber	263,004	5.2	52,746	19.0	20.1	10,885	12.8	20.6
Furniture	174,685	3.5	14,901	5.4	8.5	1,617	1.9	10.9
Paper	107,433	2.2	6,774	2.4	6.3	1,394	1.6	20.6
Rubber	56,476	1.1	780	0.3	1.4	50	0.1	6.4
Leather	42,237	0.8	948	0.3	2.2	35	0.0	3.7
Chemistry	163,227	3.3	3,576	1.3	2.2	229	0.3	6.4
Medicine	34,008	0.7	284	0.1	0.8	0	0.0	0.0
Soap, Perfume	25,379	0.5	277	0.1	1.1	0	0.0	0.0
Plastic Products	118,852	2.4	6,131	2.2	5.2	565	0.7	9.2
Textile	377,600	7.5	34,953	12.6	9.3	24,176	28.5	69.2
Clothing	459,869	9.2	28,949	10.5	4.7	12,695	15.0	43.8
Food Products	622,062	12.4	27,323	9.9	4.4	5,528	6.5	20.2
Beverage	58,512	1.2	1,704	0.6	2.9	326	0.4	19.2
Tabacco	18,183	0.4	1,684	0.6	9.3	91	0.1	5.4
Printing	142,078	2.8	3,129	1.1	2.2	617	0.7	19.7
Other Manufacturing	222,558	4.5	7,890	2.9	3.5	1,853	2.2	23.5
						8,887/2	10.5	-
Total	5,004,522	100.0	276,813	100.0	5.5	84,749	100.0	30.6

Note : /1 A figure of a specific industrial type does not include figures which are not identified as a certain industrial type.
/2 An industrial type is not identified.

Sources : E028 and E039

Table IV.2.34 AVERAGE ASSETS HOLDINGS OF MANUFACTURING INDUSTRIES BY TYPE OF INDUSTRY IN THE BASIN AT THE END OF 1980

(Unit : Cr$ 10^6 /Establishment)

Industrial Type	Fixed Assets						Inventory Stock		
	Tangible Assets					Intangible Assets	Raw Material & Semi-Products	Manufactured Products	Goods for Resale
	Site & Building	Machine & Equipment	Installation	Furniture	Vehicle				
Mining	3,201	8,473	1,418	106	1,209	4,856	954	2,397	-
Non-metallic Products	1,800	1,832	349	58	395	87	873	803	18
Metallurgy	2,289	4,048	250	144	232	6,170	2,751	1,623	81
Machinery	2,459	5,311	320	194	304	498	6,989	1,539	174
Electric and Communication Products	1,746	4,458	229	306	137	202	7,384	2,949	155
Vehicles	1,527	1,851	371	109	202	282	1,980	2,072	127
Timber	1,524	1,306	250	62	775	321	816	998	88
Furniture	1,254	1,116	125	71	220	57	1,388	294	71
Paper	12,173	17,460	1,919	328	1,281	2,750	8,132	2,142	162
Rubber	1,269	2,298	213	164	485	181	782	107	364
Leather	3,916	4,589	345	180	402	9	4,802	1,649	278
Chemistry	18,548	27,128	8,752	367	1,151	102	9,443	15,047	7
Medicine	4,378	3,726	986	615	115	258	7,751	1,439	-
Soap, Perfume	648	900	258	51	376	6	1,174	1,442	127
Plastic Products	4,036	17,744	652	312	300	99	7,667	7,368	55
Textile	7,964	24,248	1,875	885	171	237	13,625	5,210	35
Clothing	1,985	2,183	298	199	201	114	5,441	2,570	38
Food Products	2,850	2,610	773	163	495	130	3,526	2,956	152
Beverage	3,634	3,426	563	207	436	4,204	1,562	1,772	223
Tabacco	21,386	20,358	3,029	1,435	1,565	745	5,568	32,744	12,298
Printing	678	2,308	136	184	111	51	781	62	147
Other Manufacturing	1,329	2,429	212	120	165	288	2,999	2,342	23
Total	2,429	3,409	513	143	488	355	2,651	1,804	121

Sources : E028 and E039

Table IV.2.35 SALES AMOUNT OF COMMERCIAL AND SERVICE'S ESTABLISHMENTS BY TYPE OF INDUSTRY : 1980

Industrial Type	Brazil		Santa Catarina			Itajai River Basin/1		
	Receipts (Cr$10⁶)	Distribution (%)	Receipts (Cr$10⁶)	Distribution (%)	Share to Brazil(%)	Receipts (Cr$10⁶)	Distribution (%)	Share to SC(%)
Commerce								
Retail Stores	4,347,547	47.5	153,452	68.8	3.5	35,006	53.7	22.8
Wholesale	4,814,062	52.5	69,574	31.2	1.4	27,584	42.4	39.6
						2,551/2	3.9	-
Sub-total	9,161,609	100.0	223,026	100.0	2.4	65,141	100.0	29.2
Service/3								
Eating and Lodging	322,480	22.4	8,551	28.7	2.7	1,745	28.0	20.4
Maintenance and Fixing	145,925	10.2	5,557	18.6	3.8	1,311	21.1	23.6
Personal Care	32,254	2.2	939	3.1	2.9	191	3.1	20.3
Broadcasting	52,636	3.7	1,420	4.8	2.7	158	2.5	11.1
Estate Agent	120,680	8.4	3,199	10.7	2.7	325	5.2	10.2
Other Services	764,529	53.1	10,180	34.1	1.3	2,412	38.8	23.8
						83/2	1.3	-
Sub-total	1,438,504	100.0	29,845	100.0	2.1	6,225	100.0	20.9
Total	10,600,113	-	252,871	-	2.4	71,365	-	28.2

Notes : /1 A figure of a specific industrial type does fot include figures which are not identified as a certain industrial type.
/2 An industrial type is not identified.
/3 This catgory, included in "Other Services" in Table IV.2.4., excludes independent professionals such as medical doctor and liberal professionals.

Sources : E029, E030, E040 and E041

Table IV.2.36 NUMBER OF COMMERCIAL AND SERVICE'S ESTABLISHMENTS BY TYPE OF INDUSTRY : 1982

Industrial Type	Brazil		Santa Catarina			Itajai River Basin		
	No.	Distribution (%)	No.	Distribution (%)	Share to Brazil(%)	No.	Distribution (%)	Share to SC(%)
Commerce								
Retail Stores	885,588	95.1	22,326	94.5	2.5	3,896	92.8	17.5
Wholesale	45,969	4.9	1,311	5.5	2.9	304	7.2	23.2
Sub-total	931,527	100.0	23,637	100.0	2.5	4,200	100.0	17.8
Service								
Eating and Lodging	327,017	45.4	9,741	42.3	3.0	1,867	36.2	19.2
Maintenance and Fixing	204,117	28.3	6,960	30.2	3.4	1,704	33.1	24.5
Personal Care	75,082	10.4	2,437	10.6	3.2	535	10.3	22.0
Broadcasting	10,122	1.4	345	1.5	3.4	42	0.8	12.2
Estate Agent	16,651	2.3	503	2.2	3.0	109	2.1	21.8
Other Services	87,639	12.2	3,037	13.2	3.5	900	17.5	29.6
Sub-total	720,628	100.0	23,023	100.0	3.2	5,157	100.0	22.4
Total	1,652,155	-	46,660	-	2.8	9,357	-	20.1

Sources : E029, E030, E040 and E041

Table IV.2.37 NUMBER OF EMPLOYEES BY COMMERCIAL AND SERVICE'S ESTABLISHMENTS BY TYPE OF INDUSTRY : 1980

Industrial Type	Brazil		Santa Catarina			Itajai River Basin/1		
	No.	Distribution (%)	No.	Distribution (%)	Share to Brazil(%)	No.	Distribution (%)	Share to SC(%)
Commerce								
Retail Stores	2,817,273	86.4	88,280	88.1	3.1	17,399	76.5	19.7
Wholesale	442,385	13.6	11,956	11.9	2.7	3,318	14.6	22.8
						2,022/2	8.9	-
Sub-total	3,259,658	100.0	100,236	100.0	3.1	22,739	100.0	22.7
Service								
Eating and Lodging	869,117	32.6	28,304	34.1	3.3	5,349	30.9	18.9
Maintenance and Fixing	512,261	19.2	18,792	22.6	3.7	4,361	25.2	18.8
Personal Care	144,220	5.4	3,975	4.8	2.8	685	4.0	17.2
Broadcasting	66,261	2.5	2,556	3.1	3.9	313	1.8	12.3
Estate Agent	99,274	3.7	2,598	3.1	2.6	463	2.7	17.9
Other Services	977,465	36.6	26,836	32.3	2.7	5,734	33.2	21.4
						379/2	2.2	-
Sub-total	2,668,598	100.0	83,061	100.0	3.1	17,284	100.0	20.8
Total	5,928,256	-	183,297	-	3.1	40,023	-	21.8

Notes : /1 A figure of a specific industrial type does not include figures which are not identified as a certain industrial type.
/2 An industrial type is not identified.

Sources : E029, E030, E040 and E041

Table IV.2.38 AVERAGE ASSETS HOLDINGS OF COMMERCIAL AND SERVICES' ESTABLISHMENTS BY TYPE OF INDUSTRY IN THE BASIN AT THE END OF 1980

(Unit : Cr$ 10^3/Establishment)

Industrial Type	Fixed Assets					Inventory
	Tangible Assets				Intangible Assets	Stock
	Site & Building	Equipment	Furniture	Vehicle		
Commerce						
Retail Stores	391	150	69	97	28	1,215
Wholesale	1,375	660	180	1,096	169	7,841
Sub-total	446	178	75	152	108	1,583
Service						
Eating and Lodging	456	169	81	7	9	78
Maintenance and Fixing	166	149	20	17	3	140
Personal Care	87	98	31	7	0	35
Broadcasting	1,044	1,108	162	41	8	138
Estate Agent	1,638	289	178	150	412	410
Other Services	564	439	112	209	1,102	148
Sub-total	380	211	66	41	161	98
Total	413	194	71	98	97	962

Sources : E029, E030, E041 and E042

Table IV.2.39 EXISTING ROADS AND ROAD DENSITY : 1985

(Unit : km)

Item	Santa Catarina	Itajai River Basin	Percentage Share (%)
National Roads	2,176.9	205.0	9.4
- Pavement	2,074.9	205.0	9.9
- Improved	102.0	-	-
- Earth	-	-	-
State Roads	5,511.5	926.7	16.8
- Pavement	2,537.3	379.4	15.0
- Improved	905.4	184.9	20.4
- Earth	2,068.8	362.4	17.5
Minicipal Roads	80,402.0	13,472.0	16.8
- Pavement	666.0	26.0	3.9
- Improved	18,273.0	3,813.0	20.9
- Earth	61,463.0	9,633.0	15.7
Total	88,090.4	14,603.7	16.6
Land Area (km^2)	95,483	15,221	15.9
Road Density (km/km^2)	0.923	0.959	-

Sources : E101

Table IV.2.40 NUMBER OF REGISTERED MOTOR VEHICLES AND RATIO TO POPULATION : 1984

Category	Brazil		Santa Catarina		
	Number	Percentage Distribution (%)	Number	Percentage Distribution (%)	Percentage Share to Brazil (%)
Motorcycle & Tricycle	923,303	7.3	62,242	11.7	6.7
Car	9,162,384	72.7	356,979	66.8	3.9
Van & Jeep	845,662	6.7	37,164	7.0	4.4
Bus	129,131	1.0	3,394	0.6	2.6
Truck	952,530	7.6	50,842	9.5	5.3
Others	587,562	4.7	23,377	4.4	4.0
Total	12,600,572	100.0	533,998	100.0	4.2
Population(10^3)	132,580	-	4,011	-	3.0
Ratio per 1000 Residents	53.0	-	133.1	-	-

Source : E022

Table IV.2.41 EXISTING MUNICIPAL AND INDUSTRIAL WATER SUPPLY SYSTEMS IN THE ITAJAI RIVER BASIN

Entity / Micro-Region	Number of Municipality/1	Number of Waterworks	Water Source: Surface	Water Source: Well	Population (1985): Urban	Population (1985): Served	Population (1985): Rate of Served	Average Volume Produced (10^3m^3/month)	Reservoir Volume (m^3)	Total Extension of Piping Network (10km)
CASAN										
Litoral de Itajai	4	4	4	0	136,232	108,192	79.4%	1,111	9,230	323
Colonial de Blumenau	10	13	12	1	63,742	36,995	58.0%	272	2,700	183
Colonial do Itajai do Norte	4	6	5	1	16,658	11,225	67.4%	69	750	79
Colonial do Alto Itajai	16	16	15	1	77,282	60,385	78.1%	478	4,725	358
SAMAE										
Colonial de Blumenau	5	5	4/2	0/2	228,145/2 /3	222,605/2	97.6%	1,234/2	11,069/2	782/2
Total	39	44	40/2	3/2	522,059/2	439,402/2	84.2%	3,164/2	28,474/2	1,725/2

Notes : /1 Counted only municipalities which include the municipal capitals.
/2 The municipality of Presidente Nereu is lacking.
/3 Estimation is quoted from E203.

Sources : E102 and E113

Table IV.2.42 NUMBER OF ELECTRICTY CONSUMERS AND CONSUMPTION BY CONSUMER TYPE : 1984

Micro-Region Basin/State	Residential	Industrial	Commercial	Rural	Public Office	Public Illumination	Social Service	Self-Consumption	Total
NUMBER OF ELECTRICITY CONSUMERS									
Litoral de Itajai	28,613	469	3,154	1,069	284	2	12	6	33,532
Colonial de Blumenau	75,201	1,975	7,479	8,930	634	15	55	32	94,343
Colonial do Itajai do Norte	4,095	142	643	3,693	140	5	7	5	8,730
Colonial do Alto Itajai	17,870	587	2,815	13,830	483	18	26	19	35,643
Colonial Serrana Catarinense	539	8	132	799	13	1	2	1	1,495
Campos de Lages	102	0	12	2	1	0	0	0	120
Planalto de Canoinhas	1,002	45	167	218	18	1	3	0	1,456
Total in the Basin	127,422	3,227	14,403	28,542	1,494	43	106	65	175,321
Total in Santa Catarina	589,215	11,319	65,682	103,043	7,350	221	511	379	777,720
Rate of the Basin to Santa Catarina	0.22	0.29	0.22	0.28	0.20	0.20	0.21	0.17	0.23
NUMBER OF ELECTRICITY CONSUMPTION									
Litoral de Itajai	42,859	77,927	23,589	1,919	3,437	6,803	3,461	263	160,258
Colonial de Blumenau	125,148	541,900	64,014	15,195	5,670	17,521	6,800	1,353	788,189
Colonial do Itajai do Norte	5,502	14,441	2,165	4,873	350	1,545	273	82	29,229
Colonial do Alto Itajai	24,173	42,903	13,511	18,273	1,457	6,128	1,845	161	108,326
Colonial Serrana Catarinense	569	94	3,112	650	28	159	27	0	1,839
Campos de Lages	110	2,539	391	36	27	34	14	3	2,665
Planalto de Canoinhas	840	1,142	599	1,169	69	439	171	1	4,428
Total in the Basin	199,201	680,946	104,228	42,113	11,038	32,628	12,591	1,864	1,84,609
Total in Santa Catarina	817,737	2,496,113	463,364	363,052	79,435	173,661	71,201	8,179	4,472,742
Rate of the Basin to Santa Catarina	0.24	0.27	0.22	0.12	0.14	0.19	0.18	0.23	0.24

Source : E045

Table IV.2.43 POPULARIZATION OF HOUSEHOLD EFFECTS AND INSTALLATION

Item	1970				1980			
	Number in the Basin	Pervaded Rate(%)			Number in the Basin	Pervaded Rate (%)		
		Basin	Santa Catarina	Brazil		Basin	Santa Catarina	Brazil
1. Number of Household/1	102,815	-	-	-	144,438	-	-	-
2. Piped Supply Water	21,640	21.0	18.9	32.8	60,290	41.7	41.3	54.9
3. Sewerage System	0	0.0	1.7	13.2	0	0.0	3.7	27.7
4. Fuel for Cooking								
- LPG	34,494	33.5	24.2	42.7	77,166	30.6	42.9	60.6
- City Gas	0	0.0	0.0	-	0	0.0	0.0	2.0
- Firewood	63,359	61.6	73.5	45.0	66,650	46.1	56.5	30.6
- Charcoal	-	-	-	-	3	0.0	0.0	5.5
- Electricity	-	-	-	-	44	0.0	0.0	0.0
5. Electrification	67,110	65.3	49.0	47.6	125,980	87.2	79.0	68.5
6. Telephone	-	-	-	-	12,314	8.5	8.3	12.6
7. Electric Appliance								
- Refrigerator	31,697	30.8	23.4	26.1	111,444	77.1	63.7	50.4
- Radio	77,459	75.3	73.2	58.9	125,262	86.7	85.5	76.2
- Television	21,326	20.7	16.3	24.1	109,449	75.8	64.3	56.1
8. Car	10,981	10.7	9.7	9.0	49,508	34.3	29.8	22.7

Note : /1 Number of answerer to the questionnaire.
Sources : E027, E034, E041 and E042

Table IV.2.44 RECORDS OF COMPENSATION FOR EXPROPRIATED LAND AND HOUSES BECAUSE OF SUBMERGENCE IN THE RESERVOIR OF NORTE DAM

Year	Number of Lot	Total Area Expropriated (ha)	Indemnity (Cr$10³)	
			Actual	Revised[1]
1976	14	176.5	2,711.8	2,623,409
1977	23	108.6	2,699.2	1,819,825
1978	45	323.0	7,869.4	3,744,259
1979	16	110.7	7,327.8	1,937,465
1980	49	147.3	8,839.2	1,123,465
1981	47	88.7	8,029.6	509,882
1982	-	-	-	-
1983	-	-	-	-
1984	27	150.8	103,598.7	372,955
Total	221	1,105.6	141,075.8	12,131,260
Per Lot Average	-	5.0	638.4	54,893

Note : Revised by Consumer Price Index calculated by ITAG
Source : DNOS

Table IV.2.45 LAND USE OF THE ITAJAI RIVER BASIN : 1980

Municipality Micro-Region Basin	Total Area (km²)	Residential Area[1] (ha)	Agricultural Area (ha)							Not Utilized (ha)	Unsuitable Land (ha)	Unidentified Area[2] (ha)
			Crop Land			Pasture Land		Forest Land				
			Permanent	Annual	Fallow	Natural	Artificial	Natural	Forested			
Camboriu	29	0	29	254	102	203	32	640	113	95	131	1,301
Ilhota	263	150	349	4,852	44	6,283	248	5,167	454	1,869	2,614	4,270
Itajai	304	1,940	75	2,039	493	3,658	1,317	2,884	323	973	639	16,059
Navegantes	72	600	56	480	64	548	47	306	22	83	179	4,815
Litotal de Itajai	668	2,690	509	7,625	703	10,692	1,644	8,997	912	3,020	3,563	26,445
Ascurra	119	190	152	1,529	946	214	1,407	1,467	185	342	1,366	4,102
Benedito Novo	744	140	225	5,635	3,162	10,523	2,198	13,783	1,518	2,947	7,022	27,247
Blumenau	410	4,410	362	2,497	2,472	3,148	241	5,284	780	1,720	2,487	17,599
Botuvera	184	60	241	1,543	855	660	24	3,057	158	975	6,009	4,818
Brusque	401	1,260	226	1,193	888	1,203	165	2,779	44	489	753	31,100
Gaspar	336	700	529	3,947	1,302	6,946	383	7,880	457	1,851	1,599	8,006
Guabiruba	178	160	420	863	265	556	64	4,080	12	372	944	10,064
Indaial	951	1,090	1,282	5,941	1,685	7,143	724	33,945	1,969	5,655	7,564	28,102
Luiz Alves	253	40	593	4,352	2,138	1,404	1,617	4,882	1,047	2,147	2,817	4,263
Massaranduba	121	0	317	2,542	1,035	1,190	75	1,385	60	575	1,150	3,771
Pomerode	211	260	249	4,331	2,105	3,478	29	2,642	262	2,428	1,957	3,359
Presidente Nereu	274	50	81	2,440	967	3,084	1,211	5,609	409	1,173	2,944	9,432
Rio dos Cedros	475	130	557	3,914	3,740	11,711	2,460	13,102	8,278	1,340	1,217	1,051
Rodeio	135	160	472	2,016	979	1,735	203	1,611	415	768	1,133	4,008
Timbo	161	520	352	2,401	570	2,273	145	1,477	40	1,078	946	6,298
Vidal Ramos	427	70	49	7,307	2,514	85	5,675	7,870	162	4,065	3,911	10,992
Colonial de Blumenau	5,380	9,240	6,107	52,451	25,623	55,353	16,621	110,853	15,796	27,925	43,819	174,212
Dona Emma	154	30	78	2,659	819	738	3,718	2,557	76	401	832	3,492
Ibirama	1,061	290	300	12,167	4,668	11,650	2,102	21,683	1,968	6,627	10,121	34,524
Presidente Getulio	323	270	61	5,905	1,748	477	7,760	5,107	222	1,194	2,805	6,751
Witmarsum	132	40	26	3,298	1,042	539	4,067	2,938	228	235	597	190
Colonial do Itajai do Norte	1,670	630	465	24,029	8,277	13,404	17,647	32,285	2,494	8,457	14,355	44,957

(To be continued)

(Continuation)

Municipality Micro-Region Basin	Total Area (km²)	Residential Area/1 (ha)	Agricultural Area (ha)							Not Utilized (ha)	Unsuitable Land (ha)	Unidentified Area/2 (ha)
			Crop Land			Pasture Land		Forest Land				
			Permanent	Annual	Fallow	Natural	Artificial	Natural	Forested			
Agrolandia	198	90	95	5,218	1,651	3,818	193	2,376	971	1,011	2,079	2,298
Agronomica	130	60	14	3,568	552	1,684	177	1,760	138	393	783	3,871
Atalanta	149	40	8	3,494	691	1,577	2	1,150	189	409	921	6,419
Aurora	198	30	82	5,155	2,244	712	4,296	2,856	442	769	1,853	1,361
Imbuia	92	60	21	3,487	217	2,169	115	909	868	374	881	99
Ituporanga	495	370	166	13,638	3,476	7,916	393	5,346	362	2,336	3,511	11,986
Laurentino	82	70	136	3,391	630	1,454	20	684	24	196	554	1,041
Lontras	230	170	67	3,604	1,309	4,255	57	2,579	254	1,226	1,290	8,189
Petrolandia	265	70	48	6,464	2,672	3,980	8,247	2,530	373	1,059	1,041	16
Pouso Redondo	412	140	134	9,453	1,666	5,271	2,448	4,167	246	2,122	2,019	13,534
Rio do Campo	377	130	3	4,783	1,634	4,991	2,156	5,108	229	1,114	2,392	15,160
Rio do Oeste	246	160	68	5,491	971	8,051	362	4,883	179	1,262	1,340	1,833
Rio do Sul	177	700	266	3,766	1,414	5,396	1,072	4,251	365	170	240	60
Salete	210	80	18	3,103	1,827	1,527	3,474	3,179	269	837	2,041	4,645
Taio	1,001	320	77	11,359	3,046	17,249	7,126	22,770	1,494	2,111	8,136	26,412
Trombudo Central	204	100	72	5,749	1,285	4,681	164	3,086	180	921	1,243	2,919
Colonial do Alto Itajai	4,466	2,590	1,275	91,723	25,285	74,731	30,302	67,634	6,583	16,310	30,324	99,843
Alfredo Wagner	840	0	107	8,179	5,748	21,063	2,093	6,641	5,487	3,095	5,866	25,721
Colonial Serrana Catarinense	840	0	107	8,179	5,748	21,063	2,093	6,641	5,487	3,095	5,866	25,721
Bom Retiro	164	0	77	696	338	7,926	619	3,644	1,284	175	1,232	409
Otacilio Costa	146	0	25	484	96	7,465	418	2,118	1,052	106	963	1,873
Campo de Lages	310	0	102	1,180	434	15,391	1,037	5,762	2,336	281	2,195	2,282
Itaiopolis	1,413	0	285	18,312	13,281	22,076	2,171	28,031	5,199	743	8,798	42,404
Monte Castelo	60	0	8	570	236	1,176	133	1,008	638	233	500	1,498
Papanduva	414	0	80	9,317	3,040	6,222	1,266	5,412	732	1,302	2,198	11,831
Planalto de Canoinhas	1,887	0	373	28,199	16,557	29,474	3,570	34,451	6,569	2,278	11,496	55,733
Total in the Basin	15,221	15,150	8,938	213,386	82,627	220,108	72,914	266,623	40,177	61,366	111,618	429,193
Total by Land Use Category	15,221	15,150		304,951		293,022		306,800			602,177	

Notes : /1 Area was measured on the basis of both the topographic map and aerial infrared photographs.
/2 Area was estimated to subtract both Residential area and Agricultural area from total area.
Sources : E051

Table IV.2.46 AREA BY LAND USE TYPE AND RIVER STRETCH IN THE PROBABLE INUNDATION AREA OF THE ITAJAI RIVER BASIN

(Unit : ha)

River / Stretch No.	Paddy	Sugar Cane	Other Crops	Residential Area		Pasture Land	Not Utilized	Total
				Urban	Rural			
Itajai River								
IT 1	0.0	0.0	0.0	637.5	0.0	0.0	250.0	887.5
IT 2	0.0	1,120.0	52.5	265.0	97.5	0.0	225.0	1,760.0
IT 3	0.0	2,237.5	0.0	25.0	47.5	412.5	100.0	2,822.5
IT 4	0.0	177.5	0.0	25.0	25.0	225.0	0.0	452.5
IT 5	132.5	182.5	0.0	5.0	12.5	850.0	25.0	1,207.5
TI 6	407.5	0.0	82.5	347.5	90.0	705.0	100.0	1,732.5
IT 7	0.0	0.0	112.5	790.0	52.5	7.5	475.0	1,437.5
IT 8	0.0	0.0	17.5	80.0	145.0	0.0	230.0	472.5
IT 9	0.0	0.0	282.5	147.5	77.5	7.5	532.5	1,047.5
IT 10	0.0	0.0	217.5	0.0	75.0	467.5	207.5	967.5
IT 11	417.5	0.0	30.0	122.5	45.0	325.0	137.5	1,077.5
IT 12	40.0	0.0	277.5	52.5	107.5	965.0	1,812.5	3,255.0
IT 13	175.0	0.0	432.5	390.0	92.5	1,020.0	105.0	2,215.0
Itajai do Sul River								
IS 1	0.0	0.0	90.0	57.5	67.5	180.0	40.0	435.0
IS 2	0.0	0.0	65.0	12.5	7.5	95.0	87.5	267.5
IS 3	0.0	0.0	0.0	112.5	0.0	0.0	30.0	142.5
Itajai do Norte River								
IN 1	0.0	0.0	32.5	130.0	0.0	32.5	50.0	245.0
Itajai do Oeste River								
IO 1	0.0	0.0	70.0	80.0	27.5	137.5	0.0	315.0
IO 2	252.5	0.0	307.5	107.5	37.5	182.5	22.5	910.0
Benedito Novo River								
BN 1	25.0	0.0	190.0	177.5	20.0	150.0	120.0	682.5
Itajai Mirim River								
IM 1	15.0	0.0	0.0	485.0	57.5	232.5	1,147.5	1,937.5
IM 2	137.5	0.0	17.5	212.5	12.5	542.5	375.0	1,297.5
IM 3	377.5	0.0	32.5	0.0	0.0	162.5	725.0	1,297.5
IM 4	295.0	0.0	87.5	0.0	62.5	527.5	410.0	1,382.5
IM 5	0.0	0.0	145.0	255.0	142.5	27.5	100.0	670.0
Total	2,275.0	3,717.5	2,542.5	4,517.5	1,302.5	7,255	7,307.5	28,917.5

Table IV.2.47 PAST FORESTED AREA BY SPECIES IN THE ITAJAI RIVER BASIN AND SANTA CATARINA FROM 1964 TO 1982

(Unit : ha)

Year	Itajai River Basin					Santa Catarina				
	Pinus Americano	Pinheiro Brasileiro	Eucalipto	Others	Total	Pinus Americano	Pinheiro Brasileiro	Eucalipto	Others	Total
1964	n.a.	n.a.	n.a.	n.a.	n.a.	21	0	12	n.a.	33
1965	n.a.	n.a.	n.a.	n.a.	n.a.	477	-	4	n.a.	481
1966	n.a.	n.a.	n.a.	n.a.	n.a.	80	6	1	n.a.	87
1967	n.a.	n.a.	n.a.	n.a.	n.a.	2,555	26	8	n.a.	2,589
1968	n.a.	n.a.	n.a.	n.a.	n.a.	6,107	458	16	n.a.	6,581
1969	n.a.	n.a.	n.a.	n.a.	n.a.	9,631	716	283	n.a.	10,630
1970	n.a.	n.a.	n.a.	n.a.	n.a.	18,913	1,995	617	n.a.	21,525
1971	n.a.	n.a.	n.a.	n.a.	n.a.	21,429	2,451	1,234	n.a.	25,114
1972	n.a.	n.a.	n.a.	n.a.	n.a.	30,848	3,483	548	n.a.	34,879
1973	n.a.	n.a.	n.a.	n.a.	n.a.	30,103	2,689	851	n.a.	33,643
1974	n.a.	n.a.	n.a.	n.a.	n.a.	26,782	1,929	2,632	n.a.	31,343
1975	1,263	50	50	27	1,390	19,401	1,792	2,589	792	24,574
1976	1,977	229	38	35	2,279	23,294	3,066	1,462	580	28,402
1977	2,516	122	205	129	2,972	34,404	3,595	5,658	746	44,403
1978	3,189	255	432	135	4,011	22,043	3,713	4,392	2,525	32,673
1979	1,323	526	203	683	2,735	22,093	4,578	3,281	2,117	32,069
1980	854	437	293	302	1,886	21,076	2,964	6,966	4,613	35,619
1981	540	317	445	56	1,358	9,480	3,010	6,025	943	19,458
1982	1,212	97	553	36	1,898	14,245	2,006	8,764	528	25,543
Total	12,874	2,033	2,219	1,403	18,529	312,982	38,477	45,343	12,844	409,646

Sources : E056, E057, E058, E059, E061 and E071

Table IV.3.1 PROJECTED BASIN POPULATION BY URBAN/RURAL AND BY MICRO-REGION IN THE BASIN

Micro-Region	Urban /Rural	Projected Basin Population							
		1985	1990	1995	2000	2005	2010	2015	2020
Litoral de Itajai	Total	122,847	138,860	153,954	168,741	183,244	197,480	211,369	224,594
	Urban	104,376	120,762	136,260	151,437	166,315	180,917	195,163	208,748
	Rural	18,471	18,098	17,694	17,304	16,929	16,563	16,206	15,846
Colonial de Blumenau	Total	395,831	449,018	499,126	548,183	596,279	643,473	689,507	733,337
	Urban	316,239	373,862	427,820	480,186	531,178	580,937	629,277	675,228
	Rural	79,592	75,156	71,306	67,997	65,101	62,536	60,230	58,109
Colonial do Itajai do Norte	Total	41,788	43,206	44,543	45,849	47,131	48,387	49,613	50,781
	Urban	17,061	19,741	22,183	24,455	26,590	28,609	30,523	32,328
	Rural	24,727	23,465	22,360	21,394	20,541	19,778	19,090	18,453
Colonial do Alto Itajai	Total	155,078	160,516	165,634	170,651	175,558	180,375	185,072	189,548
	Urban	75,418	85,323	94,349	102,863	110,951	118,692	126,096	133,081
	Rural	79,660	75,193	71,285	67,788	64,607	61,683	58,976	56,467
Colonial Serrana Catarinense	Total	9,021	8,540	8,087	7,644	7,209	6,783	6,367	5,971
	Urban	2,197	2,258	2,299	2,316	2,313	2,291	2,253	2,204
	Rural	6,824	6,282	5,788	5,328	4,896	4,492	4,114	3,767
Campos de Lages	Total	853	822	799	780	767	756	748	743
	Urban	0	0	0	0	0	0	0	0
	Rural	853	822	799	780	767	756	748	743
Planalto de Canoinhas	Total	18,047	17,705	17,367	17,057	16,772	16,508	16,258	16,009
	Urban	0	0	0	0	0	0	0	0
	Rural	18,047	17,705	17,367	17,057	16,772	16,508	16,258	16,009
Basin Total	Total	743,465	818,667	889,510	958,905	1,026,960	1,093,762	1,158,934	1,220,983
	Urban	515,291	601,946	682,911	761,257	837,347	911,446	983,312	1,051,589
	Rural	228,174	216,721	206,599	197,648	189,613	182,316	175,622	169,394

Table IV.3.2 PROJECTED BASIN POPULATION BY MUNICIPALITY IN THE BASIN

Municipality Micro-Region Basin	Projected Basin Population							
	1985	1990	1995	2000	2005	2010	2015	2020
Camboriu	756	717	685	659	639	622	607	593
Ilhota	7,687	7,316	6,968	6,627	6,293	5,965	5,645	5,340
Itajai	100,600	115,340	129,218	142,802	156,116	169,178	181,917	194,042
Navegantes	13,804	15,487	17,083	18,653	20,196	21,715	23,200	24,619
Litoral de Itajai	122,847	138,860	153,954	168,741	183,244	197,480	211,369	224,594
Ascurra	6,264	7,151	7,985	8,802	9,603	10,388	11,154	11,884
Benedito Novo	10,191	9,647	9,136	8,635	8,144	7,662	7,193	6,746
Blumenau	188,000	224,908	259,684	293,723	327,086	359,820	391,745	422,140
Botuvera	3,420	3,255	3,100	2,948	2,800	2,654	2,511	2,376
Brusque	45,171	49,289	53,165	56,959	60,678	64,326	67,884	71,270
Gaspar	29,516	33,593	37,431	41,188	44,870	48,483	52,006	55,360
Guabiruba	7,556	7,980	8,379	8,769	9,152	9,527	9,894	10,242
Indaial	32,014	35,599	38,974	42,277	45,515	48,691	51,789	54,738
Luiz Alves	6,022	5,545	5,096	4,656	4,226	3,803	3,391	2,998
Massaranduba	2,726	2,582	2,454	2,341	2,241	2,151	2,069	1,995
Pomerode	16,146	17,994	19,734	21,437	23,106	24,744	26,341	27,861
Presidente Nereu	2,948	2,699	2,465	2,235	2,010	1,790	1,575	1,370
Rio dos Cedros	7,832	7,171	6,548	5,938	5,341	4,755	4,183	3,639
Rodeio	8,214	8,458	8,689	8,915	9,136	9,353	9,565	9,767
Timbo	21,440	25,106	28,557	31,935	35,245	38,493	41,661	44,676
Vidal Ramos	8,372	8,041	7,729	7,425	7,126	6,833	6,546	6,275
Colonial de Blumenau	395,831	449,018	479,126	548,183	596,279	643,473	689,507	733,337
Dona Emma	3,320	3,160	3,010	2,862	2,718	2,576	2,438	2,307
Ibirama	24,864	26,258	27,571	28,855	30,115	31,350	32,555	33,702
Presidente Getulio	10,408	10,718	11,011	11,297	11,577	11,852	12,120	12,376
Witmarsum	3,196	3,070	2,951	2,835	3,721	2,609	2,500	2,396
Colonial do Itajai do Norte	41,788	43,206	44,543	45,849	47,131	48,387	49,613	50,781

(To be continued)

(Continuation)

Municipality Micro-Region Basin	Projected Basin Population							
	1985	1990	1995	2000	2005	2010	2015	2020
Agrolandia	6,226	6,318	6,404	6,489	6,572	6,654	6,733	6,809
Agronomica	4,328	4,097	3,880	3,668	3,459	3,254	3,055	2,865
Atalanta	3,539	3,592	3,641	3,689	3,736	3,783	3,828	3,871
Aurora	5,021	4,754	4,501	4,255	4,013	3,775	3,544	3,324
Imbuia	4,164	4,774	5,348	5,911	6,462	7,002	7,529	8,031
Ituporanga	18,117	19,133	20,089	21,026	21,943	22,843	23,721	24,557
Laurentino	4,089	4,168	4,242	4,315	4,386	4,455	4,523	4,588
Lontras	7,462	7,605	7,741	7,873	8,003	8,130	8,254	8,372
Petrolandia	6,387	5,847	5,339	4,843	4,355	3,877	3,411	2,967
Pouso Redondo	11,093	11,423	11,735	12,040	12,339	12,632	12,918	13,190
Rio do Campo	5,363	4,910	4,484	4,067	3,657	3,256	2,864	2,492
Rio do Oeste	6,844	6,266	5,722	5,189	4,667	4,155	3,655	3,180
Rio do Sul	41,761	47,512	52,926	58,226	63,420	68,517	73,486	78,217
Salete	5,931	6,341	6,727	7,106	7,476	7,839	8,193	8,531
Taio	17,920	17,212	16,546	15,893	15,254	14,626	14,014	13,432
Trombudo Central	6,833	6,564	6,309	6,061	5,816	5,577	5,344	5,122
Colonial do Alto Itajai	155,078	160,516	165,634	170,651	175,558	180,375	185,072	189,548
Alfredo Wagner	9,021	8,540	8,087	7,644	7,209	6,783	6,367	5,971
Colonial Serrana Catarinense	9,021	8,540	8,087	7,644	7,209	6,783	6,367	5,971
Bom Retiro	662	613	572	536	506	479	455	434
Otacilio Costa	191	209	227	244	261	277	293	309
Campo de Lages	853	822	799	780	767	756	748	743
Itaiopolis	12,189	11,584	11,044	10,564	10,135	9,748	9,397	9,073
Monte Castelo	546	537	528	519	511	503	495	488
Papanduva	5,312	5,584	5,795	5,974	6,126	6,257	6,366	6,448
Planalto de Canoinhas	18,047	17,705	17,367	17,057	16,772	16,508	16,258	16,009
Total in the Basin	743,465	818,667	889,510	958,905	1,026,960	1,093,762	1,158,934	1,220,983
Total in Santa Catarina	4,082,561	4,556,145	5,002,027	5,438,441	5,866,173	6,285,841	6,695,097	7,084,654

Table IV.3.3 PROJECTED GROSS REGIONAL DOMESTIC PRODUCT

GDP / GRDP Economic Sector	1980	1990	2000	2010	2020
Projected Value (Cz$10^6 at 1986 Constant Prices)					
GDP	4,302,395	6,269,483	11,227,690	16,619,724	24,601,251
GRDP in Santa Catarina	154,571	250,779	449,108	664,411	984,050
- Primary Sector	24,731	40,125	71,857	106,366	157,448
- Secondary Sector	58,521	94,945	170,032	251,689	372,562
- Tertiary Sector	71,319	115,710	207,218	306,734	454,041
- Per capita GRDP (Cz$)	42,606	55,042	82,580	105,700	138,900
Average Annual Growth Rate (%)					
GDP	--	3.8	6.0	4.0	4.0
GRDP in Santa Catarina	--	5.0	6.0	4.0	4.0
- Primary Sector	--	5.0	6.0	4.0	4.0
- Secondary Sector	--	5.0	6.0	4.0	4.0
- Tertiary Sector	--	5.0	6.0	4.0	4.0
- Per capita GRDP	--	2.6	4.1	2.5	2.8

Table IV.3.4 PROJECTED INVESTMENT FOR FLOOD CONTROL FACILITIES

(Unit : Cz$10^6 at 1986 Constant Prices)

Item	1990	1995	2000	2005	2010	2015	2020
GDP	6,269,483	8,389,983	11,227,690	13,660,201	16,619,724	20,220,435	24,601,251
Revenue of Federal Government	620,679	830,608	1,111,541	1,352,360	1,645,353	2,001,823	2,435,524
Projected Investment for Flood Control in Santa Catarina							
High Scenario/1	16,758	22,426	30,012	36,514	44,425	54,049	65,759
Medium Scenario/2	7,572	10,133	13,561	16,499	20,073	24,422	29,713
Low Scenario/3	3,479	4,655	6,230	8,337	10,143	12,340	15,014

Notes : /1 2.70% of the national disbursement
/2 1.22% of the national disbursement
/3 0.75% of the national disbursement

Table IV.3.5 POPULATION DENSITY IN MAJOR URBAN AREAS IN 1980 AND IN 2020

Municipality	Urban Population		Percentage of Urban Pop.		Built-up Area(ha)	Density (Person/ha)	
	1980	2020	1980	2020	in 1980	1980	2020/1
Camboriu	0	0	0	0	0	-	-
Ilhota	1,406	1,501	17	28	150	9	10
Itajai*	78,779	187,215	91	96	1,940	41	97
Navegantes	8,381	20,033	69	81	600	14	33
Ascurra	3,736	10,687	69	90	190	20	56
Benedito Novo	3,767	4,359	35	66	140	27	31
Blumenau*	146,001	418,571	94	98	4,410	33	95
Botuvera	472	506	13	21	60	8	8
Brusque	37,923	65,575	92	92	1,260	30	52
Gaspar*	13,725	45,295	54	82	700	20	65
Guabiruba	4,239	6,938	59	68	160	26	43
Indaial	18,263	47,879	64	87	1,090	17	44
Luiz Alves	1,037	1,173	16	39	40	26	29
Massaranduba	0	0	0	0	0	-	-
Pomerode*	8,924	23,931	62	86	260	34	92
Presidente Nereu	646	542	20	40	50	13	11
Rio dos Cedros	1,884	1,467	22	40	130	14	11
Rodeio	4,643	8,260	58	85	160	29	52
Timbo*	14,459	41,982	81	94	520	28	81
Vidal Ramos	982	1,650	11	26	70	14	24
Dona Emma	811	1,321	23	57	30	27	44
Ibirama	8,230	21,207	35	63	290	28	73
Presidente Getulio	4,780	9,337	47	75	270	18	35
Witmarsum	328	463	10	19	40	8	12
Agrolandia	1,266	2,227	21	33	90	14	25
Agronomica	511	407	1	14	60	9	7
Atalanta	620	927	18	24	40	16	23
Aurora	408	541	8	16	30	14	18
Imbuia	921	3,467	26	43	60	15	58
Ituporanga	5,305	12,978	31	53	370	14	35
Laurentino	1,595	3,023	40	66	70	23	43
Lontras	3,789	6,731	52	80	170	22	40
Petrolandia	934	436	14	15	70	13	6
Pouso Redondo	3,189	7,828	30	59	140	23	56
Rio do Casmpo	1,054	1,028	18	41	130	8	8
Rio do Oeste	1,549	748	21	24	160	10	5
Rio do Sul*	33,362	76,865	92	98	700	48	110
Salete	1,869	4,653	34	55	80	23	58
Taio	6,234	8,454	34	63	320	19	26
Trombudo Central	2,292	2,767	32	54	100	23	28
Total	428,314	1,055,176	64	86	15,150	28	70
Total of Major cities/2	295,250	793,859	88	96	8,530	35	93

Note : /1 In case that urban area is the same as that in 1980.
/2 Municipalities having a mark of "*".

Figures

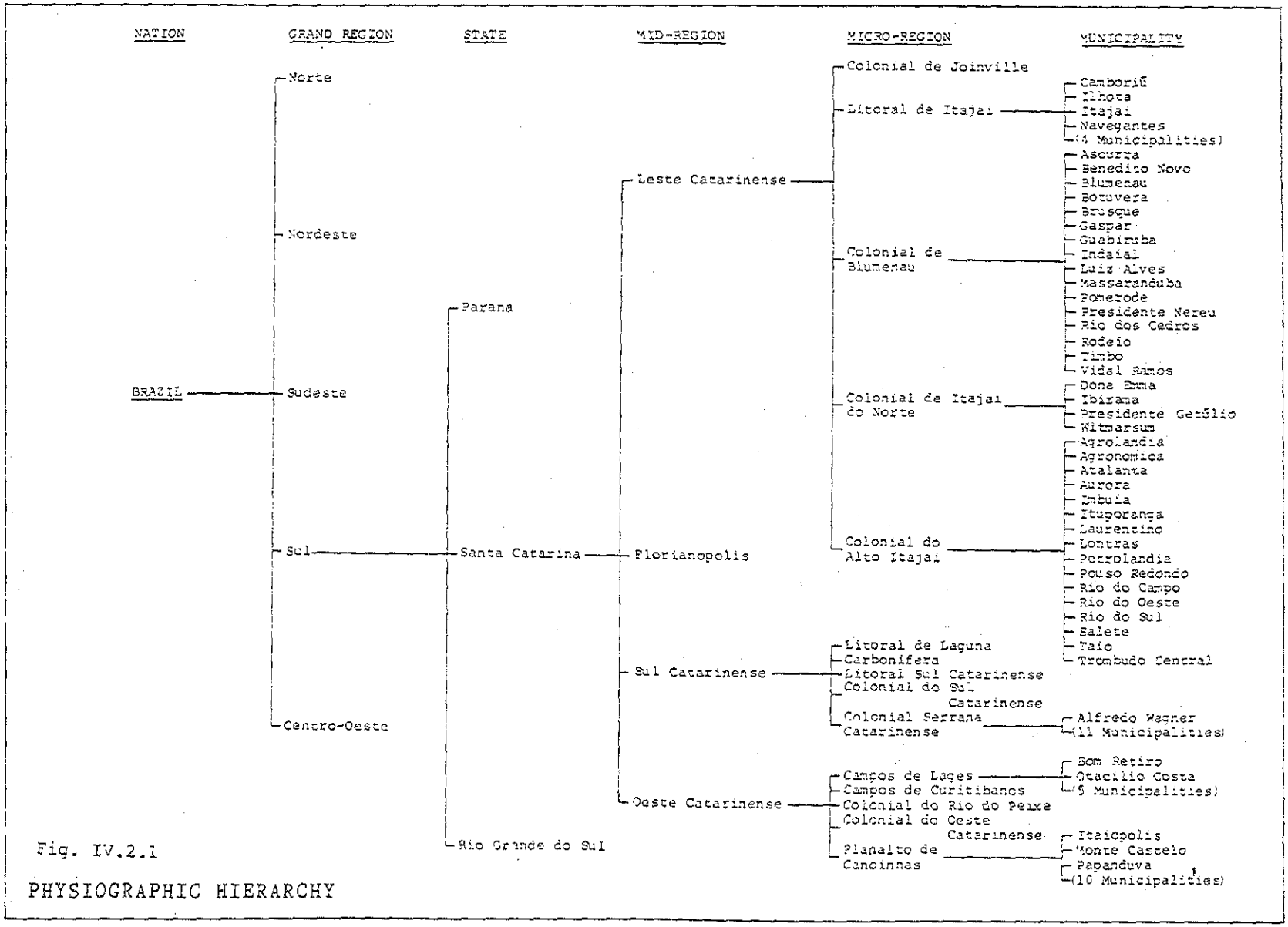

Fig. IV.2.1

PHYSIOGRAPHIC HIERARCHY

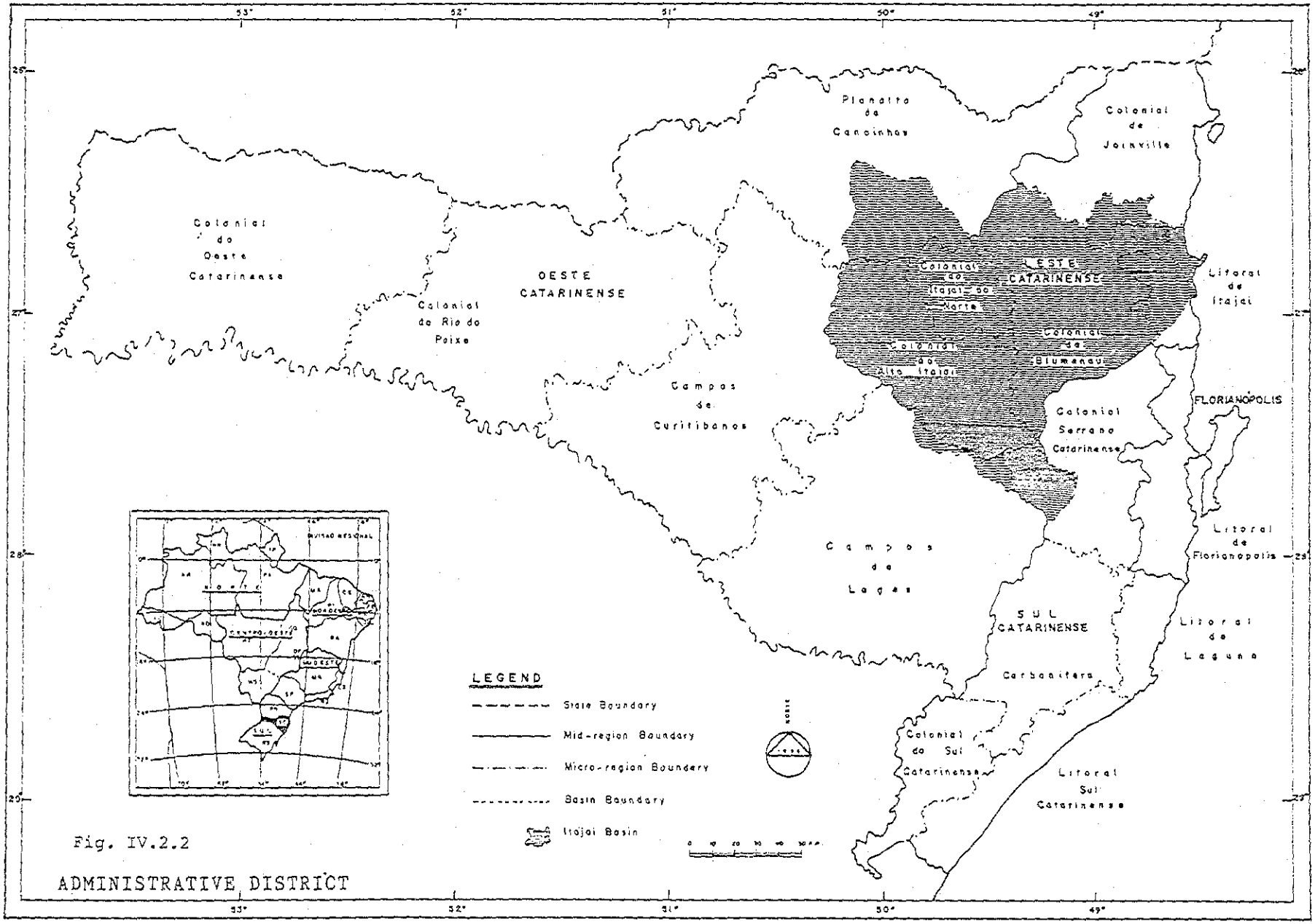

Fig. IV.2.2

ADMINISTRATIVE DISTRICT

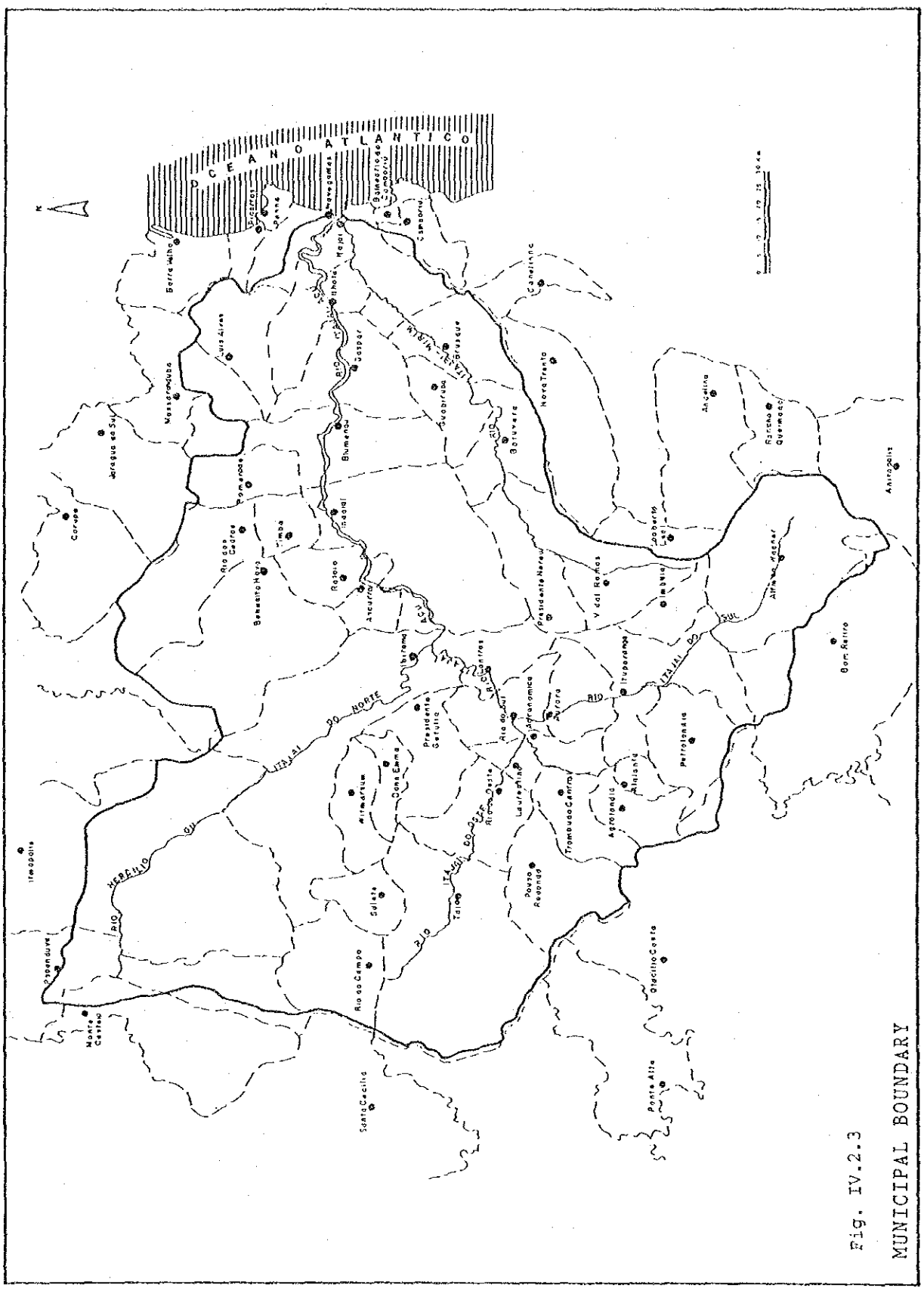

Fig. IV.2.3

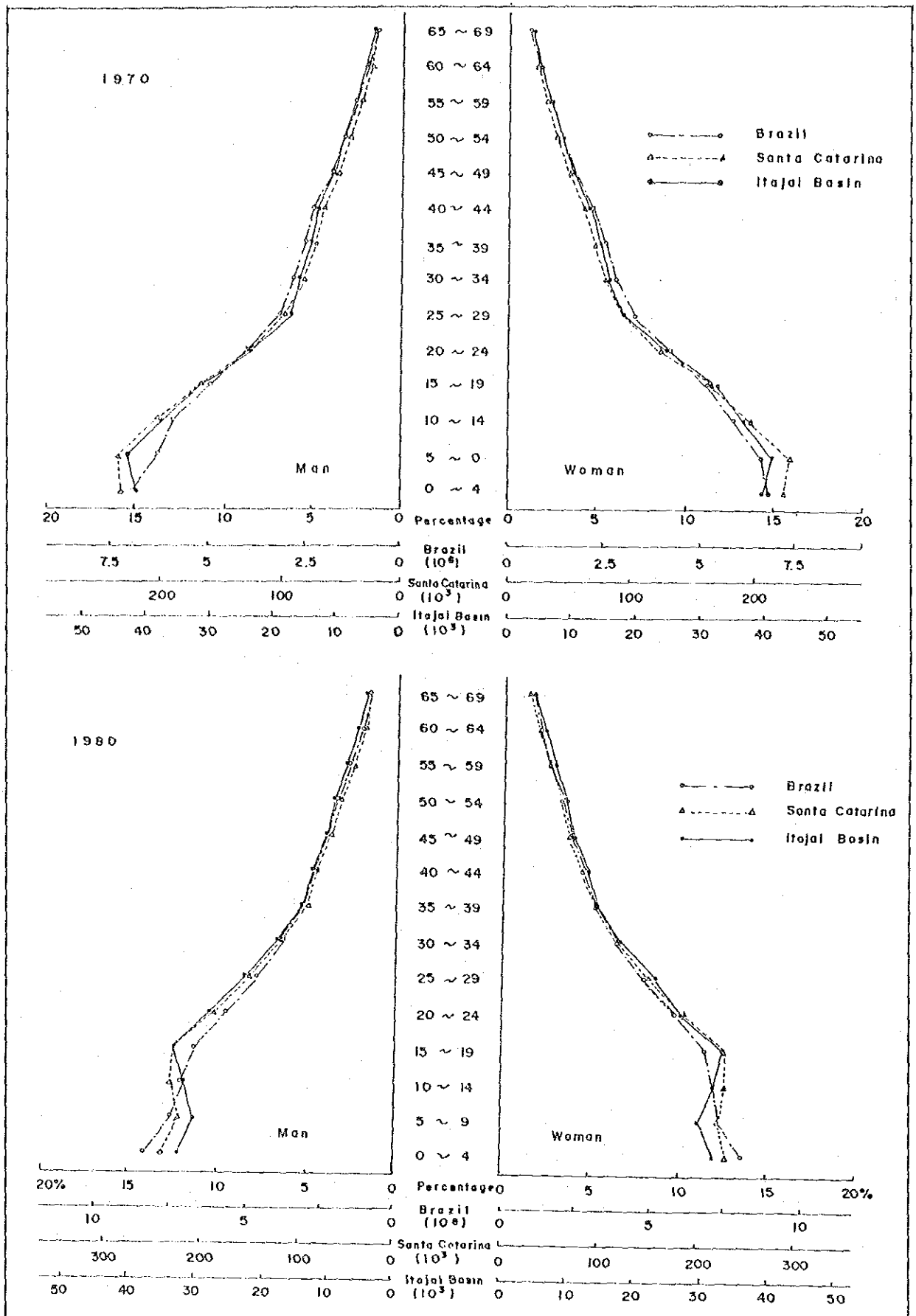

Fig. IV.2.4 POPULATION BY AGE

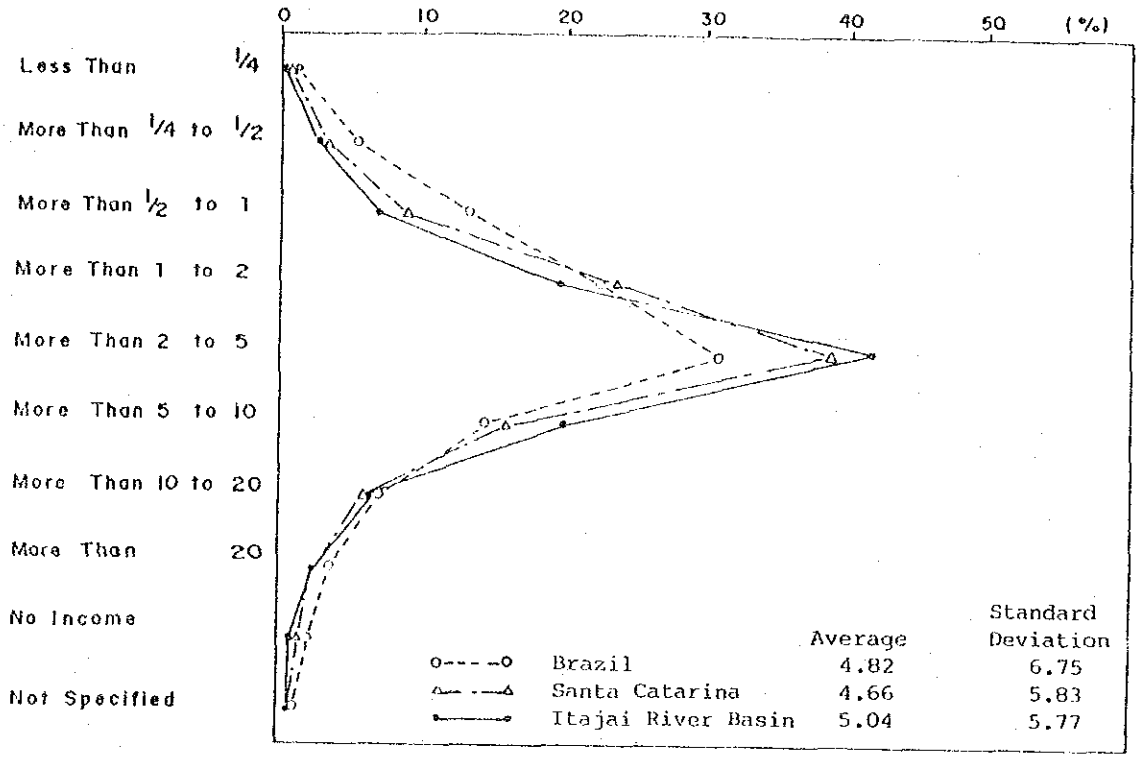

Fig. IV.2.5 DISTRIBUTION OF AVERAGE FAMILY INCOME:1980

Fig. IV. 2.6
PRESENT LAND USE

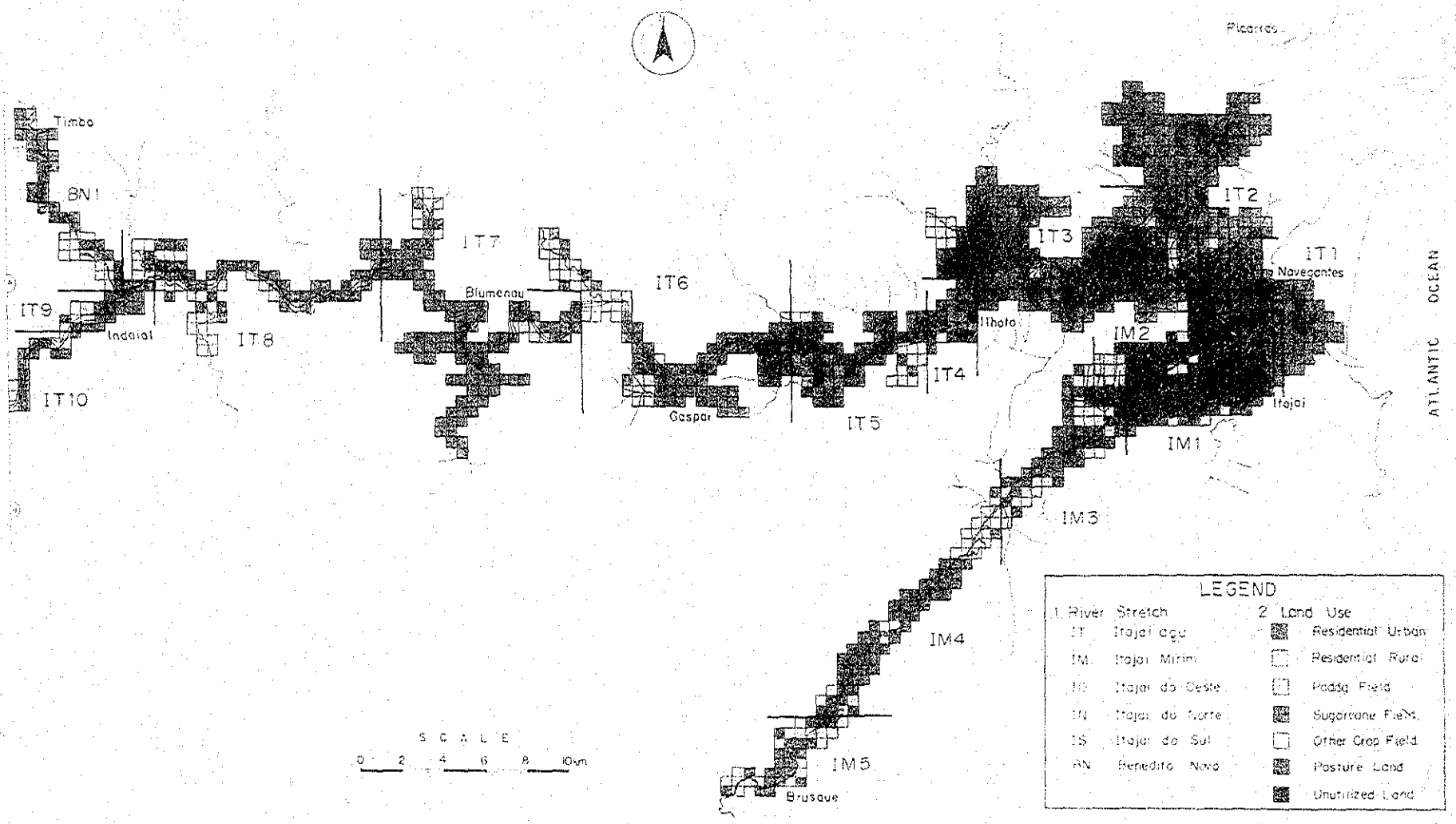

Fig IV.2.7 Present Land Use along the Itajai River (1/2)

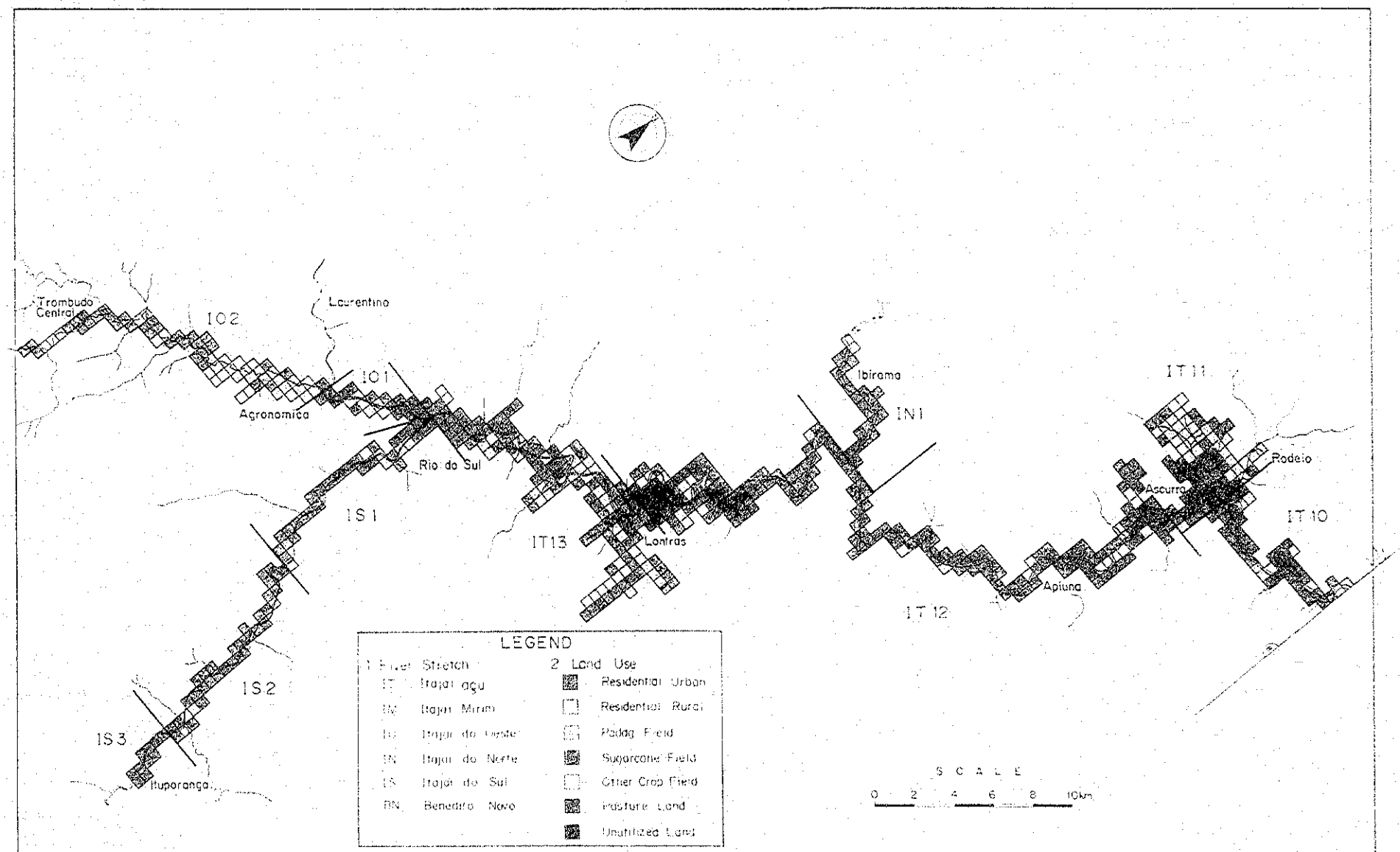

Fig IV.2.7 Present Land Use along the Itajai River (2/2)

LIST OF REFERENCE AND DATA BOOKS

No	Title	Issued on	Issued by
	GENARAL		
E001	Bacia do Rio Itajai - Caracterizacao dos Usos e das Disponibilidades Hidricas	Oct. 1984	MME, DNAEE
E002	I PND; I Plano Nacional de Desenvolvimento Da Nova Republica 1986 - 1989 Projeto	Nov. 1985	Republica Federativa do Brasil
E003	Relatorio 1984 - Banco Central Brasil	1985	Banco Central do Brasil
E004	Analise Conjuntura de Santa Catarina No1/1a Semestre/1985	1985	GAPLAN
E005	Analise Conjuntura de santa Catarina No2/2a Semestre/1985	1986	GAPLAN
E006	Projeto, Contencao de Enchentes	1986	Municipal de Brusque, Santa Maria-RS
E007	Contas Nacionais do Brasil Metodologia e Tabelas Estatisticas	1984	FGV
E008	Simulador de Grandes Macroeconomicas, Metodologia Extensiva da conta de Producao	May 1984	GAPLAN
E009	Conjuntura	June 1985	FGV
E010	Conjuntura	Aug. 1985	FGV
E011	Conjuntura	Mar. 1986	FGV
E012	Levantamento Socio-economico	1987	Municipality of Blumenau
	CENSUS		
E021	Anuario Estatistico do Brasil-1984	May 1985	IBGE
E022	Anuario Estatistico do Brasil-1985	May 1986	IBGE
E023	Numeros de Santa Catarina / 85	May 1985	GAPLAN
E024	Censo Demografico Dados Distritais-1980 Volume 1- Tomo 3- Numero 21, Santa Catarina	1982	IBGE

No	Title	Issued on	Issued by
E025	Censo Demografico Dados Gerais-1980 Volume 1- Tomo 4- Numero 21,Santa Catarina	1982	IBGE
E026	Censo Demografico Mao-de-Obra - 1980 Volume 1- Tomo 5- Numero 21, Santa Catarina	1983	IBGE
E027	Censo demografico Familias e domicilios 1980, Volume 1 - Tomo 6- Numero 21, Santa Catarina	1984	IBGE
E028	Censo Industrial Dados Gerais - 1980 Volume 3-Tomo 2- Numero 21, Santa Catarina	1984	IBGE
E029	Censo Comercial Dados Gerais - 1980 Volume 4 - Numero 21, Santa Catarina	1984	IBGE
E030	Censo dos Servicos Dados Grais - 1980 Volume 5 - Numero 21, Santa Catarina	1984	IBGE
E031	Censo Industrial, Santa Catarina-1975 Serie Regional, Volume 2 - Tomo 19	1979	IBGE
E032	Censo Comercial, Santa Catarina-1975 Serie Regional, Volume 3 - Tomo 19	1980	IBGE
E033	Censo dos service, Santa Catarina-1975 Serie Regional, Volume 4 - Tomo 19	1981	IBGE
E034	Censo Demografico, Santa Catarina-1970 Serie Regional, volume I - Tomo XX	1973	IBGE
E035	Censo Demografico de 1960, Santa Catarina Serie Regional, Volume I - Tomo XV - Parte 1	1968	IBGE
E036	Censo Demografico Dados Gerais-1980 Volume 1 - Tomo 4 - Numero 1, Brasil	1983	IBGE
E037	Censo Demografico Mao-de-Obra -1980 Volume 1 - Tomo 5 - Numero 1, Brasil	1983	IBGE
E038	Censo demogrfico Familias e domicitlios 1980, volume 1 - Tomo 6 - Numero 1, Brasil	1983	IBGE
E039	Censo Industrial Dados Gerais-1980 -Volume 3 - Tomo 2 - Parte 1 - Numero 1, Brasil	1984	IBGE
E040	Censo comercial Dados Gerais-1980 Volume 4 - Numero 1, Brasil	1984	IBGE
E041	Censo dos Servicos Dados Gerais - 1980 Volume 5 - Numero 1, Brasil	1984	IBGE

No	Title	Issued on	Issued by
E042	Censo Demografico, Brasil- 1970 Serie Nacional - Volume I	1979	IBGE
E043	Censo Demografico de 1960, Brasil Serie Nacional - volume I		IBGE
E044	Santa Catarina, Its people, land and Production	1982	GAPLAN
E045	Boletim Estatistico	1984	CELESC
E046	Information	-	ITAG
E047	BRASIL - 1984, Comercio Exterior	1984	Banco do Brasil CACEX
E048	Pesquisa Nacional por Amostra de Domicilios - 1984, Volume 8 - Tomo 1, Brasil e Grandes Regioes	1985	IBGE
E049	Pesquisa Nacional por Amostra de Domicilios - 1984, Volume 8 - Tomo 5, Santa Catarina e Outras	1985	IBGE
E050	Empresas de Transporte Rodoviario	1982	IBGE
E051	Censo Agropecuario, Santa Catarina - 1980 Volume 2 - Tomo 3 - Numero 21 - Parte 1	Oct.1983	IBGE
E052	Censo Agropecuario, Santa Catarina - 1980 Volume 2 - Tomo 3 - Numero 21 - Parte 2	Oct.1983	IBGE
E053	Producao Agricola Municipal - 1980 Volume 7 - Tomo 6, Parana - Santa Catarina - Rio Grande do Sul, Culturas Temporarias e Permanentes	1980	IBGE
E054	Censo Agropecuario, Santa Catarina - 1975 Serie Regional, Volume 1 - Tomo 19	Aug. 1979	IBGE
E055	Censo Agropecuario, Santa Catarina - 1970 Serie Regional, volume III - Tomo XX	Jan. 1975	IBGE
E056	Silvicultura, Brasil - Grandes Regioes - Unidades da Federacao - Mesorregioes - Microrregioes Homogeneas - Municipios, Volume 5, 1982	Oct. 1984	IBGE

No	Title	Issued on	Issued by
E057	Silvicultura, Brasil - Grandes Regioes - Unidades da Federacao - Mesorregioes - Microrregioes Homogeneas - Municipios, Volume 4, 1981	July 1984	IBGE
E058	Silvicultura, Brasil - Grandes Regioes - Unidades da Federacao - Mesorregioes - Microrregioes Homogeneas - Municipios, Volume 3, 1980	Nov. 1982	IBGE
E059	Silvicultura, Brasil - Grandes Regioes - Unidades da Federacao - Mesorregioes - Microrregioes Homogeneas - Municipios, Volume 1, 1975 -1977	Nov. 1981	IBGE
E060	Inventario Florestal Nacional, Florestas Nativas, Parana, Santa Catarina	1984	IBDF
E061	Inventario Florestal Nacional, Reflorestamento, Parana, Santa Catarina	1984	IBDF
E062	Custos de Producao dos Principais	June 1986	CEPA/SC
E063	Sintese Anual da Agricultura da Santa Catarina 1985-86, Volume 1	1986	CEPA/SC
E064	Sintese Anual da Agricultura da Santa Catarina 1984-85, Volume 1 Desempenho, Perspectivas	1985	CEPA/SC
E065	Sintese Anual da Agricultura da Santa Catarina 1984-85, Volume 1 Infra-Estrutura, Recursos, Naturais, Insumos e Fatores, Credito Agricola, Oferta e Demanda, Valor da Producao	1985	CEPA/SC
E066	Anuario Estatistico - 1985 Serie documentos Informe anual No14	1985	SUDEPE
E067	Anuario Estatistico - 1984 Controle de Desembarque de Pescado em Santa Catarina, Serie documentos Informe Anual No13	1984	SUDEPE
E068	Anuario Estatistico - 1980 Controle de Desembarque de Pescado em Santa Catarina, Serie Documentos Informe Anual No5	1983	SUDEPE
E069	Anuario Mineral Brasileiro	1985	DNPM
E070	Producao Agricola Municipal - 1984 Parana - Santa Catarina - Rio Grande do Sul, Culturas Temporarias e Permanetes	1984	IBGE

No	Title	Issued on	Issued by
E071	Censo Industrial Santa Catarina - 1970 Serie Regional, Volume V - Tomo XX	1975	IBGE
E072	Censo Comericial, Santa Catarina - 1970 Serie Regional, Volume VI - Tomo XX	1975	IBGE
E073	Censo dos Servicos, Santa Catarina - 1970 Serie Regional, Volume VII - Tomo XX	1975	IBGE
	OTHERS		
E101	Sistema Rodoviario Estadual	1985	DER
E102	Acompanhamento	1985	CASAN
E103	CELESC - Analise do Impacto das enchentes	1983	ELETROBRAS
E104	Pro-Energia - State Energy Programme	1980	CODESC
E105	Reinicio Gerencial	1985	TELESC
E106	Relatorio anual do DNER	1984	DNER
E107	Rede Rodoviaria do PNV. Divisao em Trechos - 1983	Dec. 1982	DNER
E108	Censo Anual de Trafego Rodoviario Regiao Sul, Serie Historica 1980-1982	1983	DNER
E109	Manual de Defensa Civil 1982	1982	SEDEC Estado de Sta. Catarina
E110	Uma Comdec Atuante e a Seguranca da comunidade	-	SEDEC Estado de Sta. Catarina
E111	Brazil, People and Institutions	1972	Luisiana St. Univ. Press
E112	Brasil, Estimaciones y Proyecciones de Poblacion, 1950-2025	July 1984	IBGE Centro Latino-Americano de Demografia
E113	Population Projection in Sanra Catarina	-	GAPLAN
E114	Investment Opportunities	1983	GAPLAN

No	Title	Issued on	Issued by
E115	Relatorio dos prejuizos causados a sociedade	1983	GAPLAN
E116	As Enchentes de Julho/83 e a Busca de Solucoes	1984	UFSC
E117	Santa Catarina acao de reconstrucao	1984	UFSC
E118	Indice de Precos ao Consumidor	-	UDESC
E119	Codigo Florestal (Lei No. 4771, de 15 de Setembro de 1965), Protecao a Fauna (Lei No. 5197, de 3 de Janiro de 1976)	-	-
E120	Conselho Nacional do Meio Ambiente	-	Ministerio do Desenvolvimento Urbano e Meio Ambiente
E121	Sistemas de Producao para Feijao (Revisao) Santa Catarina, Boletim No. 209	June 1980	EMPASC EMATER-SC ACARESC
E122	Sistemas de Producao para Alho (Revisao) Santa Catarina, Boletim No. 269	Nov. 1980	EMPASC EMATER-SC ACARESC
E123	Sistema de Producao para Cebola (1a Revisao) Santa Catarina Sistemas de Producao No. 3	1983	EMPASC EMATER-SC ACARESC
E124	Sistema de Producao para Milho (2a Revisao) Santa Catarina Sistemas de Producao No. 4	1983	EMPASC EMATER-SC ACARESC
E125	Sistema de Producao para Arroz Irrigado (Revisao) Santa Catarina Sistemas de Producao No. 5	1983	EMPASC EMATER-SC ACARESC

ANNEX V. FLOOD DAMAGE STUDY

V. FLOOD DAMAGE STUDY

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1. INTRODUCTION

The occurrence of a large scale of floods has been a common natural disaster in the Itajai river valley, which caused a tremendous amount of flood damages to the region. In particular, floods which occurred in 1983 and 1984 not only caused the great trouble to the population of the Itajai basin, but also gave flood damages to property items of private and public sectors and agricultural products. Furthermore, a long inundation duration due to flood interrupted the basin economy.

The objective of flood damage study is to count up the damage amount of various kinds of property items caused by different magnitude of floods happened in the past. Although some records of actual flood damage of the year 1983 and 1984 exist, there is no complete flood damage records covering all damages due to flooding by municipality in the Itajai river basin. Besides, records of flood damage is only confined to the cases of both 1983 and 1984 floods. As a result, probable flood damages have to be estimated by analytical methods.

The flood damage study is analyzed with the following procedures;

- Firstly, an analysis is made in terms of actual flood damage records caused by 1983 and 1984 floods in order to enumerate damage amount corresponding to the magnitude of both floods.

- Secondarily, probable inundation area covering flooding area caused by whatever scale of flood has to be estimated on the basis of inundation area due to 1983 and 1984 floods and topographic conditions. The selection of those two floods is considered to be reasonable since both floods are categorized as a large scale of flood. Probable inundation area means the Study area in this report.

- Thirdly, the various kinds of properties' value in probable inundation area are surveyed and analyzed as property items vulnerable to flooding.

- Fourthly, hydrological analysis is made in the light of area-depth-duration by different magnitude of flooding and different type of floods.

- Finally, probable flood damage by different scale of flooding is estimated based on study items mentioned above.

In this flood damage study, the components of flood damages are classified into five items, namely, crop, livestock, building, indoor movables inside building, infrastructure. The five items categorized as direct damages are the damage amount of various kinds of properties identified in Study area. The last item broadly indicates the loss of economic activities in the Study area due to flooding.

The procedure of flood damage study is shown in Fig V.1.1.

2. EXISTING RECORDS OF PAST LARGE SCALE OF FLOODS

Among the past big floods, the floods broke out in 1983 and 1984 are considered to be large scale of ones occurred in recent years. With respect to two big floods mentioned above, the following descriptions are made in terms of area-depth-duration and flood damage records.

2.1 Area-Depth-Duration

The characteristics of two flooding are explained in such a way that inundation area along the Itajai river was bigger in 1983 than in 1984, whereas inundation area along the Itajai Mirim river was bigger in 1984 than in 1983. Therefore, as shown in Fig V.2.1, inundation area along the Itajai river indicates one caused by 1983 flooding, while inundation area along the Itajai Mirim river shows one caused by 1984 flooding. Inundation area caused by two floods spreaded over twenty municipalities, of which inundation area in Itajai and Brusque indicates one due to 1984 flood. Total area under inundation caused by two floods was approximately 270 km2 which is about 2% of catchment area (15,220 km2) of the Itajai river basin.

Table V.1.1 shows a list of municipality name and the proportion of inundation area to each municipality one. Most of urban residential area suffered from inundation.

A extensive survey concerning to water depth in inundation area was conducted by a local engineering firm (HIDROTERRA S.A.). Although water depth depends on the topographic condition of place at which water depth was measured, the noteworthy record is that there were many measuring points at which water depth was more than 2 m.

A reconnaissance was conducted by the study team in order to interview local people about duration of inundation. The duration was averagely 1 week along the Itajai river and Itajai Mirim river in 1983 and 1984 floods respectively. The maximum duration reached to 2 weeks at some places in the downstream of Itajai river.

2.2 Actual Flood Damage Records

The observation of flood damages record in 1983 flooding makes it to understand the fact that damage amount caused by 1983 floods in Santa Catarina were not negligible. The amount of direct flood damage caused by 1983 flood reached to about 340 billion Cr$ whose value was about 7.6% of GRDP of Santa Catarina State. The noticeable point is that damage amount incurred by private sector was far beyond those incurred by public sector in both 1983 flood. Agriculture was the most damaged sector whose direct damage record was almost half of all damages in 1983 flooding.

The more detailed result of flood damages by municipality in the Study area is shown in Table V.2.1 (2/2). The problem is that flood damages are not compatible among municipalities owing to insufficient data. Items described in this table are inundation population, the number of houses affected by inundation, and each damage categories.

Total number of inundation population caused by 1983 flood was about 141,700 in the Study area, which was around 64% of inundation population (219,856) in Santa Catarina State. Although accurate analysis of flood damages in the Study area can not be made, damage amount to buildings inclusive of indoor properties is in proportion to the size of economic

activities by municipality. The biggest portion of flood damages to buildings was recorded in Blumenau. Flood damages of agriculture sector in the Study area was not so outstanding as those counted in the entire Santa Catarina state.

3. ESTIMATION OF PROBABLE INUNDATION AREA

The characteristics of inundation area due to 1983 and 1984 floods shown in Fig V.2.1 were already explained in section 2. Although the extent of inundation area depends on hydrological condition, probable inundation area covering flooding area of any magnitude of flood is estimated by considering topographic condition in the Study area and area probably affected due to overflow of the Itajai river and its tributaries. In this respect, inundation area due to 1983 and 1984 floods becomes the important reference to estimation of probable inundation area. Fig V.3.1 shows the probable inundation area delineated on the topographic map with a scale of 1 to 50,000.

The probable inundation area covers the Itajai river and its tributaries, namely, Itajai Mirim, Benedito, Itajai do Norte, Itajai do Oeste and Itajai do Sul rivers. The probable inundation area crosses over seventeen municipal territories, of which major cities are Blumenau and Itajai.

The probable inundation area is divided by river stretches for the study of flood analysis and selection of the flood protection priority area. The Itajai river is divided into 13 stretches, Itajai Mirim 5 stretches, Itajai do Sul 3 stretches, Benedito 1 stretch, Itajai do Oeste 2 stretches, and Itajai do Norte 1 stretch.

4. PROCEDURE OF ESTIMATING DAMAGEABLE AMOUNTS

4.1 General

The appraisal for damageable amounts requires a proper projection of physical and socio-economic condition on which various types of property value is estimated. For damage appraisal for project evaluation, the present condition is merely a convenient benchmark to understand damageable amounts in inundation area. Since the economy in Itajai valley is expected to grow in real term and the basin population is also expected to increase in the future, especially in urban area of municipality, forecast for future socio-economic condition is the vital study for the increase of the damageable values in the probable inundation area. The increase of damageable property value is assessed by the augment rate of unit property value and of the number of damageable property items. The value of damageable property is expressed at 1986 constant price.

Damageable property value is estimated with the following procedure.

- Identification of urban and rural area in administrative territory corresponding to each probable inundation area divided by river stretch.
- Identification of various types of properties in probable inundation area
- Method of mesh survey
- Preliminary study on socio-economic condition in river basin related to probable inundation area
- Estimate of present and future unit property value and increase rate of property items.
- Distribution of properties

4.2 Identification of Urban and Rural Area In Municipal Territory of Probable Inundation Area

Since the definition of urban and rural area is not clear in each municipal territory, urban area is decided to be equivalent to urban residential area in central part of each municipal territory. Seventeen municipalities are related to the probable inundation area which is divided by river stretches, some of which cross over a few municipalities.

4.3 Identification of Various Types of Properties in Probable Inundation Area

Kinds of properties in probable inundation area are summarized as follows;

- various kind of crops on farm land
- livestock on pasture land
- various types of buildings for household, retail and wholesaler, private and public services, manufacturing and mining industry.

- indoor movables of buildings specified above.

- infrastructure such as roads, bridges and public utilities related to water and electricity supply

4.4 Method of Mesh Survey

The probable inundation area is divided by meshes having intervals with 500 m which is equivalent to 25 ha. The elevation of the ground surface is read out by using topographic map with a scale of 1:50,000 or 1:10,000 in case of city area with low elevation. Having identified kinds of properties, land use condition is categorized as paddy, sugarcane, and other crops as farm land, pasture land for estimating livestock value, and residential area.

The total number of meshes based on river stretch and land use is 1,146. Distribution of meshes by land use and river stretch number is shown in Table V.4.1.

4.5 Preliminary Study on Socio-economic Condition in River Basin Related to Probable Inundation Area

The assessment of damageable property value by river stretch is based on the fundamental analysis of socio-economic activity in the Itajai river basin. The socio-economic characteristics of basin can be explained in such a way that a large proportion of population concentrates on urban area whereas rural area is sparsely populated, and most of economic activities categorized as service, commercial and industrial sector tends to exist in urban area. As a result, the concentration of damageable property value on urban area is identified in terms of building together with its indoor movables.

The principal crops in probable inundation area are represented by paddy, sugarcane, and maize. Paddy fields are principally identified in Ascurra, Rio do Sul, and Itajai along the river of Itajai Mirim. Sugarcane in flood plain is mostly planted in the downstream of Itajai river such as Ilhota, Navegantes and Itajai.

4.5.1 Basic socio-economic indicators

Tables V.4.2 and V.4.3 shows population growth rate between 1970 and 1980 and density of population and houses in municipalities related to probable inundation area. Population movement into urban area is outstanding while the growth rate of population has been negative in rural area. Density of population and houses is by far larger in urban area than in rural area.

A comprehension of general characteristics about population helps to forecast future population in the same area. Table V.4.4 indicates population projection in selected years. Assumptions required for population projection are specified in the Sector Report IV of Socio - Economy.

Based on the Table V.4.4, the number of houses in the coming decades is projected on the assumption that family size shown in Table V.4.3 will continue to be the same as that of the year 1980. The projected number of houses is shown in Table V.4.5.

Statistical references concerning to commercial, service and industrial sector published by IBGE shows historical records relating to the number of establishments. The division of establishments between urban and rural areas in 1980 is tentatively estimated by considering the proportion of population and houses in urban and rural area respectively. The projection in the number of establishments is based on the following assumptions.

- Since activities of both commercial and service sector are closely related to population or the number of residence, the rate of increase in the number of buildings is assumed to be the same as that in the number of houses.

- The augment rate of industrial establishments is assumed to change in proportion to the growth rate of GRDP shared by manufacturing and mining sector shown in Table V.4.10.

The result of projected number of houses per ha and other buildings per 25 ha by municipality is shown in Table from V.4.6 to V.4.9.

Santa Catarina achieved an annual economic growth rate of GRDP (11%) in real term between 1970 and 1980. Forecast for economic growth rate in real term is estimated in a conservative way, 6% between 1986 and 2000, 4% between 2000 and 2020. Although the growth rate of GRDP is expected to be different among industrial sectors, GRDP share by sectors is assumed to be the same as those in 1980.

As shown in Table V.4.10, per capita output is estimated at 49,600 Cz$ in 1986 and projected to reach at 82,580 Cz$ in 2000.

4.5.2 Agro-economic indicators

For the assessment of damageable crop value, the basic parameters relating principal crops in probable inundation area have to be analyzed. As far as economic price of crops is concerned, import condition is applied to paddy and maize, whereas economic price of sugarcane is calculated as export crops. The detailed information is shown in Tables V.4.11 and V.4.13.

Tables V.4.14 to V.4.16 shows production cost of principal crops. Total cost shown in above tables is the average production cost of Santa Catarina.

Historical records of unit yield related to three crops are shown in Tables V.4.17 to V.4.19 by municipalities relating to the probable inundation area. The average unit yield of paddy and maize was 4.1 ton/ha and 2.6 ton/ha respectively in 1984. The big difference of unit yield of sugarcane can be observed in 1980. In general, Itajai, Navegantes and Ilhota in the downstream of the Itajai river is favorable endowed with high yield rate which was over 50 ton/ha in 1980. Data on the number of livestock and those values by municipalities are derived from the statistical reference of the year 1984. Value of livestock in 1986 is adjusted by referring to historical movement of current GRDP value of Santa Catarina, which is shown in table V.4.20.

4.6 Estimate of Present and Future Unit Property Value and Increase Rate of Property Items.

By referring to preliminary study of the section 4.5, present and future unit property value and increase rate of property items are analyzed.

4.6.1 Unit value of building

Present unit value per each type of building is estimated based on building cost per m^2, standard size of building, and its salvage value. The detailed data on unit cost of building are shown in Table V.4.21.

Future unit value of building is assumed to increase in proportion to the growth rate of GRDP on condition that standard size of building and salvage value will per capita continue to be the same as those of the year 1986.

4.6.2 Value of indoor movables per building

Value of indoor movables per each type of building is estimated based on various kinds of social, financial and economic indicators, such as population, investment, GRDP and so on.

(1) Household effect

Unit value of household effect is counted on the basis of the average quantity of indoor movables per house and their price by considering salvage value of them. Future value of household effect is assumed to increase in proportion to the growth rate of per capita output shown in Table V.4.10.

(2) Building in commercial sector

The contents of indoor movables are classified into indoor properties and stock value of goods to be sold. From statistical data on commercial sector in 1980, the ratio of value of indoor property to value added of commercial sector is calculated at 16%. Subsequently, future value of indoor property can be estimated provided that the ratio will continue to be the same as that in 1980.

If kinds of shops are classified into store for food, machine and clothes, the percentage of each sales value to total sales was 15%, 30%, and 55% respectively. Then, stock value of them can be estimated with the following assumptions.

- Shops for food

  If stock period is assumed to be 2 weeks, stock value is estimated with the following equation.

  Stock value = Total sales x 0.15 x 1/24

- Shops for machine

  If stock period is assumed to be 2 months, stock value is estimated with the following equation.

  Stock value = Total sales x 0.3 x 1/4

- Shops for clothes

If stock period is assumed to be 1 month, stock value is estimated with the following equation.

Stock value = Total sales x 0.55 x 1/12

Future value of sales can be estimated provided that the ratio of total sales to value added will continue to be the same as that in 1980. Conditions required for estimating stock value are also assumed to be the same as those mentioned above. The detailed data on indoor movables are shown in Table V.4.22.

(3) Building in service sector

The components of indoor movables are classified into indoor properties and input cost. From statistical data on service in 1975 and 1980, the average ratio of indoor property value to value added of service sector is calculated at 6.2%. Future value of indoor property can be estimated if this ratio will continue to be the same as that in 1975 and 1980.

If input costs are classified into consumption plus merchant goods for service operation, and machine for service activity, the percentage of respective input cost was 97% and 3% in 1980. Therefore, stock value of them can be estimated with the following equations.

- Consumption plus merchant goods for operation

If stock period is assumed to be 1 month,

stock value
= Value added (VA) x Input costs/Value added (VA) x 0.97 x 1/12

- Machine for service activity

If stock period is assumed to be 1 year,

stock value = VA x Input cost / VA x 0.03 x 1

Future value of input costs can be also estimated if the ratio of input cost to value added will continue to be the same as that in 1980. The detailed data on indoor movables are shown in Table V.4.23.

(4) Industrial establishment

The contents of indoor movables are classified into indoor property raw material, and production to be sold. From statistical data on industrial sector in 1975 and 1980, the average ratio of indoor property to value added in industrial sector was 52%. Future value of indoor property can be estimated if the ratio will continue to be same as that in 1980.

The ratio of intermediate goods to value added was 1.8 in 1980. Furthermore, the ratio of raw material to intermediate goods was 82% in 1980. Stock value of raw material can be estimated with the following equation.

- Raw material

If stock period is assumed to be 1 month,

stock value = VA x 1.8 x 0.82 x 1/12

The ratio of production value to value added was 2.8 in 1980. Stock value of production can be estimated with the following equation.

- Production

If stock period is assumed to be 2 weeks,

stock value = VA x 2.8 x 1/24

The detailed information on indoor movables are shown in Table V.4.24.

Present and future unit value of indoor movables per each type of building are shown in Table V.4.25.

4.6.3 Present building density and increase rate of buildings

Based on Table V.4.1 and V.4.6 to V.4.9, the number of buildings by river stretches is estimated in 1986, 2000 and 2020, which is shown in V.4.26 to V.4.29. The number of establishments are classified into those in urban and rural area. Future increase rate of buildings is estimated by assuming that the maximum building density is about 60% of 1 mesh.

4.6.4 Unit value of crops

The damageable value of crops per ha is estimated as expected net income plus accumulated production cost spent at the time when a flood occurs. Since the time of flood attacking is unknown, the damageable value calculated as the expected value is the sum of probable value of net income plus production cost through the year. Probability required for the calculation of expected value is based on seasonal frequency of floods.

Unit value of crops is estimated with the following parameters.

- crop yield
- cropping pattern
- planted area
- seasonal frequency of floods
- Economic price of crops
- Production cost

As far as unit yield is concerned, the average unit yield of municipalities related to probable inundation area is applied to paddy and maize. Since sugarcane is planted mostly in the downstream of the Itajai river, unit yield is the average one of related municipalities. The future unit yield is estimated by potentiality of farming technology shown in publication issued by CEPA. The procedure taken in the calculation of damageable value are shown in Figs V.4.1 to V.4.3. Accumulated cost is estimated by referring to input requirement at each stage of farming practice.

The damageable value of each crop per ha at present and in the future is estimated at the same one in all river stretches. After 2000, unit value of crops per ha is assumed to continue to be the same as those in 2000.

4.6.5 Unit value of livestock

If some river stretches cross over two municipalities, unit value of livestock per ha is estimated by using the weight average. Future unit value of livestock per ha is assumed to increase in proportion to the growth rate of per capita GRDP which is shown in table V.4.30.

5. PROBABLE FLOOD DAMAGE

5.1 Area-Depth-Duration Analysis

Area-depth-duration analysis is made using the estimated probable floods explained in the Hydrological study, topographic information from 1 to 50,000 or 1 to 10,000 maps, and river cross sections by non-uniform flow analysis.

Cross sections of probable inundation area are prepared through topographic survey at the interval 1 km along the Itajai river and its tributaries.

Discharge rating curve at each cross section is calculated by the non-uniform flow analysis. From rating curve, the inundation depth due to probable floods of 2-, 5-, 10-, 25-, 50-, and 100-year return period is estimated. Inundation area due to probable flood is shown in Fig.V.5.1.

5.2 Damage Rate

The damage rate of direct damage are assumed as follows ;

- With respect to crops, buildings, and indoor movables, standard rate developed by Ministry of Construction, Japan shown in Table V.4.31 is taken as the approximate damage rate conceivable in Brazil.

- Damage rate of livestock is assumed to be 100% if water depth is more than 2 m since lots of cattle were drowned in 1983 flooding with water depth more than 2 m.

- A reference shown in Table V.2.1(1/2) concerning flood damages due to 1983 flood in Santa Catarina mentions the detailed category of flood damages, which are crops plus livestock, industry, commercial sector respectively, and infrastructure. The damage rate of infrastructure to other damages was about 29% in 1983.

Indirect flood losses are the net economic losses of goods and services to the nation due to interruption of industry, commerce, service, traffic, communication, and other activities. Indirect losses incurred in manufacturing and commercial sector are estimated based on multiplication of sales loss during operation stop by the number of affected companies. Operation loss of public utilities and emergency relief cost are derived from the Report issued by Special Secretariat for the Rebuilding of the State. As a result, the damage rate of indirect loss to direct damages is calculated at 10% in 1983.

5.3 Probable Flood Damage

Probable flood damage by different scale of flood and river stretches is estimated based on four patterns of flood simulated in Hydrological study.As shown in Table V.4.32, flood damage amount in all river stretches of Study area is characterized by either 1983 or 1984 pattern of flood. The general feature of damageability by river stretches is summarized in such a way that annual mean flood damage in the downstream of the Itajai river and area along the Itajai Mirim river is simulated to be the largest one in case of 1984 flood,whereas other stretches are characterized by 1983 type of flood.

For the purpose of comparing probable flood damage with actual damage due to 1983 flood, Table V.4.33 showing potential damage caused by 50 year scale of 1983 type of flood is illustrated because a flood occurred in 1983 corresponds to 50 year scale. The general characteristics of potential damage shown in Table V.4.33 are summarized in the following way.

- The total amount of direct flood damage in all river stretches is estimated to be 3,476 million Cz$ which is about 2% of estimated GRDP of Santa Catarina in 1986. Considering that the ratio of direct damage in entire Santa Catarina to GRDP is about 7.6% in 1983, the ratio 2% mentioned above is judged to be a reasonable figure.

- Unlike actual direct flood damage amount of agricultural sector in entire Santa Catarina shown in Table V.2.1(1/2), crop and livestock damage in Study area is negligible. Paddy is the principal crop susceptible to flood damage.

- The major component vulnerable to flood is building and indoor movables whose damage is mostly identified in urban area of Blumenau, Itajai, and Rio do Sul.

- Based on simulated inundation urban area, population having to abandon houses and damage to industrial buildings are estimated in Blumenau and Itajai. As shown in Table V.4.34, inundation population in Blumenau and Itajai in 1983 type of flood is projected to be 57,600 and 45,400 in 1986. These figures are the reasonable estimate, compared to corresponding figures shown in Table V.2.1(2/2).

- Flood damage to industrial buildings are estimated at 156 and 317 million Cz$ in Itajai and Blumenau respectively. By considering that price level of 1986 year is about 37 times as large as that of 1983 year, the above figures are equivalent to 4 and 9 million Cz$ in Itajai and Blumenau at 1983 price level. By comparing Table V.4.35 to V.2.1(2/2), probable and actual damage to factories are almost the same at 1983 price level.

Annual mean flood damage at future level is estimated by counting on the augment rate of property items and value. In Blumenau, present building density in urban area is assumed to reach at full capacity. As a result, increase rate of flood damage at future level is in parallel to that of property value. In 2000, it is estimated that total amount of annual mean flood damage in Blumenau would be less than that in Itajai city. Table V.4.32 shows annual mean flood damage in 1986 and 2000 by river stretches.

Tables

Table V.1.1 INUNDATION AREA DUE TO 1983 AND 1984 FLOODS

Municipality	Administrative Area (km2) (1)	Inundation Area (km2) (2)	(1)/(2) (%)
Brusque	400.5	15.9	4.0
Picarras	153.8	8.0	5.2
Navegantes	97.0	19.7	20.3
Itajai	304.0	72.3	23.8
Ilhota	262.5	28.1	10.7
Caspar	336.0	26.2	7.8
Blumenau	488.0	12.9	2.6
Indaial	950.4	11.8	1.2
Timbo	161.0	1.7	1.1
Rodeio	135.3	2.4	1.8
Ascurra	118.9	17.8	15.0
Lontras	229.7	20.3	8.8
Ibirama	1,061.0	3.0	0.3
Rio do Sul	177.0	17.0	9.6
Pres. Getulio	322.4	0.9	0.3
Ituporanga	494.5	1.2	0.2
Trombudo. Cent:	213.7	2.2	1.0
Agronomica	129.6	6.4	4.9
Laurentino	81.5	1.3	1.6
Aurora	197.3	1.8	0.9
Total	6,314.1	273.6	4.3
Catchment area of the Itajai basin	15,220.0		1.7 *1

Note: *1 The percentage of total inundation area to catchment area is about 1.7

Table V.2.1 (1/2) ACTUAL FLOOD DAMAGE RECORDS BY 1983 AND 1984 FLOODS IN SANTA CATARINA

Unit : Billion Cr$

Item	Amount	
	1983	1984
Private Sector		
1. Agriculture	162.00	50.55
2. Manufacturing & Mining	378.40	128.50
3. Commerce & Service	66.40	36.65
4. Residence	28.80	9.60
Sub - total	635.60	225.30
Public Sector		
1. Fedural Government	9.80	2.00
2. State Government	35.00	47.06
3. Municipal Government	35.20	48.69
Sub - total	80.00	97.75
Total	715.60	323.05
GRDP of Santa Catarina *1	4,456.45	14,855.37

Source: 1984 Report - Special Secretariat for the Rebuilding of the State

Note: Damage records shown in the above table consist of direct damages and indirect loss due to inundation caused by 1983 and 1984 floods.

*1: Estimation by GAPLAN

Table V.2.1 (2/2) ACTUAL FLOOD DAMAGE RECORDS OF 1983 FLOOD BY MUNICIPALITY

Unit: 10^3 Cr$

Municipality	Inundation Population	Inundation Houses *1	Agriculture	Damages to Buildings: House	Industry	Commerce & Service	Public Building	Municipal Facility *3	Road	Bridge	Canal	Equipment (Public Sector)
Itajai	40,000	8,990			2,177,460	1,038,052						
Navegantes	3,070	670			928,381							
Ilhota	4,910	1,000			1,666,419		7,500	3,700	249,560	2,885		49,000
Gaspar	3,981	845			2,491,792	308,283	4,595		1,295,870	138,700		
Blumenau	50,000	11,400			10,649,175	7,551,318				2,009,813		
Indaial	1,200	260			4,480,713					353,318		
Rodeio	400	85							47,421	67,293	1,229	
Ascurra	190	35							3,000	3,500		
Lontras	4,000	860										
Rio do Sul	25,000	5,670	469,000		3,682,653	4,210,783						
Aurora	614	120										
Agronomica	746	150	395,188						316,457	15,240	1,680	
Tromb. Central	2,980	650										
Ituporanga	1,820	360				184,932						
Timbo	1,610	350			105,873	106,219						
Ibirama	980	200			284,501							
Brusque	210	47				9,100	(170,100)	(446,900)	(1,529,549) *2			
Total	141,711	31,692										

Source: Data from Municipal Governments, Report on Damages of Climatic Phenomena to Santa Catarina (GAPLAN)

Note:
*1 The estimated number of houses affected by inundation. All of them were not always houses which suffered from damages.
*2 Parentheses shows flood damages caused by 1984 flood.
*3 Park, sport, and other service facility for the public.
*4 Inundation population means people having to abandon houses

Table V.4.1 THE NUMBER OF MESHES BY RIVER STRETCH AND LAND USE

River Stretch	Municipality	A	B	C	D		E	F	Total
					Urban	Rural			
IT1	Itajai				16.6			10.0	26.6
IT1	Navegantes				8.9				8.9
IT2	Itajai		44.8	2.1	8.1	0.8		9.0	64.8
IT2	Navegantes				2.5	3.1			5.6
IT3	Ilhota		89.5		1.0	1.9	16.5	4.0	112.9
IT4	Ilhota		7.1		1.0	1.0	9.0		18.1
IT5	Gaspar	5.3	7.3		0.2	0.5	34.0	1.0	48.3
IT6	Gaspar	16.3		3.3	13.9	3.6	28.2	4.0	69.3
IT7	Blumenau			4.5	34.8	2.1	0.3	19.0	58.6
IT8	Blumenau			0.7		3.0		9.2	12.9
IT8	Indaial					2.8			2.8
IT9	Indaial			11.3	5.9	3.1	0.3	21.3	41.9
IT10	Indaial			8.7		1.5	3.3	8.3	21.8
IT10	Rodeio					1.5	15.4		16.9
IT11	Ascurra	16.7		1.2	4.9	1.8	13.0	5.5	43.1
IT12	Indaial	1.6		8.9	1.3	1.0	11.0	68.2	92.0
IT12	Lontras			2.2	0.8	3.3	27.6	4.3	38.2
IT13	Lontras	7.0		17.3	2.7	1.8	16.7	4.2	49.7
IT13	Rio do Sul				12.9	1.9	24.1		30.1
IS1	Rio do Sul			3.6	1.6	2.7	4.5	1.6	14.0
IS1	Aurora				0.7		2.7		3.4
IS2	Aurora			2.6	0.5	0.3	1.9	3.5	8.8
IS2	Ituporanga						1.9		1.9
IS3	Ituporanga				4.5			1.2	5.7
IN1	Ibirama			1.3	5.2		1.3	2.0	9.8
IO1	Rio do Sul			2.8	1.3	0.4	2.0		6.5
IO1	Agronomica				1.9	0.7	3.5		6.1
IO2	Agronomica	10.1		12.3	1.8	0.7	1.6	0.9	27.4
IO2	T. Central				2.5	0.8	5.7		9.0
BN1	Indaial					0.8	3.0	4.8	8.6
BN1	Timbo	1.0		7.6	7.1		3.0		18.7
IM1	Itajai	0.6			19.4	2.3	9.3	45.9	77.5
IM2	Itajai	5.5		0.7	8.5	0.5	21.7	15.0	51.9
IM3	Itajai	15.1		1.3			6.5	29.0	51.9
IM4	Itajai	11.8		3.5		2.5	8.6	16.4	42.8
IM4	Brusque						12.5		12.5
IM5	Brusque			5.8	10.2	5.7	1.1	4.0	26.8
	Total								1145.8

Remarks: A - Paddy field B - Sugarcane C - Other crops
D - Residential area E - Pasture land F - Non-use

Table V.4.2 POPULATION IN MUNICIPALITIES RELATED TO INUNDATION AREA

Municipality	Population				Annual Growth Rate of Population (%)	
	1970		1980			
	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	54,073	9,066	78,779	7,681	3.8	-1.60
Navegantes	5,536	4,514	8,381	5,149	4.2	1.30
Picarras			3,173	2,421		
Ilhota	1,220	7,315	1,406	6,645	1.4	-0.90
Gaspar	4,453	13,964	13,725	11,881	11.9	-1.60
Blumenau	86,509	13,766	146,001	11,257	5.4	-2.00
Indaial	7,133	15,216	18,263	10,311	9.9	-3.80
Ascurra	1,409	2,561	3,736	1,678	10.2	-4.10
Rodeio	2,149	5,806	4,643	3,334	8.0	-5.40
Lontras	1,678	5,328	3,789	3,535	8.5	-4.00
Rio do Sul	21,528	6,010	33,362	2,878	4.5	-7.00
Agronomica	499	4,276	511	4,039	0.2	-0.50
Trombudo Central	1,705	5,626	2,292	4,801	3.0	-1.50
Laurentino	1,013	2,968	1,595	2,419	4.6	-2.00
Aurora	298	5,315	408	4,870	3.2	-0.80
Ituporanga	3,312	11,822	5,305	11,834	4.8	-0.01
Ibirama	4,180	16,828	8,230	15,292	7.0	-1.00
Pres. Getulio	2,452	6,947	4,780	5,329	6.9	-2.60
Timbo	6,731	5,098	14,459	3,465	7.9	-3.80
Brusque	32,380	2,820	37,923	3,301	1.6	1.60

Source: CENSO DEMOGRAFICO SANTA CATARINA (IBGE)

Table V. 4. 3 SOCIO DATA ON MUNICIPALITIES RELATED TO INUNDATION AREA

Municipality	Area (km2)		Population Density in 1980 (person/km2)		No. of Houses in 1980		Density of Houses in 1980 (house/km2)		Family Size in 1980 (person/ house)	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	17.0	290	6,060	26	17,841	1,585	1,372	5	4.4	4.8
Navegantes	3.0	91	2,794	57	1,895	1,059	632	12	4.4	4.9
Picarras	3.8	150	835	16	730	458	192	3	4.3	5.3
Ilhota	0.5	261	2,812	25	312	1,324	624	5	4.5	5.0
Gaspar	3.5	329	3,921	36	3,005	2,436	858	7	4.6	4.9
Blumenau	19.0	463	7,892	24	33,521	2,335	1,812	5	4.4	4.8
Indaial	5.4	945	3,382	11	4,130	2,076	765	2	4.4	5.0
Ascurra	1.9	117	1,966	14	686	320	361	3	5.4	5.2
Rodeio	1.3	134	3,571	25	1,020	685	784	5	4.6	4.9
Lontras	1.7	228	2,229	16	873	709	513	3	4.3	5.0
Rio do Sul	7.0	170	6,672	17	7,640	583	1,528	3	4.4	4.9
Agronomica	0.6	129	852	31	117	797	195	6	4.3	5.0
Trombudo Centra	0.7	213	3,274	23	542	1,008	774	5	4.2	4.7
Laurentino	0.5	81	3,190	30	331	468	662	6	4.8	5.1
Aurora	0.3	197	1,360	25	91	956	303	5	4.5	5.1
Ituporanga	1.5	493	3,537	24	1,168	2,195	779	4	4.5	5.4
Ibirama	2.0	1,059	4,115	14	1,900	2,916	950	3	4.3	5.2
Pres. Getulio	1.4	321	3,414	17	1,062	1,006	759	3	4.5	5.3
Timbo	4.0	157	3,615	22	3,182	726	796	5	4.5	4.8
Brusque	6.5	394	5,834	8	8,472	681	1,303	2	4.5	4.8

Table V. 4. 4 POPULATION PROJECTION BY MUNICIPALITIES RELATED TO PROBABLE INUNDATION AREA

	1986		2000		2020	
Municipality	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	93,850	7,280	135,600	7,200	187,220	6,830
Navegantes	10,280	5,490	14,300	4,350	20,030	4,590
Ilhota	1,500	6,260	1,530	5,090	1,500	3,840
Gaspar	18,740	11,330	30,420	10,760	45,300	10,070
Blumenau	182,140	10,740	288,690	9,210	413,570	8,850
Indaial	23,350	9,140	34,410	7,860	47,880	6,860
Ascurra	4,830	1,490	7,460	1,340	10,690	1,200
Rodeio	5,330	2,650	6,910	2,010	8,260	1,510
Lontras	4,540	2,990	5,680	2,200	6,730	1,640
Rio do Sul	39,350	2,400	56,570	1,650	76,870	1,350
Agronomica	500	3,870	470	3,200	410	2,460
T. Central	2,570	4,400	2,740	3,320	2,770	2,360
Aurora	460	4,600	520	3,740	540	2,780
Ituporanga	6,530	11,880	9,240	11,780	12,980	11,580
Ibirama	10,460	14,670	15,230	13,630	21,210	12,490
P. Getulio	5,800	4,750	7,510	3,780	9,340	3,040
Timbo	18,560	3,160	29,000	2,940	41,980	2,690
Brusque	41,340	3,610	52,400	4,560	65,580	5,700

Table V.4.5 PROJECTED NUMBER OF HOUSES BY MUNICIPALITIES RELATED TO PROBABLE INUNDATION AREA

Munincipality	1986		2000		2020	
	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	21,330	1,517	30,820	1,500	42,550	1,420
Navegantes	2,336	1,120	3,250	890	4,550	940
Ilhota	332	1,329	340	1,020	330	770
Gaspar	4,075	2,312	6,610	2,200	9,850	2,050
Blumenau	41,396	2,238	65,600	1,710	95,130	1,840
Indaial	5,307	1,829	7,820	1,570	10,880	1,370
Ascurra	895	286	1,380	260	1,980	230
Rodeio	1,158	541	1,500	410	1,800	310
Lontras	1,056	598	1,320	440	1,570	330
Rio do Sul	8,944	490	12,860	340	17,470	280
Agronomica	117	774	110	640	90	490
T. Central	611	937	650	710	660	500
Aurora	103	903	120	730	120	540
Ituporanga	1,451	2,200	2,050	2,180	2,880	2,140
Ibirama	2,433	2,822	3,540	2,620	4,930	2,400
P. Getulio	1,289	897	1,670	710	2,070	570
Timbo	4,125	658	6,440	610	9,330	560
Brusque	9,186	753	11,640	950	14,570	1,190

Note: The number of houses is projected by refering to population

Table V.4.6 PROJECTED NUMBER OF HOUSES PER HA BY MUNICIPALITIES

Municipality	1986		2000		2020	
	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	12.5	0.05	18.1	0.05	21.3	0.05
Navegantes	7.8	0.12	10.8	0.10	15.2	0.10
Ilhota	6.6	0.05	6.8	0.04	6.6	0.03
Gaspar	11.6	0.07	18.9	0.07	20.2	0.06
Blumenau	21.8	0.05	21.8	0.04	21.8	0.04
Indial	9.8	0.02	14.5	0.02	20.1	0.01
Ascurra	4.7	0.02	7.3	0.02	10.4	0.02
Rodeio	8.9	0.04	11.5	0.03	13.8	0.02
Lontras	6.2	0.03	7.8	0.02	9.2	0.01
Rio do Sul	12.7	0.03	18.4	0.02	21.1	0.02
Agronomica	2.0	0.06	1.8	0.05	1.5	0.04
T. Central	8.7	0.04	9.3	0.03	9.4	0.02
Aurora	3.4	0.05	4.0	0.04	4.0	0.03
Ituporanga	9.7	0.04	13.7	0.04	19.2	0.04
Ibirama	12.2	0.03	17.7	0.02	21.3	0.02
P. Getulio	9.2	0.03	11.9	0.02	14.8	0.02
Timbo	10.3	0.04	16.1	0.04	19.8	0.04
Brusque	14.1	0.02	17.9	0.02	20.1	0.03

Table V.4.7 PROJECTED NUMBER OF BUILDINGS IN SERVICE SECTOR PER 25HA BY MUNICIPALITIES

Municipality	1986		2000		2020	
	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	12.3	0.05	17.7	0.05	20.7	0.05
Navegantes	4.9	0.08	6.8	0.07	9.5	0.07
Ilhota	2.7	0.02	2.8	0.02	2.7	0.02
Gaspar	11.5	0.07	18.7	0.07	19.7	0.06
Blumenau	21.7	0.05	21.7	0.04	21.7	0.04
Indaial	9.0	0.02	13.3	0.02	18.4	0.01
Ascurra	4.6	0.02	7.1	0.02	10.1	0.02
Rodeio	7.6	0.04	9.8	0.03	11.8	0.02
Lontras	4.8	0.02	6.0	0.01	7.1	0.01
Rio do Sul	17.1	0.04	24.5	0.03	28.5	0.03
Agronomica	0.8	0.02	0.7	0.02	0.6	0.02
T. Central	7.6	0.04	8.1	0.03	8.1	0.02
Aurora	0.9	0.01	1.1	0.01	1.1	0.01
Ituporanga	8.5	0.04	12.0	0.04	16.8	0.04
Ibirama	17.8	0.01	25.8	0.01	30.8	0.01
P. Getulio	5.0	0.02	6.5	0.01	8.1	0.01
Timbo	8.9	0.04	13.9	0.04	16.9	0.04
Brusque	12.3	0.07	15.6	0.07	17.6	0.11

Table V.4.8 PROJECTED NUMBER OF BUILDINGS IN COMMERCIAL SECTOR PER 25 HA BY MUNICIPALITIES

Municipality	1986		2000		2020	
	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	12.4	0.05	17.9	0.05	20.9	0.05
Navegantes	4.1	0.06	5.7	0.05	8.0	0.05
Ilhota	4.8	0.03	4.9	0.02	4.8	0.02
Gaspar	8.8	0.05	14.3	0.05	15.3	0.04
Blumenau	15.6	0.03	15.6	0.02	15.6	0.02
Indaial	7.7	0.02	11.4	0.02	15.8	0.01
Ascurra	2.1	0.01	3.3	0.01	4.7	0.01
Rodeio	6.1	0.03	7.9	0.02	9.5	0.01
Lontras	2.3	0.01	2.9	0.01	3.4	0.01
Rio do Sul	11.5	0.03	16.5	0.02	18.5	0.02
Agronomica	0.8	0.02	0.7	0.02	0.6	0.02
T. Central	4.4	0.02	4.7	0.02	4.8	0.01
Aurora	1.9	0.02	2.2	0.02	2.2	0.02
Ituporanga	7.9	0.04	11.2	0.04	15.7	0.04
Ibirama	8.0	0.02	11.6	0.01	13.6	0.01
P. Getulio	6.5	0.02	8.4	0.01	10.4	0.01
Timbo	8.8	0.04	13.8	0.04	16.8	0.04
Brusque	10.1	0.01	12.8	0.01	14.8	0.02

Table V.4.9 PROJECTED NUMBER OF BUILDINGS IN INDUSTRIAL SECTOR PER 25HA BY MUNICIPALITIES

Municipality	1986		2000		2020	
	Urban	Rural	Urban	Rural	Urban	Rural
Itajai	2.7	0.08	3.6	0.10	3.6	0.13
Navegantes	1.5	0.03	1.8	0.04	2.3	0.04
Ilhota	2.5	0.02	2.0	0.02	2.0	0.01
Gasper	7.1	0.04	9.3	0.05	9.3	0.07
Blumenau	5.3	0.10	5.3	0.13	5.3	0.16
Indaial	4.7	0.01	4.8	0.01	4.9	0.01
Ascurra	3.9	0.03	6.8	0.05	12.1	0.09
Rodeio	4.2	0.03	4.2	0.03	4.6	0.03
Lontras	1.8	0.01	1.5	0.01	1.0	0.01
Rio do Sul	3.5	0.07	3.6	0.07	3.6	0.07
Aurora	0.0	0.00	0.0	0.00	0.0	0.00
Ituporanga	2.7	0.02	2.2	0.02	1.5	0.01
Agronomica	1.3	0.03	1.3	0.03	1.3	0.03
Trombudo	3.2	0.04	3.6	0.04	3.6	0.05
Ibirama	3.9	0.01	2.9	0.01	1.8	0.01
Pres. Getulio	2.7	0.01	1.8	0.01	0.9	0.00
Timbo	8.2	0.01	9.3	0.01	11.1	0.01
Brusque	6.9	0.05	9.7	0.08	10.7	0.11

Table V. 4.10 FORECAST OF BASIC ECONOMIC INDICATORS IN SANTA CATARINA

unit : mil.Cz$

Sector	1986	2000	2020
Primary sector	31,989	71,857	157,448
Secondary sector	77,360	170,032	372,562
Manufacturing	65,408	143,764	315,005
Mining	2,367	5,202	11,398
Others	9,585	21,066	46,159
Tertiary sector	90,103	207,218	454,041
Commercial	21,264	48,902	107,150
Service	68,839	158,316	346,891
GRDP	199,453	449,108	984,050
Population	4,021,170	5,438,440	7,084,650
Per Capita			
Cut put (cz$)	49,600	82,580	138,900

Note : GRDP is estimated at the mid-year value.

Projected GRDP in 1986 is estimated by considering the recent movement of Consumer Prince Index.

Owing to insufficient data on sectoral development planning, the forecast of GRDP shares by sectors is assumed to be the same as those in 1980.

Table V.4.11 ECONOMIC PRICE FOR PADDY (FOR IMPORT)

Item	1986		1995	
	US$/ton	CZ$/ton	US$/ton	CZ$/ton
1. U.S. 5% broken FOB U.S.	210		246	
2. Quality adjustment *1	210		246	
3. External transportation *2	12		12	
4. CIF at Itajai	222	3,064	258	3,560
5. Port handling cost		20		20
6. Storage cost		40		40
7. Internal transportation *3		170		170
8. Selling price of rice at ex-mill gate		3,294		3,790
9. Milling charge		-260		-260
10. Selling price of paddy *4		3,034		3,530
11. Transportation cost to farm gate		-13		-13
12. Farm gate price		2,050		2,387

Note: *1 The quality of rice produced in Brasil is 5% broken.
*2 Ocean freight between U.S. and Itajai
*3 The average transportation cost between the Itajai port and the study area (Itajai-Blumenau)
*4 Convertion rate from rice to paddy (1:0.68)
*5 Exchange rate 1 US$=13.8cz$

Table V.4.12 ECONOMIC PRICE FOR MAIZE (FOR IMPORT)

Item	1986		1995	
	US$/ton	CZ$/ton	US$/ton	CZ$/ton
1. FOB Gulf Port	99		110	
2. External transportation	12		12	
3. CIF at Itajai	111	1,532	122	1,684
4. Port handling cost		20		20
5. Storage cost		40		40
6. Internal transportation cost		170		170
7. Local market price		1,762		1,914
8. Transportation cost to farm gate		-28		-28
9. Farm gate price		1,734		1,886

Note: *1 Ocean freight from U.S. Gulf to Itajai

ECONOMIC PRICE FOR SUGAR, CRYSTAL (FOR EXPORT)

Item	1986		1995	
	US$/ton	CZ$/ton	US$/ton	CZ$/ton
1. FOB at Itajai		2,320		4,520<2
2. Port handling cost		20		20
3. Storage cost		40		40
4. Internal transportation cost		170		170
5. Local market price		2,090		4,290
6. Marketing cost *1		-1,066		-1,066
7. Transportation cost to farm gate		-28		-28
8. Farm gate price		997		3,200

Note: *1 Marketing cost means the processing cost from sugarcane to sugar (crystal)
*2 Future price of sugar is estimated by refering to Commodity Price forecast issued by the World Bank (Jan 31, 1986)

Table V.4.13 ECONOMIC PRICE FOR UREA

Item	1986	
	US$/ton	CZ$/ton
1. FOB N.W.Europe	115	
2.External transportation	30	
3. CIF at Itajai	145	2,001
4. Port handling cost		20
5. Storage cost		40
6. Internal transportation<1		170
7. Market price		2,231
8. Transportation to farm		-13
9. Farm gate price		2,218

Note : The average transportation cost between the Itajai port and the Study area (Itajai-Blumenau)

Source: Commodity Price Forecast (The world Bank)

Table V.4.14 PRODUCTION COST (SUGARCANE) PER HA

Item	Amount	Unit Cost CZ$	Total Cost CZ$
1. Seeds			1,275
2. Fertilizer			1,530
3. Agro-chemical			502

4. Farming practice	Labour Cost (CZ$)	Machine Cost (CZ$)	Total Cost (CZ$)
- Land preparation	490	3,000	3,490
- Fertilization	40	330	370
- Transplanting	390	500	890
- Weeding	270	230	500
- Spraying		160	160
- Harvesting	620		620
- Transportation		28	28
Grand Total			9,365

Source:CEPA

Table V.4.15 PRODUCTION COST (IRRIGATION PADDY) PER HA

Item	Amount	Unit Cost CZ$	Total Cost CZ$
1. Seed	100kg	3.7	370
2. Lime	0.5ton	213.0	107
3. Fertilizer			
- Nutrient	150kg	2.7	405
- UREA	50kg	2.2	110
4. Agro-chemical			
- Insecticide	12kg	9.0	108
- Herbicide	14l	76.5	1,071

5. Farming practice	Labour Cost	Machine Cost	Total Cost
- Land preparation	3	180	183
- Drainage	100		100
- Plowing		420	420
- Leveling		720	720
- Fertilization	3	120	123
- Top dressing	12		12
- Harrowing		120	120
- Herbicide	3	60	63
- Insecticide	12		12
- Water management	100		100
- Harvesting	15	1200	1,215
- Transportation		240	240
- Drying		650	650
Grand total			6,129

Note : *1 Economic labour cost is assumed to be 50% of the market wage.

Source: Instituto CEPA

Table V.4.16 PRODUCTION COST (MAIZE) PER HA

Item	Amount	Unit Cost (CZ$)	Total Cost (CZ$)
1. Seed	15kg	9.7	145
2. Fertilizer	150kg	2.9	435
3. Formic acid	1kg	14.2	14
4. Farming practice	Labour Cost (CZ$)	Machine Cost (CZ$)	Total Cost (CZ$)
- Plowing		360	360
- Leveling		103	103
- Plantation	38		38
- Fertilization	25		25
- Formic acid	12		12
- Weeding	250		250
- Harvesting	100		100
- Transportation		50	50
- Thrashing		250	250
Grand total			1,782

Note : *1 Economic labour cost is assumed to be 50% of the market wage.

Source : Instituto CEPA

Table V.4.17 HISTORICAL RECORDS OF RICE IN MUNICIPALITIES RELATED TO INUNDATION AREA

Municipality	1980			1984		
	Area(ha)	Production(t)	Yield(t/ha)	Area(ha)	Production(t)	Yield(t/ha)
Itajal	800	2,776	3.5	1,008	3,393	3.4
Navegantes	240	240	1.0	209	945	4.5
Ilhota	1,750	6,125	3.5	1,900	8,550	4.5
Gaspar	3,152	12,651	4.0	2,135	9,970	4.7
Blumenau	54	152	2.8	190	667	3.5
Indaial	230	945	4.1	290	915	3.2
Ascurra	650	2,275	3.5	655	3,275	5.0
Rodeio	1,100	3,850	3.5	910	4,368	4.8
Lontras	88	330	3.8	80	332	4.2
Rio do Sul	235	900	3.8	275	1,787	6.5
Agronomica	690	2,805	4.1	800	3,905	4.9
T. Central	220	887	4.0	270	885	3.3
Aurora	500	1,500	3.0	350	875	2.5
Ituporanga	1,202	2,650	2.2	650	1,625	2.5
Ibirama	335	831	2.5	370	883	2.4
P. Getulio	410	995	2.4	270	697	2.6
Timbo	650	2,600	4.0	500	2,224	4.4
Brusque	250	1,000	4.0	280	1,050	3.8
Total	12,556	43,512	3.5	11,142	46,346	4.1

Source : Agriculutural Cencus

Table V.4.18 HISTORICAL RECORDS OF MAIZE IN MUNICIPALITIES RELATED TO INUNDATION AREA

Municipality	1980			1984		
	Area (ha)	Production(t)	Yield(t/ha)	Area(ha)	Production(t)	Yield(t/ha)
Itajai	70	168	2.4	200	420	2.1
Navegantes	15	20	1.3	58	100	1.7
Ilhota	200	360	1.8	75	142	1.9
Gaspar	214	535	2.5	300	630	2.1
Blumenau	1,300	3,380	2.6	870	2,087	2.4
Indial	750	1,730	2.3	1,600	3,680	2.3
Ascurra	131	393	3.0	305	717	2.4
Rodeio	330	768	2.3	300	690	2.3
Lontras	1,830	5,364	2.9	1,230	3,690	3.0
Rio do Sul	1,400	4,800	3.4	1,400	4,060	2.9
Agronomica	1,010	3,030	3.0	800	2,560	3.2
T. Central	2,380	7,140	3.0	1,540	4,620	3.0
Aurora	2,180	6,000	2.8	2,100	5,565	2.7
Ituporanga	6,400	15,384	2.4	4,725	12,758	2.7
Ibirama	3,100	6,840	2.2	3,800	9,120	2.4
P. Getulio	2,525	6,060	2.4	2,100	5,040	2.4
Timbo	900	2,592	2.9	650	1,690	2.6
Brusque	700	1,806	2.6	300	900	3.0
	25,435	66,370	2.6	22,353	58,469	2.6

Source:Agricalutural Census

Table V.4.19 HISTORICAL RECORDS OF SUGARCANE IN MUNICIPALITIES RELATED TO INUNDATION AREA

Municipality	1980			1984		
	Area(ha)	Production(t)	Yield(t/ha)	Area(ha)	Production(t)	Yield(t/ha)
Itajai	719	50,330	70.0	900	58,500	65.0
Navegantes	796	55,719	70.0	850	55,250	65.0
Ilhota	1,200	90,000	75.0	1,300	84,500	65.0
Gaspar	345	15,525	45.0	320	9,600	30.0
Blumenau						
Indaial	60	2,900	48.3			
Ascurra						
Rodeio						
Lontras						
Rio du Sul						
Agronomica						
T. Central						
Laurentino						
Aurora						
Ituporanga						
Ibirama						
P. Getulio						
Timbo	50	2,000	40.0			
Brusque	100	5,000	50.0			

Source : Agricalutural Cences

Table V.4.20 DATA RELATED TO LIVESTOCK

Mil. Cz$

Municipal	Rural Area (km2)	Quantity (Head)	Value Mil. Cz$	Cattle Density per km2	Value per km2
1. Itajai	290	150,813	66.573	520	0.23
2. Navegantes	91	5,501	9.865	60	0.11
3. Picarras	150	13,875	14.314	92	0.10
4. Ilhota	261	19,000	15.938	72	0.06
5. Gaspar	329	104,705	128.026	318	0.39
6. Blumenau	463	252,145	136.255	544	0.30
7. Indaial	945	195,360	139.625	206	0.15
8. Ascurra	117	58,547	26.796	500	0.23
9. Rodeio	134	77,435	45.829	577	0.34
10. Lontras	228	79,525	68.815	348	0.30
11. Rio do Sul	170	99,660	106.576	586	0.63
12. Agronomica	129	46,285	37.945	358	0.29
13. Trombudo Central	213	401,740	78.354	1,886	0.38
14. Aurora	197	103,060	92.723	523	0.47
15. Ituporanga	493	184,690	135.506	374	0.27
16. Ibirama	1,059	199,500	193.446	188	0.18
17. Pres. Getulio	321	133,490	158.791	415	0.49
18. Timbo	154	204,670	75.229	1,303	0.48
19. Brusque	394	95,372	41.378	242	0.11

Source: I. B. G. E.

Note : Quantity of livestock is based on statistical data of 1984. Present value at 1986 price levelis estimated by refering to current value of GRDP.

Table V.4.21 PRESENT UNIT COST PER EACH TYPE OF BUILDINGS

Item	House		Industory	Commercial	Service
	Urban	Rural			
Unit cost per m2		2,039	1,085	1,822	2,427
Standard size of building (m2)	125	65	900	125	130
Unit cost per building (thousand Cz$)	254.9	70.5	1,639.8	303.4	302.4
Salvage value	10% of unit cost per building				
Average unit cost per buildings (thousand Cz$)	140.2	38.8	901.9	166.9	166.3

Source: Unit cost per m2
Dados levantados junto ao CREA-REVISTA CONSTRUTION April,1986
Standard size of building
Annual Statistics of Brazil 1984

Note : Size of industry is the approximate size identified averagely from sample survey in Blumenau, Ascurra, and Itajai.

The size of commercial building is assumed to be the same as that of house.

Table V.4.22 INDOOR MOVABLES OF BUILDING IN COMMERCIAL SECTOR

Unit:thousand Cz$

Item	1975	1980		At 1980 const. price 1975	1980
Indoor property			Total value		
Aggregate	465,564	6,570,265	(1) Indoor	4,048,125	6,831,093
No of samples	18,913	22,742	Property		
Average	25	289			
Index *1	12	100	Value added *3	26,074,714	41,636,026
			(1)/V. A	15%	16%
Investment					
Aggregate	103,966	1,314,259	(3) Total sales *4	167,925,883	223,025,852
No of samples	5,439	6,307	(3)/V. A	6.4	5.4
Average	19	208			
Index	12	100			
Total Sales					
Aggregate	20,151,106	223,025,852			
No of samples	19,431	23,637			
Average	1,037	9,435			
Index	12	100			
Total No of Est *2	19,431	23,637			

Note: *1 Price Index of Commercial sector from GAPLAN.
*2 Total number of establishments.
*3 Value added of Commercial sector.
*4 Percentage of total sales category.
Food 15%
Machine, processed goods, etc 30%
Clothing, paper, etc 55%

Table V.4.23 INDOOR MOVABLES OF BUILDINGS IN SERVICE SECTOR

Unit:thousand C$

Item	1975	1980		At 1980 const. price 1975	1980
Indoor property			Total value		
Aggregate	423,712	9,524,022	(1) Indoor Property	3,081,179	10,084,074
No of Samples	13,507	21,722			
Average	31	438			
Index *1	14	100	Value added *3	68,790,764	127,661,776
			(1)/VA	4.5%	7.9%
Investment					
Aggregate	71,900	1,308,055	(3) Input costs *4	4,273,892	7,965,958
No of Samples	4,092	6,019	(3)/V.A	6.2%	6.2%
Average	17	217			
Index	14	100			
Input costs					
Aggregate	542,034				
No of Samples	12,747	21,716			
Average	43	346			
Index	14	100			
Total No of Est *2	13,915	23,023			

Note: *1 Price index of Service sector from GAPLAN.
*2 Total number of establishments.
*3 Value added of Service sector.
*4 Percentage of input costs category
consumption goods 97%
Merchant goods 97%
Machine for service 3%

Table V.4.24 INDOOR MOVABLES OF BUILDINGS OF MANUFACTURING AND MINING SECTOR

Item	1975	1980
Indoor property		
Aggregate	3,462,411	45,002,705
No of Samples	5,348	11,073
Average	647	4,064
Index *1	12	100
Investment		
Aggregate	1,048,419	10,911,795
No of Samples	2,885	4,432
Average	363	2,462
Index	12	100
Raw material		
Aggregate	12,795,981	201,606,541
No of Samples	9,758	11,371
Average	1,311	17,730
Index	12	100
Total production		
Aggregate	24,163,147	368,531,890
No of Samples	9,758	11,371
Average	2,467	32,410
Index	12	100
Total No of Est *2	9,758	11,371

Unit:thousand Cz$

	At 1980 const. price 1975	1980
Production value *3	209,851,994	376,741,481
Intermediate good	134,668,090	240,957,656
Value added	75,184,351	135,783,825
I.M/V.A	1.8	1.8
P.V/V.A	2.8	2.8
Total value		
(1) Indoor property	52,611,833	46,211,744
(1)/VA	0.7	0.3
(2) Raw material	106,633,175	201,606,541
(2)/I.M	0.8	0.8
(3) Total production *4	201,359,558	368,531,890

Note: *1 Price index of manufacturing sector from GAPLAN.
*2 Total number of establishments.
*3 Production value, intermediate good, value added related to manufacturing sector
*4 Data on production value in slightly different between GAPLAN and IBGE

Table V.4.25 PRESENT AND FUTURE UNIT VALUE OF INDOOR MOVABLES PER EACH TYPE OF BUILDING

Building Item	1986	2000	2020
House hold effect (Cz$)	37,660	62,700	105,500
Commercial (million Cz$)	0.62	1.05	1.76
Service (million Cz$)	0.19	0.32	0.53
Industry (million Cz$)	4.20	7.60	13.70

Note: Present value of household effect is estimated as the average value between market price and its salvage value (10%). Quantity of household effect is counted through interview survey.

Table V.4.26 THE NUMBER AND ANNUAL INCREASE RATE OF HOUSE PER HA BY RIVER STRETCH

River Stretch	Urban 1986		Urban 2000		Urban 2020	Rural 1986		Rural 2000		Rural 2020
IT 1	10.8	(2.6)	15.5	(1.1)	19.2	0.00	(-)	0.00	(-)	0.00
IT 2	11.4	(2.6)	16.3	(1.0)	19.9	0.11	(-1.4)	0.09	(-)	0.09
IT 3	6.6	(0.2)	6.8	(-0.2)	6.6	0.05	(-1.6)	0.04	(-1.4)	0.03
IT 4	6.6	(0.2)	6.8	(-0.2)	6.6	0.05	(-1.6)	0.04	(-1.4)	0.03
IT 5	11.6	(3.5)	18.9	(0.3)	20.2	0.07	(-)	0.07	(-0.7)	0.06
IT 6	11.6	(3.5)	18.9	(0.3)	20.2	0.07	(-)	0.07	(-0.7)	0.06
IT 7	21.8	(0.0)	21.8	(0.0)	21.8	0.05	(-1.6)	0.04	(-)	0.04
IT 8	9.8	(2.8)	14.5	(1.6)	20.1	0.04	(-2.0)	0.03	(-)	0.03
IT 9	9.8	(2.8)	14.5	(1.6)	20.1	0.02	(-)	0.02	(-3.4)	0.01
IT 10	0.0	(-)	0.0	(-)	0.0	0.03	(-)	0.03	(-2.0)	0.02
IT 11	4.7	(3.2)	7.3	(1.8)	10.4	0.02	(-)	0.02	(-)	0.02
IT 12	8.4	(2.5)	11.9	(1.5)	15.9	0.03	(-2.9)	0.02	(-3.4)	0.01
IT 13	11.6	(2.6)	16.6	(0.9)	19.7	0.03	(-2.9)	0.02	(-3.4)	0.01
IS 1	9.8	(2.6)	14.0	(0.6)	15.9	0.04	(-2.0)	0.03	(-2.0)	0.02
IS 2	3.4	(1.2)	4.0	(-)	4.0	0.05	(-1.6)	0.04	(-1.4)	0.03
IS 3	9.7	(2.5)	13.7	(1.7)	19.2	0.00	(-)	0.00	(-)	0.00
IN 1	12.2	(2.7)	17.7	(0.9)	21.3	0	(-)	0	(-)	0
IO 1	6.3	(2.3)	8.5	(0.6)	9.5	0.05	(-1.6)	0.04	(-1.4)	0.03
IO 2	5.9	(0.4)	6.2	(0.1)	6.1	0.05	(-1.6	0.04	(-1.4)	0.03
BN 1	10.3	(3.2)	16.1	(1.0)	19.8	0.02	(-)	0.02	(-3.4)	0.01
IM 1	12.5	(2.7)	18.1	(0.8)	21.3	0.05	(-)	0.05	(-)	0.05
IM 2	12.5	(2.7)	18.1	(0.8)	21.3	0.05	(-)	0.05	(-)	0.05
IM 3	0.0	(-)	0.0	(-)	0.0	0.00	(-)	0.00	(-)	0.00
IM 4	0.0	(-)	0.0	(-)	0.0	0.05	(-)	0.05	(-)	0.05
IM 5	14.1	(1.7)	17.9	(0.6)	20.1	0.02	(-)	0.02	(2.0)	0.03

Note: Parentheses indicates an annual increase rate of buildings.

Table V.4.27 THE NUMBER AND ANNUAL INCREASE RATE OF BUILDINGS IN SERVICE SECTOR PER 25HA BY RIVER STRETCH

River Stretch	Urban						Rural					
	1986		2000		2020		1986		2000		2020	
IT 1	9.7	(2.6)	13.8	(1.0)	16.8		0.00	(-)	0.00	(-)	0.00	
IT 2	10.5	(2.7)	15.1	(0.9)	18.1		0.07	(-)	0.07	(-)	0.07	
IT 3	2.7	(0.3)	2.8	(-)	2.7		0.02	(-)	0.02	(-)	0.02	
IT 4	2.7	(0.3)	2.8	(-)	2.7		0.02	(-)	0.02	(-)	0.02	
IT 5	11.5	(3.5)	18.7	(0.3)	19.7		0.07	(-)	0.07	(-0.7)	0.06	
IT 6	11.5	(3.5)	18.7	(0.3)	19.7		0.07	(-)	0.07	(-0.7)	0.06	
IT 7	21.7	(0.0)	21.7	(0.0)	21.7		0.05	(-1.6)	0.04	(-)	0.04	
IT 8	9.0	(2.8)	13.3	(1.6)	18.4		0.04	(-2.0)	0.03	(-)	0.03	
IT 9	9.0	(2.8)	13.3	(1.6)	18.4		0.02	(-)	0.02	(-3.4)	0.01	
IT 10	0.0	(-)	0.0	(-)	0.0		0.03	(-)	0.03	(-2.0)	0.02	
IT 11	4.6	(3.1)	7.1	(1.8)	10.1		0.02	(-)	0.02	(-)	0.02	
IT 12	7.4	(2.5)	10.5	(1.5)	14.1		0.02	(-4.8)	0.01	(-)	0.01	
IT 13	15.0	(2.5)	21.3	(0.8)	24.8		0.03	(-2.8)	0.02	(-3.4)	0.01	
IS 1		(2.6)	17.2	(0.8)	20.2		0.04	(-2.0)	0.03	(-)	0.03	
IS 2	0.9	(1.4)	1.1	(-)	1.1		0.01	(-)	0.01	(-)	0.01	
IS 3	8.5	(2.5)	12.0	(1.7)	16.8		0.00	(-)	0.00	(-)	0.00	
IN 1	17.8	(2.7)	25.8	(0.9)	30.8		0.00	(-2.8)	0.00	(-)	0.00	
IO 1	7.4	(2.5)	10.3	(0.7)	11.9		0.03	(-)	0.02	(-)	0.02	
IO 2	4.8	(0.3)	5.0	(-)	5.0		0.03	(-)	0.03	(-2.0)	0.02	
BN 1	8.9	(3.2)	13.9	(1.0)	16.9		0.02	(-)	0.02	(-3.4)	0.01	
IM 1	12.3	(2.7)	17.7	(0.8)	20.7		0.05	(-)	0.05	(-)	0.05	
IM 2	12.3	(2.7)	17.7	(0.8)	20.7		0.05	(-)	0.05	(-)	0.05	
IM 3	0.0	(-)	0.0	(-)	0.0		0.00	(-)	0.00	(-)	0.00	
IM 4	0.0	(-)	0.0	(-)	0.0		0.05	(-)	0.05	(-)	0.05	
IM 5	12.3	(1.7)	15.6	(0.6)	17.6		0.07	(-)	0.07	(2.3)	0.11	

Note: Parentheses indicates an annual increase rate of buildings.