

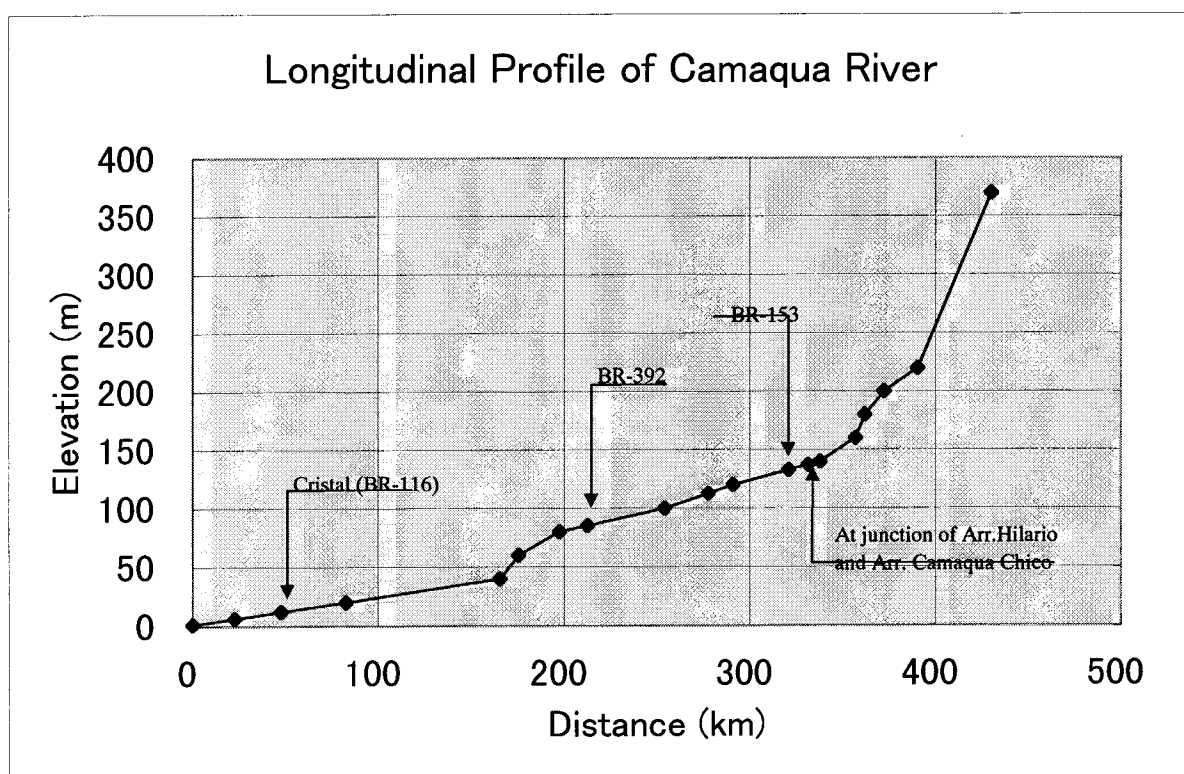
## **RIV-T-1 River System**

- 1. Longitudinal Riverbed Slope of Camaqua River**
- 2. Longitudinal Riverbed Slope of Piratini River**

## 1. Longitudinal Riverbed Slope of Camaqua River

Point	Distance (km)	Elevation (m)	River Slope			
River mouth	0.0	1.00				
Pacheca	22.5	6.18	0.00023	1/ 4342		
Cristal (BR-116)	47.5	11.94	0.00023	1/ 4342	0.000230	1/ 4342
EL 20m	82.5	20.00	0.00023	1/ 4342		
EL 40m	165.5	40.00	0.00024	1/ 4150		
EL 60m	175.5	60.00	0.00200	1/ 500		
EL 80m	197.5	80.00	0.00091	1/ 1100		
BR-392	212.5	85.31	0.00035	1/ 2825	0.000397	1/ 2520
EL 100m	254.0	100.00	0.00035	1/ 2825		
Passo do Cacao	277.5	112.70	0.00054	1/ 1850		
EL 120m	291.0	120.00	0.00054	1/ 1850		
BR-153	321.0	132.77	0.00043	1/ 2350	0.000410	1/ 2436
Arr. Hilario/Camaqua Chico	331.5	137.23	0.00043	1/ 2350	0.000411	1/ 2433
EL 140m	338.0	140.00	0.00043	1/ 2350		
EL 160m	357.0	160.00	0.00105	1/ 950		
EL 180m	362.0	180.00	0.00400	1/ 250		
EL 200m	372.5	200.00	0.00190	1/ 525		
EL 220m	390.5	220.00	0.00111	1/ 900		
EL 370m	430.0	370.00	0.00380	1/ 263	0.000858	1/ 1165

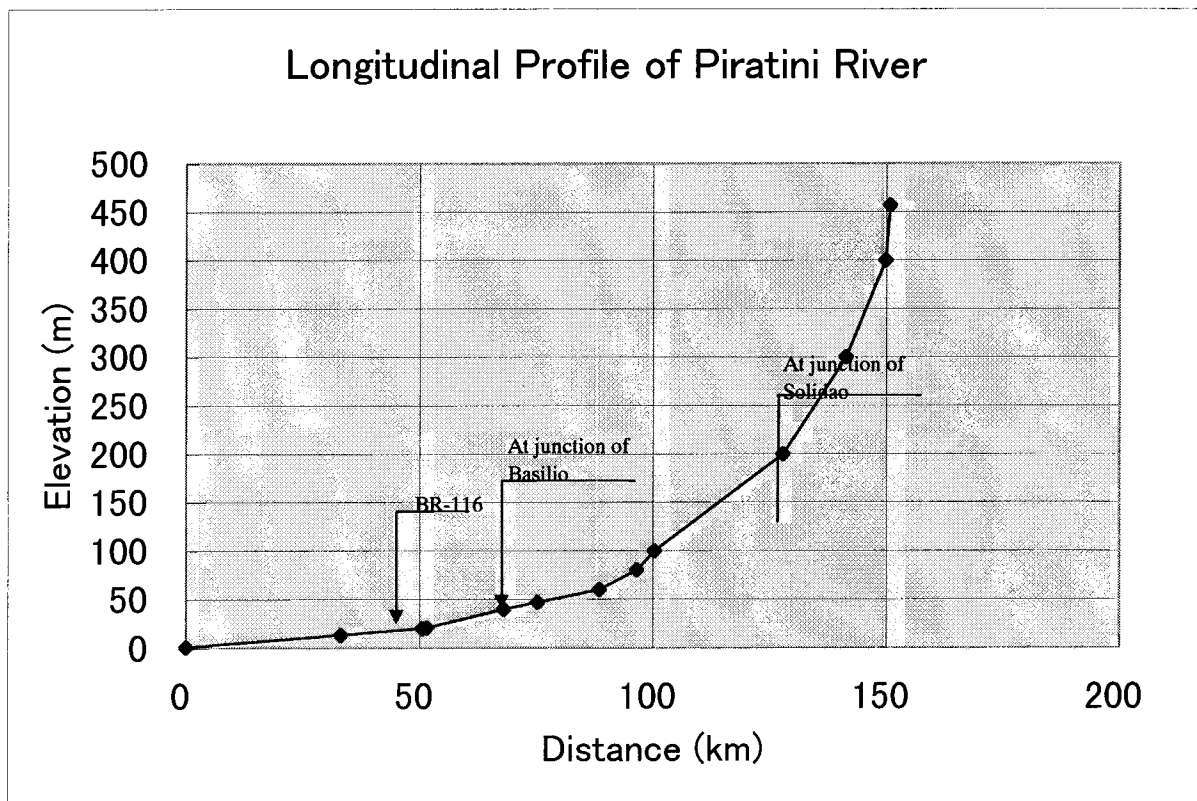
Source: Geological Map (Scale = 1/250,000)



## 2. Longitudinal Riverbed Slope of Piratin River

Point	Distance (km)	Elevation (m)	River Slope			
River mouth	0.0	1.00				
BR-116	33.0	13.42	0.00038	1/ 2658		
EL 20m	50.5	20.00	0.00038	1/ 2658		
At junction of Arr. Basilio	51.5	21.14	0.00114	1/ 875	0.000391	1/ 2557
EL 40m	68.0	40.00	0.00114	1/ 875		
BR-293	75.3	47.12	0.00098	1/ 1025	0.000613	1/ 1633
EL 60m	88.5	60.00	0.00098	1/ 1025		
EL 80m	96.5	80.00	0.00250	1/ 400		
EL 100m	100.3	100.00	0.00526	1/ 190	0.000987	1/ 1013
EL 200m	127.8	200.00	0.00364	1/ 275		
EL 300m	141.3	300.00	0.00741	1/ 135		
EL 400m	149.8	400.00	0.01176	1/ 85		
EL 457m	150.8	457.00	0.05700	1/ 18	0.003024	1/ 331

Source: Geological Map (Scale = 1/250,000)



## **RIV-T-2   Soil Conditions of Sub-basins**

### Annex RIV-T-2 Soil Conditions of Sub-basins in the Study Area

Symbol	Name of Soil	Sab-basin															
		L20	L30-1	L30-2	L30-3	L30-4	L30-5	L30-6	L40-1	L40-2	L40-3	L40-4	L40-5	L40-6	L40-7	L40-8	L40-9
PBe	Eutrophic brunet-gray podzolic soil				*											**	
PBP	Eutrophic planosol brunet-gray podzolic soil		*	*								*					
PVa	<i>Alico</i> red-yellow podzolic soil	*							*	*							
PVd	Dystrophic red-yellow podzolic soil		***		***	***	***	***				***	***	***	***	***	
PVe	Eutrophic red-yellow podzolic soil		*	*	**							*					
PEd	Dystrophic dark-red podzolic soil		**	*													
P	Indiscriminated podzolics soils		**						*	***	**		*				
BV	Red brunizem soil												*	*			
B	Brunizem soil		*														
BT	<i>Vertic brunizem</i> soil ( <i>Brunizem Vertico</i> )											***					
PLe	Eutrophic planosol		*		*												
PLS	Solod planosol soil	***				***	***	***	**	***	***	**	***	**	***		**
PTa	<i>Alic plinthsoil</i> ( <i>Plintossolo alico</i> )	*								*							*
HGHe	Eutrophic grey humid soil											*					
HGHS	Solod grey humid soil								***	*	*		*	*			*
HGPS	Solod grey low-humid soil								***		*		**	*	*		
HAQHa	<i>Alic humic</i> ( <i>Humicas alicas</i> ) hydromorphical quartz sand	*															*
HOd	Dystrophic organic soil								**	*	**		*		*		
Ae	Eutrophic alluvial soil	*				**	*	*									
V	<i>Vertisil</i> ( <i>Vertissolo</i> )											***					
Rd	Dystrophic litholic soil		*	**	***	*	*	*				*		**			**
Re	Eutrophic litholic soil		***	***	*							*					
DN	Dune	**							*	**	***						***

Source: Instituto Brasileiro de Geografia e Estatística (IBGE)

Notes: \*\*\* : more than 20% area of the Sub-basins

\*\* : 10% to 20% area of the Sub-basins

\* : less than 10% area of the Sub-basin

## **RIV-T-3 Existing Hydrological Observation Stations**

- 1. Rainfall Gauging Stations**
- 2. Stream Gauging Stations**

## 1. List of Rainfall Gaging Stations in the Study Area

No	Station Name	Station ID	Organization	Sub-basin	Município	Latitude	Longitude	Altitude (m)	Gaging Record
1	Lavras do Sul	3053007	CEEE	P-1	Lavras do Sul	30° 48' 00"	53° 54' 00"	300	Aug.1944 - present
2	Passo do Cacao	3053010	DNAEE	P-2	Bage	30° 57' 40"	53° 29' 19"	120	Jun.1976 - present
3	Torrinhas	3153017	DNAEE	P-3	Pinheiro Machado	31° 18' 51"	53° 29' 52"	420	Sep.1976 - present
4	Passo da Capela	3153006	DNAEE	P-3	Piratini	31° 08' 01"	53° 03' 16"	120	Jan.1977 - present
5	Serra dos Pedorosa	3052012	DNAEE	P-3	Encruzilhada do Sul	30° 37' 19"	52° 48' 35"	400	Mar.1977 - present
6	Passo do Mendonca	3152011	DNAEE	P-4	Sao Lourenco do Sul	31° 00' 01"	52° 02' 59"	40	Apr.1944 - present
7	Camaqua	3051016	DNAEE	P-4	Camaqua	30° 52' 14"	51° 47' 41"	65	Jun.1965 - present
8	Cerro Grande	3051004	DNAEE	P-5	Tapes	30° 35' 53"	51° 45' 16"	120	Sep.1976 - present
9	Fazenda da Boa Vista	3051017	DNAEE	P-5	Camaqua	30° 46' 18"	51° 39' 35"	25	Jul.1976 - present
10	Boqueirao	3152002	DNAEE	P-6	Sao Lourenco do Sul	31° 16' 52"	52° 04' 45"	120	Jan.1966 - present
11	Sao Lourenco do Sul	3151003	DNAEE	P-6	Sao Lourenco do Sul	31° 22' 10"	51° 59' 12"	2	Jan.1943 - present
12	Farol de Itapua	3051035	DNAEE	P-7	Viamao	30° 23' 00"	51° 03' 00"	20	Jan.1986 - present
13	Palmares do Sul	3050002	DNAEE	P-7	Palmares do Sul	30° 23' 00"	51° 03' 00"	20	Jan.1986 - present
14	Bojuru	3151001	DNAEE	P-7	San Jose do Norte	31° 37' 00"	51° 25' 00"	2	Oct.1969 - present
15	Solidao	3050007	DNAEE	P-8	Mostardas	30° 40' 06"	50° 32' 27"	2	Jan.1983 - present
16	Granja Osorio	3253003	DNAEE	M-1	Santa Vitoria do Palmar	32° 57' 09"	53° 07' 08"	3	Jan.1966 - present
17	Rio Grande	3252020	INEMET	M-2	Rio Grande	30° 40' 06"	50° 32' 27"	2	Jan.1983 - present
18	Granja Cerrito	3252006	DNAEE	M-3	Rio Grande	32° 20' 58"	52° 32' 25"	4	Jul.1964 - present
19	Jaguarao	3253020	OUTRAS	M-4	Jaguarao	32° 37' 00"	53° 22' 00"	2	Feb.1966 - present
20	Herval	3253004	DNAEE	M-5	Herval	32° 01' 40"	53° 23' 55"	260	Oct.1965 - present
21	Arroio Grande	3253001	DNAEE	M-5	Arroio Grande	32° 14' 11"	53° 05' 16"	20	Dec.1965 - present
22	Granja Colonel Pedro Osorio	3252005	DNAEE	M-5	Arroio Grande	32° 00' 20"	52° 39' 10"	20	Jan.1966 - present
23	Pedras Altas	3153007	DNAEE	M-6	Pinheiro Machado	31° 44' 10"	53° 35' 20"	380	Aug.1963 - present
24	Pinheiro Machado	3153008	DNAEE	M-6	Pinheiro Machado	31° 34' 39"	53° 22' 37"	440	Oct.1965 - present
25	Estacao Experomental Piratini	3153021	DNAEE	M-6	Piratini	31° 25' 48"	53° 06' 22"	340	Aug.1979 - present
26	Ferraria	3153004	DNAEE	M-6	Piratini	31° 44' 11"	53° 03' 06"	200	Aug.1963 - present
27	Pedro Osorio	3152013	DNAEE	M-6	Pedro Osorio	31° 52' 46"	52° 48' 31"	27	Jan.1964 - present
28	Pelotas	3152014	INEMET	M-7	Pelotas	31° 45' 00"	52° 21' 00"	13	Apr.1912 - present
29	Cangucu	3152003	DNAEE	M-8	Cangucu	31° 23' 28"	52° 41' 50"	400	Jan. 1943 - present
30	Ponte Cordeiro de Farias	3152016	DNAEE	M-8	Pelotas	31° 34' 23"	52° 27' 43"	40	Aug.1964 - present
31	Granja Sao Pedro	3152008	DNAEE	M-8	Pelotas	31° 40' 07"	52° 10' 49"	3	Jan. 1966 - present

DNAEE: National Department of Water and Electric Energy

## 2. List of Stream Flow Gauging Stations in the Study Area

No.	Station Name	Station ID	Organization	Sub-basin	River	Latitude	Longitude	Drainage Area (km <sup>2</sup> )	Gaging Record	Altitude (m)
1	Passo do Cacao	87590000	DNAEE	P-2	Camaqua	30° 57' 40"	53° 29' 19"	4,069	Jul.1973 - Dec.1996	120
2	Passo do Mendonca	87905000	DNAEE	P-4	Camaqua	31° 00' 36"	52° 03' 10"	15,543	Jun. 1964 - Dec. 1996	24
3	Pacheca	87915000	DNAEE	P-4	Camaqua	31° 07' 49"	51° 47' 19"	17,223	Nov.1976 - present	12
4	Cerro Chato	88575000	DNAEE	M-6	Arr.Basilio	31° 51' 52"	53° 16' 08"	1,043	Aug.1976 - Dec.1997	115
5	Contrato	88600001	DNAEE	M-6	Arr.Basilio	31° 52' 00"	52° 54' 54"	2,371	Oct.1965-Aug.1976	37
6	Ponte do Imperio	88550000	DNAEE	M-6	Piratini	31° 43' 00"	52° 54' 54"	1,873	Sep.1976 - Dec.1987	90
7	Picada Nova	88560001	DNAEE	M-6	Piratini	31° 48' 00"	52° 51' 51"	2,236	Oct.1965 - Nov.1976	30
8	Passo do Ricardo	88680000	DNAEE	M-6	Piratini	31° 54' 00"	52° 39' 39"	5,370	Aug.1961 - Dec.1982	15
9	Passo dos Carros	88750000	DNAEE	M-7	Arr.Fragata	31° 42' 45"	52° 28' 31"	133	Oct.1964 - Dec.1997	10
10	Ponte Cordeiro de Farias	88850000	DNAEE	M-8	Arr.Pelotas	31° 34' 23"	52° 27' 43"	362	Aug.1964 - Dec.1997	35
11	Dona Francisca	85400000	DNAEE	Jacui	Jacui	29° 37' 37"	53° 21' 10"	14,014	Jan.1984-Dec.1994	-
12	Restinga Seca	85438000	DNAEE	Jacui	Vacacai	29° 47' 58"	53° 22' 06"	914	Jan.1984-Dec.1994	-
13	Ponte Sao Gabriel	85470000	DNAEE	Jacui	Vacacai	30° 21' 36"	54° 18' 43"	973	Jan.1984-Dec.1994	-
14	Passo do Rocha	85480000	DNAEE	Jacui	Vacacai	30° 13' 53"	53° 59' 07"	2,698	Jan.1984-Dec.1994	-
15	Passo das Tunas	85600000	DNAEE	Jacui	Vacacai	29° 55' 33"	53° 24' 56"	6,790	Jan.1984-Dec.1994	-
16	Passo do Freire	85610000	DNAEE	Jacui	Sao Sepe	30° 26' 07"	53° 42' 48"	62	Jan.1984-Dec.1994	-
17	Passo do Lajeado	85615000	DNAEE	Jacui	Lajeado	30° 22' 40"	53° 44' 26"	69	Feb.1983-Sep.1990	-
18	Sao Sepe-Montante	85623000	DNAEE	Jacui	Sao Sepe	30° 11' 36"	53° 33' 47"	721	Nov.1984-Dec.1994	-
19	Passo Sao Lourenco	85642000	DNAEE	Jacui	Jacui	30° 00' 31"	53° 00' 58"	27,416	Jan.1984-Dec.1994	-
20	Jusante Foz Arr. Piquiri	85670000	DNAEE	Jacui	Arr. Iruí	30° 02' 00"	52° 41' 00"	1,875	Jan.1982-Sep.1985	-
21	Passo Linha do Rio	85730000	DNAEE	Jacui	Pardo	29° 36' 00"	52° 47' 00"	1,228	Jan.1984-Mar.1986	-
22	Candelaria	85740000	DNAEE	Jacui	Pardo	29° 40' 24"	52° 46' 11"	1,376	Nov.1984-Dec.1994	-
23	Santa Cruz-Montante	85830000	DNAEE	Jacui	Pardinho	29° 42' 20"	52° 28' 08"	784	Jan.1984-Dec.1994	-
24	Rio Pardo	85900000	DNAEE	Jacui	Jacui	29° 59' 46"	52° 22' 28"	38,735	Jan.1984 - Dec.1990	-

DNAEE: National Department of Water and Electric Energy



## **RIV-T-4 Mean Monthly and Annual Rainfall**

## Annex RIV-T-4      Mean Monthly Rainfall & Maximum Daily Rainfall in the Study Area

(Unit: mm)

Sub-basin	Name of Station	Period of Data	Mean Monthly Rainfall												Annual	Daily Max.	Date
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
L20	Palmares do Sul	1974-98	89.9	94.3	91.7	85.8	91.8	123.4	135.8	109.1	118.8	104.1	93.1	77.4	1,215.2	105.1	10/09/90
L20	Solidao	1983-98	91.9	81.9	75.4	95.2	125.0	117.7	135.5	110.4	96.5	111.1	69.0	56.9	1,166.5	102.0	17/05/91
L30-1	Lavras do Sul	1944-80	99.8	110.5	118.2	98.9	94.4	118.3	141.1	125.2	144.1	149.5	83.3	101.8	1,385.1	255.3	14/10/63
L30-2	Passo do Cacao	1976-98	114.7	108.3	130.4	133.8	110.4	104.3	127.1	97.6	123.2	130.5	123.5	79.9	1,383.7	170.0	20/08/87
L30-3	Torrinhas	1976-98	122.8	151.8	109.0	140.8	131.8	116.4	156.7	94.5	111.7	128.1	118.9	101.8	1,484.3	255.2	13/04/86
L30-4	Camaqua	1976-95	115.4	145.0	100.1	111.2	118.6	122.9	169.2	124.8	133.6	116.8	115.4	112.1	1,485.1	111.8	29/08/87
L30-5	Fazenda da Boa Vista	1976-98	121.3	141.2	107.0	115.1	115.2	137.8	151.5	129.5	140.3	122.0	128.0	123.0	1,531.9	175.0	16/03/79
L30-6	Boqueirao	1966-98	124.3	168.0	125.5	113.1	118.5	137.5	183.4	128.9	143.2	127.3	117.5	123.8	1,611.0	277.2	15/10/97
L40-1	Granja Osorio	1966-96	101.5	126.6	89.5	82.3	95.8	110.8	134.2	104.1	113.4	95.7	84.2	85.8	1,223.9	118.0	12/09/81
L40-2	Rio Grande	1961-85	78.8	79.8	114.7	58.1	79.0	114.4	128.8	131.8	147.4	84.3	83.6	50.6	1,151.3	104.6	13/07/82
L40-3	Granja Cerrito	1964-96	108.8	127.0	104.9	92.2	98.0	105.5	152.7	117.5	108.4	101.6	85.8	78.1	1,280.5	135.0	21/07/72
L40-4	Jaguarao	1971-77	147.0	169.5	59.7	34.2	89.9	122.5	201.7	142.1	120.1	118.2	86.1	69.6	1,360.6	131.5	14/10/77
L40-5	Arroio Grande	1965-96	100.3	119.6	96.4	95.5	101.4	101.2	135.4	110.6	106.4	98.1	101.2	72.6	1,238.7	145.4	13/04/92
L40-6	Pinheiro Machado	1965-96	130.4	131.1	115.2	132.3	119.3	123.2	159.6	124.5	129.4	126.7	112.2	109.0	1,512.9	187.0	08/02/73
L40-7	Pelotas	1943-70	118.9	127.0	137.7	78.5	76.3	120.6	126.2	129.7	149.4	123.5	76.2	79.4	1,343.4	131.4	08/02/54
L40-8	Canguçu	1943-96	135.6	113.0	115.0	106.7	107.8	131.6	162.9	127.1	146.5	130.7	103.9	97.8	1,478.6	130.8	08/01/94
	Average		112.6	124.7	105.7	98.4	104.6	119.3	150.1	119.2	127.0	116.8	98.9	88.7	1,365.8		

Source: CPRM

## **RIV-T-5   Mean Monthly and Max./Min. Discharge**

### Annex RIV-T-5 Mean Monthly Discharge & Max/Min Discharge at Gauging Stations in the Study Area

Station ID	Station Name	River	Area (km <sup>2</sup> )	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max.	Date	Min	Date
87590000	Passo do Cacao	Camaqua	4,069	m <sup>3</sup> /s	25.6	40.7	45.0	97.3	78.7	90.2	154.0	129.0	103.0	105.0	60.4	23.5	1,916	06/10/80	0.86	06/02/90
				l/s/km <sup>2</sup>	6.3	10.0	11.1	23.9	19.3	22.2	37.8	31.7	25.3	25.8	14.8	5.8	471		0.21	
87905000	Passo do Mendonca	Camaqua	15,543	m <sup>3</sup> /s	121.0	187.0	174.0	275.0	238.0	407.0	593.0	559.0	434.0	358.0	272.0	156.0	5,106	15/04/92	4.48	08/01/89
				l/s/km <sup>2</sup>	7.8	12.0	11.2	17.7	15.3	26.2	38.2	36.0	27.9	23.0	17.5	10.0	329		0.29	
88575000	Cerro Chato	A.Basilio	1,043	m <sup>3</sup> /s	8.7	17.2	17.3	23.3	27.8	26.2	44.6	31.1	34.7	26.9	20.6	8.5	1,632	12/03/90	0.30	12/01/90
				l/s/km <sup>2</sup>	8.3	16.5	16.6	22.3	26.7	25.1	42.8	29.8	33.3	25.8	19.8	8.1	1,565		0.29	
88600001	Contrato	A.Basilio	2,371	m <sup>3</sup> /s	21.7	25.4	19.5	13.5	17.8	43.8	74.4	86.6	44.8	38.3	36.2	18.1	1,042	09/02/73	1.55	23/04/72
				l/s/km <sup>2</sup>	9.2	10.7	8.2	5.7	7.5	18.5	31.4	36.5	18.9	16.2	15.3	7.6	439		0.65	
88550000	Ponte do Imperio	Piratini	1,873	m <sup>3</sup> /s	13.0	22.3	16.9	29.5	32.2	51.3	84.8	48.9	50.0	50.8	32.8	14.6	1,153	15/10/77	1.09	07/02/79
				l/s/km <sup>2</sup>	6.9	11.9	9.0	15.8	17.2	27.4	45.3	26.1	26.7	27.1	17.5	7.8	616		0.58	
88560001	Picada Nova	Piratini	2,236	m <sup>3</sup> /s	21.3	30.6	16.3	8.5	16.2	40.3	88.3	102.0	58.4	34.4	34.0	21.6	1,965	17/07/73	0.98	25/04/70
				l/s/km <sup>2</sup>	9.5	13.7	7.3	3.8	7.2	18.0	39.5	45.6	26.1	15.4	15.2	9.7	879		0.44	
88680000	Passo do Ricardo	Piratini	5,370	m <sup>3</sup> /s	40.0	48.5	42.8	48.7	42.2	85.1	219.0	197.0	177.0	126.0	81.9	56.4	3,299	30/09/79	3.15	25/04/70
				l/s/km <sup>2</sup>	7.4	9.0	8.0	9.1	7.9	15.8	40.8	36.7	33.0	23.5	15.3	10.5	614		0.59	
88750000	Passo dos Carros	A.Fragata	133	m <sup>3</sup> /s	1.4	2.6	1.5	2.1	2.0	3.1	5.4	4.7	4.9	3.2	2.7	1.5	165	27/09/84	0.03	15/01/90
				l/s/km <sup>2</sup>	10.5	19.5	11.3	15.8	15.0	23.3	40.6	35.3	36.8	24.1	20.3	11.3	1,241		0.23	
88850000	Ponte Cordeiro de Faria	A.Pelotas	362	m <sup>3</sup> /s	5.5	10.1	6.5	8.7	8.2	11.6	18.0	15.7	15.7	10.2	10.0	5.6	519	27/09/84	0.13	10/03/65
				l/s/km <sup>2</sup>	15.2	27.9	18.0	24.0	22.7	32.0	49.7	43.4	43.4	28.2	27.6	15.5	1,434		0.36	

Source: CPRM

## **RIV-T-6    Specific Discharge in the Mirim Lake Basin**

## Annex RIV-T-6    Specific Discharge in the Mirim Lake Basin

(Unit: m<sup>3</sup>/s/km<sup>2</sup>)

No.	Gaging Station	River Name	Drainage Area (km <sup>2</sup> )	Jan.	Feb.	Mar.	Abr.	May	Jun.	Jul	Aug.	Sep.	Oct.	Nov.	Dec.	Average
1	Treinta y Tres	Olimar Grande	4,680	0.008	0.012	0.007	0.007	0.015	0.022	0.031	0.025	0.023	0.015	0.014	0.007	0.016
2	Paso Averias	R. Cebollati	7,647	0.004	0.007	0.005	0.005	0.008	0.014	0.024	0.024	0.022	0.017	0.012	0.005	0.012
3	Paso Borches	R. Tacuari	1,421	0.009	0.009	0.007	0.009	0.018	0.027	0.033	0.027	0.025	0.016	0.012	0.005	0.016
4	Paso Dragon	R. Tacuari	3,540	0.007	0.011	0.007	0.008	0.010	0.020	0.033	0.028	0.021	0.018	0.011	0.006	0.015
5	Paso Centurion	R. Jaguarao	4,700	0.011	0.014	0.013	0.020	0.019	0.024	0.038	0.026	0.024	0.019	0.015	0.010	0.019
6	Vergara	Arr. Parao	1,062	0.011	0.023	0.012	0.012	0.017	0.031	0.043	0.034	0.028	0.017	0.021	0.008	0.021
7	Dario Lassance	Arr. Candiota	320	0.006	0.008	0.008	0.013	0.012	0.013	0.021	0.017	0.017	0.015	0.010	0.007	0.012
8	Candiotinha	Arr. Candiotinha	220	0.005	0.007	0.008	0.014	0.011	0.020	0.032	0.026	0.018	0.017	0.012	0.005	0.015
9	Arroio Grande	Arr. Grande	725	0.009	0.011	0.009	0.013	0.013	0.017	0.036	0.022	0.016	0.014	0.014	0.006	0.015
10	Granja Santa Marta	Arr. Chasqueiro	279	0.009	0.014	0.010	0.013	0.013	0.016	0.033	0.022	0.014	0.013	0.013	0.005	0.015
11	Ponte do Imperio	Rio Piratini	1,873	0.012	0.017	0.013	0.016	0.016	0.021	0.037	0.027	0.023	0.022	0.016	0.011	0.019
12	Picada Nova	Rio Piratini	2,236	0.012	0.018	0.014	0.017	0.016	0.021	0.041	0.032	0.026	0.020	0.020	0.013	0.021
13	Cerro Chato	Arr. Basilio	1,043	0.013	0.019	0.014	0.020	0.021	0.024	0.039	0.029	0.027	0.022	0.017	0.011	0.021
14	Contorato	Arr. Basilio	2,371	0.013	0.015	0.014	0.015	0.014	0.015	0.025	0.020	0.017	0.014	0.015	0.010	0.016
15	Passo do Ricardo	Rio Piratini	5,370	0.012	0.016	0.013	0.016	0.015	0.019	0.038	0.031	0.029	0.022	0.020	0.012	0.020
16	Passo dos Carros	Arr. Fragata	133	0.010	0.020	0.012	0.015	0.014	0.023	0.044	0.036	0.037	0.025	0.020	0.010	0.022
17	Ponte C. de Farias	Arr. Pelotas	362	0.015	0.026	0.017	0.024	0.023	0.031	0.052	0.042	0.042	0.031	0.028	0.016	0.029
	Average			0.010	0.015	0.011	0.014	0.015	0.021	0.035	0.028	0.024	0.019	0.016	0.009	0.018

Source: Estudo para Avaliacao e Gerenciamento da Disponibilidade Hidrica da Bacia da Lagoa Mirim: IPH-SB/CLM

## **RIV-T-7   Monthly Runoff Coefficient**

- 1.   Runoff Coefficient of Camaqua River Basin**
- 2.   Runoff Coefficient of Piratini River Basin**

## 1. Runoff Coefficient of Camaqua River Basin

Gaging Station: Passo do Cacao  
 Drainage Area: 4,069 km<sup>2</sup>  
 Rainfall station: Lavras do Sul

Year	Item	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1974	Rainfall	mm	141.4	143.3	152.8	35.1	99.3	142.1	155.1	150.1	129.4	44.7	114.7	93.6
	"	m3/s	214.8	241.0	232.1	55.1	150.9	223.1	235.6	228.0	203.1	67.9	180.1	142.2
	Discharge	m3/s	26.9	9.1	41.6	17.1	24.7	51.1	116.0	225.0	86.1	41.2	81.0	46.4
	Runoff Coefficient	%	12.5	3.8	17.9	31.0	16.4	22.9	49.2	98.7	42.4	60.7	45.0	32.6
1975	Rainfall	mm	48.7	94.1	257.5	35.1	115.8	68.0	123.3	263.1	226.0	51.8	197.0	43.4
	"	m3/s	74.0	158.3	391.2	55.1	175.9	106.7	187.3	399.7	354.8	78.7	309.3	65.9
	Discharge	m3/s	7.7	6.5	66.2	11.9	13.2	96.7	78.9	277.0	215.0	98.9	103.0	35.0
	Runoff Coefficient	%	10.4	4.1	16.9	21.6	7.5	90.6	42.1	69.3	60.6	125.7	33.3	53.1
1976	Rainfall	mm	153.5	68.6	202.7	65.2	95.7	66.0	180.1	150.1	126.7	116.7	150.6	98.2
	"	m3/s	233.2	111.4	307.9	102.4	145.4	103.6	273.6	228.0	198.9	177.3	236.4	149.2
	Discharge	m3/s	26.9	9.1	41.6	17.1	24.7	51.1	116.0	225.0	86.1	41.2	81.0	46.4
	Runoff Coefficient	%	11.5	8.2	13.5	16.7	17.0	49.3	42.4	98.7	43.3	23.2	34.3	31.1



## 2. Runoff Coefficient of Piratini River Basin

Gaging Station: Passo do Ricardo  
 Drainage Area: 5,370 km<sup>2</sup>  
 Rainfall station: Pinheiro Machado

Year	Item	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1978	Rainfall	mm	102.1	98.7	71.0	136.9	69.3	111.2	168.7	35.3	56.5	117.8	84.9	88.7
	"	m3/s	155.1	166.0	107.9	214.9	105.3	174.6	256.3	53.6	88.7	179.0	133.3	134.8
	Discharge	m3/s	16.4	29.4	15.1	12.8	46.2	41.4	283.0	81.1	68.6	45.5	58.0	26.8
	Runoff Coefficient	%	10.6	17.7	14.0	6.0	43.9	23.7	110.4	151.2	77.3	25.4	43.5	19.9
1979	Rainfall	mm	49.9	140.2	69.8	86.5	64.7	34.2	72.1	131.5	257.7	104.0	86.9	188.9
	"	m3/s	75.8	235.8	106.0	135.8	98.3	53.7	109.5	199.8	404.5	158.0	136.4	287.0
	Discharge	m3/s	8.6	6.2	7.9	12.0	12.5	9.0	34.1	180.0	237.0	192.0	40.5	87.8
	Runoff Coefficient	%	11.3	2.6	7.5	8.8	12.7	16.7	31.1	90.1	58.6	121.5	29.7	30.6
1980	Rainfall	mm	32.8	66.0	281.1	324.8	42.3	225.8	136.4	43.1	53.8	281.3	93.8	210.2
	"	m3/s	49.8	107.2	427.0	509.9	64.3	354.5	207.2	65.5	84.5	427.3	147.3	319.3
	Discharge	m3/s	14.4	10.5	142.0	346.0	50.7	154.0	298.0	81.1	26.1	241.0	42.8	148.0
	Runoff Coefficient	%	28.9	9.8	33.3	67.9	78.9	43.4	143.8	123.9	30.9	56.4	29.1	46.3

## **RIV-T-8   Actual Land Use**

- 1.   Actual Land Use in the Study Area (Before Modification)**
- 2.   Modification of Cloud Area**
- 3.   Revised Actual Land Use of the Sub-basins in the Study Area**

# 1. Actual Land Use in the Study Area (Before Modification)

(unit: km<sup>2</sup>)

No.	Classification	Sub-basin																				Total
		L20	L30-1	L30-2	L30-3	L30-4	L30-5	L30-6	L40-1	L40-2	L40-3	L40-4	L40-5	L40-6	L40-7	L40-8	L40-9	PL-20	PL-30	PL-40	ML-40	
1	Urban area	0	1	0	0	4	1	2	2	0	1	3	0	4	42	2	0	0	0	0	0	62
2	Rotation between paddy and pasture	1,876	150	54	344	760	977	376	707	93	460	271	686	192	128	360	53	21	3	18	4	7,532
3	Pasture-1	0	285	121	289	0	0	0	18	0	0	455	124	362	0	0	0	0	0	0	0	1,654
4	Pasture-2	1,479	2,062	1,025	3,443	1,346	635	518	1,946	82	1,032	2,942	1,943	2,367	403	696	32	20	3	5	9	21,989
5	Upland crop and/or pasture	219	267	154	431	197	101	51	41	8	20	505	304	334	27	34	11	3	0	1	0	2,709
6	Forestation	55	23	32	452	83	41	42	15	0	5	82	34	295	26	62	0	0	0	0	0	1,247
7	Natural forest	582	655	723	2,874	1,387	532	343	192	11	134	1,147	393	2,168	161	365	15	20	2	2	2	11,706
8	Wetland-1	444	0	0	23	146	204	47	509	76	207	25	103	26	118	90	42	15	2	19	6	2,102
9	Wetland-2	0	0	0	0	0	0	0	0	67	187	0	0	0	0	0	0	0	0	0	0	254
10	Coast and dune	724	12	11	52	35	30	8	19	0	146	20	26	16	6	6	0	10	4	0	5	1,131
11	Water body	446	6	3	19	40	66	12	106	39	494	49	96	14	23	23	10	5,052	3,502	829	2,749	13,578
12	Cloud	19	0	0	0	0	0	0	125	116	1,280	0	0	0	0	8	355	4	0	258	53	2,216
	Total	5,844	3,461	2,123	7,927	3,999	2,587	1,401	3,681	491	3,966	5,497	3,709	5,777	933	1,646	518	5,145	3,517	1,132	2,826	66,179

Source:

JICA Study Team

Note:

Pasture-1: Improved pasture

Pasture-2: Pasture which partially include shrub and natural forest along stream

Wetland-1: Normal wetland

Wetland-2: Wetland which partially include water-logged pasture areas

## 2. Modification of Cloud Area

Sub-basin	Cloud	Classification	Original	Addition	Rivised
L20	19	Coast and dune	724	19	743
L40-1	125	Wetland-1	509	124	633
L40-2	116	Wetland-1	76	46	122
		Wetland-2	67	69	136
L40-3	1280	Paddy	460	128	588
		Wetland-1	207	256	463
		Wetland-2	187	256	443
		Coast and dune	146	320	466
		Water body	494	320	814
L40-8	8	Paddy	360	9	369
L40-9	355	Pasture-2	32	100	132
		Upland	11	50	61
		Coast and dune	0	204	204

Source: JICA Study Team

### 3. Revised Actual Land Use of the Sub-basins in the Study Area

No.	Classification	LITORAL AREA						BAIXO CAMAQUA						PIRATINI-JAGUARAO				ALTO-CAMAQUA				Total
		L20	L40-1	L40-2	L40-3	L40-9	sub-tota	L30-4	L30-5	L30-6	L40-7	L40-8	sub-tota	L40-4	L40-5	L40-6	sub-tota	L30-1	L30-2	L30-3	sub-total	
1	Urban area	0	2	0	1	0	3	4	1	2	42	2	52	3	0	4	6	1	0	0	1	62
2	Rotation between paddy and pasture	1,876	707	93	588	53	3,317	760	977	376	128	369	2,610	271	686	192	1,149	150	54	344	548	7,624
3	Pasture-1	0	18	0	0	0	18	0	0	0	0	0	0	455	124	362	941	285	121	289	695	1,654
4	Pasture-2	1,479	1,946	82	1,032	132	4,672	1,346	635	518	403	696	3,599	2,942	1,943	2,367	7,251	2,062	1,025	3,443	6,531	22,052
5	Upland crop and/or pasture	219	41	8	20	61	348	197	101	51	27	34	411	505	304	334	1,143	267	154	431	852	2,755
6	Forestation	55	15	0	5	0	75	83	41	42	26	62	254	82	34	295	411	23	32	452	508	1,247
7	Natural forest	582	192	11	134	15	934	1,387	532	343	161	365	2,788	1,147	393	2,168	3,707	655	723	2,874	4,251	11,680
8	Wetland-1	444	633	122	463	43	1,705	146	204	47	118	90	605	25	103	26	154	0	0	23	23	2,487
9	Wetland-2	0	0	136	443	0	579	0	0	0	0	0	0	0	0	0	0	0	0	0	0	579
10	Coast and dune	743	19	0	466	204	1,432	35	30	8	6	6	85	20	26	16	62	12	11	52	75	1,655
11	Water body	446	106	39	814	10	1,415	40	66	12	23	23	164	49	96	14	159	6	3	19	28	1,766
	Total	5,844	3,681	491	3,966	518	14,500	3,999	2,587	1,401	933	1,646	10,566	5,497	3,709	5,777	14,983	3,461	2,123	7,927	13,511	53,560

Source: JICA Study Team

Note: Pasture-1: Improved pasture

Pasture-2: Pasture which partially include shrub and natural forest along stream

Wetland-1: Normal wetland

Wetland-2: Wetland which partially include water-logged pasture areas

## **RIV-T-9    Slope Conditions and Land Use**

- 1.   Slope Conditions and Land Use in Sub-basins (1/2)**
- 2.   Slope Conditions and Land Use in Sub-basins (2/2)**
- 3.   Presumption of Cropping Area of Upland Crop**

# 1. Slope Conditions and Land Use in Sub-basins (1/2)

Sub-basin	Slope	C-1	C-2	C-3	C-4: Pasture-2			C-5: Upland crop			C-6	C-7	C-8	C-9	C-10	C-11	C-12	Total
		Urban A	R. Paddy	Pasture-1	Original	from C-5	Amendment	Original	(%)	Amendment	Forestation	N. Forest	Wetland-1	Wetland-2	Coast & D.	Water	Cloud	
L20	s<5%	0.4	1,821.1	0.0	1,380.7	56.1	1,436.8	204.3	94.1	148.2	51.3	496.1	421.4	0.0	723.6	443.6	18.6	5,561.0
	5<s<15%	0.0	48.0	0.0	88.1	3.5	91.6	12.7	5.8	9.2	1.8	60.3	22.4	0.0	0.5	0.9	0.0	234.5
	15<s<25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	s>25%	0.0	6.6	0.0	10.4	1.9	12.4	1.9	0.0	0.0	1.7	25.3	0.2	0.0	0.1	1.9	0.0	48.1
	total	0.4	1,875.6	0.0	1,479.2		1,540.7	218.8		157.4	54.8	581.6	444.0	0.0	724.2	446.3	18.6	5,843.6
L30-1	s<5%	0.0	1.0	13.2	60.7	4.0	64.7	6.0	2.3	2.0	1.8	37.6	0.0	0.0	0.1	0.2	0.0	120.6
	5<s<15%	0.0	117.8	168.8	1,388.4	113.6	1,502.0	170.7	67.3	57.1	13.1	342.7	0.0	0.0	9.2	1.4	0.0	2,212.0
	15<s<25%	0.6	28.0	92.5	519.3	51.2	570.5	76.9	30.3	25.7	8.0	254.8	0.0	0.0	2.4	4.0	0.0	986.4
	s>25%	0.0	3.6	10.4	94.0	13.8	107.8	13.8	0.0	0.0	0.7	19.5	0.0	0.0	0.3	0.0	0.0	142.2
	total	0.6	150.3	284.8	2,062.4		2,244.9	267.3		84.8	23.5	654.7	0.0	0.0	11.9	5.7	0.0	3,461.2
L30-2	s<5%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	5<s<15%	0.0	6.8	37.9	252.1	23.9	276.0	47.3	30.7	23.4	8.5	158.7	0.0	0.0	3.5	2.2	0.0	517.0
	15<s<25%	0.0	47.0	83.0	773.3	54.0	827.3	106.7	69.3	52.7	23.8	564.4	0.0	0.0	7.2	0.6	0.0	1,606.0
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	53.9	120.9	1,025.4		1,103.3	154.0		76.1	32.3	723.1	0.0	0.0	10.6	2.8	0.0	2,123.0
L30-3	s<5%	0.0	54.4	12.9	373.9	(56.9)	317.0	38.5	10.1	95.4	20.6	257.6	17.3	0.0	6.3	8.1	0.0	789.7
	5<s<15%	0.0	152.6	164.4	1,713.1	(334.4)	1,378.7	226.3	59.5	560.7	190.0	1,294.3	2.0	0.0	21.9	5.8	0.0	3,770.4
	15<s<25%	0.2	77.5	89.3	883.3	(171.1)	712.2	115.8	30.4	286.9	183.1	894.1	0.6	0.0	17.5	1.3	0.0	2,262.8
	s>25%	0.0	59.0	22.5	472.8	50.1	522.9	50.1	0.0	0.0	58.6	427.6	2.7	0.0	6.7	4.2	0.0	1,104.2
	total	0.2	343.6	289.1	3,443.1		2,930.8	430.7		943.0	452.2	2,873.7	22.6	0.0	52.4	19.4	0.0	7,927.1
L30-4	s<5%	4.0	435.9	0.0	437.3	(32.6)	404.6	98.7	50.2	131.3	6.5	302.1	111.8	0.0	12.1	27.9	0.0	1,436.3
	5<s<15%	0.0	196.1	0.0	551.9	(21.1)	530.8	63.8	32.4	84.8	32.5	454.6	26.0	0.0	13.6	11.5	0.0	1,350.1
	15<s<25%	0.0	123.8	0.0	344.9	(11.3)	333.6	34.1	17.3	45.3	43.0	619.5	6.9	0.0	8.8	0.0	0.0	1,180.8
	s>25%	0.0	4.1	0.0	12.5	0.7	13.2	0.7	0.0	0.0	0.9	10.6	1.6	0.0	0.8	0.5	0.0	31.5
	total	4.0	759.9	0.0	1,346.5		1,282.2	197.2		261.6	82.8	1,386.8	146.3	0.0	35.3	39.9	0.0	3,998.8
L30-5	s<5%	1.5	847.6	0.0	441.0	(29.7)	411.4	65.9	65.6	95.6	12.8	148.3	190.1	0.0	29.3	59.6	0.0	1,796.1
	5<s<15%	0.0	100.4	0.0	125.2	(12.1)	113.2	26.9	26.7	39.0	13.8	195.9	14.0	0.0	0.5	6.4	0.0	483.3
	15<s<25%	0.0	26.6	0.0	65.6	(3.5)	62.2	7.7	7.7	11.2	13.8	180.2	0.0	0.0	0.2	0.0	0.0	294.1
	s>25%	0.0	2.1	0.0	3.3	0.3	3.6	0.3	0.0	0.0	0.4	7.9	0.0	0.0	0.0	0.0	0.0	13.9
	total	1.5	976.7	0.0	635.2		590.3	100.8		145.7	40.8	532.3	204.1	0.0	30.0	66.0	0.0	2,587.4
L30-6	s<5%	1.7	276.1	0.0	151.8	(121.2)	30.5	22.5	47.5	143.7	0.5	44.2	44.9	0.0	2.7	11.9	0.0	556.3
	5<s<15%	0.0	71.4	0.0	175.9	(95.7)	80.2	17.7	37.5	113.4	13.3	147.9	2.5	0.0	1.3	0.0	0.0	430.0
	15<s<25%	0.0	23.9	0.0	112.1	(38.4)	73.7	7.1	15.0	45.5	12.7	95.7	0.0	0.0	2.1	0.0	0.0	253.5
	s>25%	0.0	5.2	0.0	78.7	4.2	82.9	4.2	0.0	0.0	15.8	55.4	0.0	0.0	2.3	0.0	0.0	161.6
	total	1.7	376.5	0.0	518.4		267.3	51.5		302.6	42.3	343.3	47.4	0.0	8.4	12.0	0.0	1,401.4
L40-1	s<5%	2.0	707.4	18.5	1,946.3	15.0	1,961.3	41.2	100.0	26.2	14.9	192.4	509.2	0.0	19.1	105.9	124.7	3,681.4
	5<s<15%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15<s<25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	2.0	707.4	18.5	1,946.3		1,961.3	41.2		26.2	14.9	192.4	509.2	0.0	19.1	105.9	124.7	3,681.4

Source: JICA Study Team

## 2. Slope Conditions and Land Use in Sub-basins (2/2)

Sub-basin	Slope	C-1 Urban A	C-2 R. Paddy	C-3 Pasture-1	C-4: Pasture-2			C-5: Upland crop			C-6 Forestation	C-7 N. Forest	C-8 Wetland-1	C-9 Wetland-2	C-10 Coast & D.	C-11 Water	C-12 Cloud	Total
					Pasture-2	from C-5	Amendment	Upland C.	(%)	Amendment								
L40-2	s<5%	0.0	93.4	0.0	81.8	0.3	82.1	7.5	100.0	7.2	0.0	10.8	75.8	67.1	0.1	39.2	115.6	491.4
	5<s<15%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15<s<25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	93.4	0.0	81.8		82.1	7.5		7.2	0.0	10.8	75.8	67.1	0.1	39.2	115.6	491.4
L40-3	s<5%	0.6	459.9	0.0	1,032.5	(4.3)	1,028.2	19.8	100.0	24.1	5.1	133.7	206.9	187.0	146.5	493.9	1,280.0	3,965.7
	5<s<15%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15<s<25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.6	459.9	0.0	1,032.5		1,028.2	19.8		24.1	5.1	133.7	206.9	187.0	146.5	493.9	1,280.0	3,965.7
L40-4	s<5%	2.6	115.7	95.1	794.8	73.8	868.6	114.5	22.7	40.7	13.7	201.8	21.2	0.0	1.4	23.6	0.0	1,384.3
	5<s<15%	0.0	146.4	279.5	1,762.9	195.4	1,958.2	303.0	60.0	107.6	53.1	778.3	3.7	0.0	12.9	24.4	0.0	3,364.0
	15<s<25%	0.0	9.0	80.0	384.1	56.4	440.5	87.4	17.3	31.1	15.3	166.5	0.5	0.0	5.4	0.9	0.0	749.1
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	2.6	271.1	454.6	2,941.8		3,267.3	504.9		179.3	82.0	1,146.6	25.4	0.0	19.7	48.8	0.0	5,497.3
L40-5	s<5%	0.0	634.5	23.5	1,263.6	4.4	1,267.9	136.6	44.9	132.2	5.6	74.4	96.0	0.0	18.8	82.3	0.0	2,335.4
	5<s<15%	0.1	46.8	70.3	553.4	4.4	557.8	137.4	45.1	133.0	13.9	195.4	6.4	0.0	5.5	13.8	0.0	1,043.0
	15<s<25%	0.0	4.7	30.2	125.8	1.0	126.8	30.4	10.0	29.4	14.2	122.8	0.2	0.0	1.9	0.0	0.0	330.2
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.1	686.1	124.1	1,942.8		1,952.5	304.3		294.6	33.7	392.6	102.6	0.0	26.2	96.1	0.0	3,708.6
L40-6	s<5%	0.8	90.2	0.0	225.1	4.4	229.5	29.1	8.7	24.8	4.7	62.0	22.0	0.0	1.5	11.6	0.0	447.0
	5<s<15%	2.0	90.4	300.5	1,759.3	38.4	1,797.8	257.3	77.0	218.8	237.3	1,711.6	4.3	0.0	12.6	2.3	0.0	4,377.5
	15<s<25%	0.7	11.6	61.6	382.1	7.1	389.2	47.7	14.3	40.6	53.0	393.9	0.0	0.0	2.1	0.0	0.0	952.6
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	3.5	192.2	362.0	2,366.5		2,416.4	334.1		284.2	294.9	2,167.5	26.3	0.0	16.1	13.9	0.0	5,777.1
L40-7	s<5%	42.4	115.9	0.0	252.3	(75.0)	177.3	14.7	54.1	89.6	7.8	75.3	115.1	0.0	3.6	21.8	0.0	648.8
	5<s<15%	0.0	9.4	0.0	106.3	(48.7)	57.6	9.5	35.1	58.2	10.9	52.8	2.5	0.0	1.2	1.2	0.0	193.8
	15<s<25%	0.0	2.3	0.0	44.2	(15.0)	29.2	2.9	10.8	17.9	7.2	32.8	0.0	0.0	0.8	0.0	0.0	90.1
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	42.4	127.6	0.0	402.8		264.2	27.1		165.8	25.8	160.9	117.6	0.0	5.6	22.9	0.0	932.7
L40-8	s<5%	2.2	286.2	0.0	264.2	(94.5)	169.7	10.8	31.5	105.3	0.2	41.8	80.8	0.0	3.3	22.4	7.9	719.8
	5<s<15%	0.0	64.0	0.0	263.4	(158.0)	105.4	18.0	52.6	176.0	33.7	195.6	8.7	0.0	1.3	0.4	0.0	585.1
	15<s<25%	0.0	10.0	0.0	168.0	(48.2)	119.8	5.5	16.0	53.7	27.9	127.6	0.0	0.0	1.6	0.0	0.0	340.6
	s>25%	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
	total	2.2	360.2	0.0	695.7		394.9	34.3		334.8	61.8	365.1	89.5	0.0	6.2	22.8	7.9	1,645.3
L40-9	s<5%	0.0	52.7	0.0	31.9	(12.3)	19.6	10.6	100.0	22.9	0.1	15.1	42.5	0.0	0.0	9.9	354.8	517.6
	5<s<15%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4
	15<s<25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	s>25%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	total	0.0	52.7	0.0	31.9		19.6	10.6		22.9	0.1	15.1	42.5	0.0	0.0	10.3	354.8	518.0

Source: JICA Study Team



### 3. Presumption of Cropping Area of Upland Crop

Sub-basin	Municipality	Area in Percentage	Gross Agricultural Land (ha)	Gross Paddy (ha)	Gross Upland crop (ha)	Net Upland crop (ha)	Sub-total (ha)
L20	Viamao	0.40	27,853	22,300	5,553	2,221	15,738
	Sta. Antonio da Patrulha	0.33	23,924	12,700	11,224	3,704	
	Osorio	0.20	4,800	3,410	1,390	278	
	Cidreira	0.10	2,343	1,434	909	91	
	Balneiro Pinhal	0.10	6,610	0	6,610	661	
	Parmares do Sul	0.98	25,390	24,500	890	872	
	Mostardas	1.00	35,216	33,300	1,916	1,916	
	Tavares	1.00	6,240	2,120	4,120	4,120	
	Sao Jose do Norte	0.45	6,897	2,730	4,167	1,875	
L30-1	Cacapava do Sul	0.25	17,980	4,020	13,960	3,490	8,478
	Lavras do Sul	0.50	5,556	1,950	3,606	1,803	
	Bage	0.25	27,116	18,000	9,116	2,279	
	Dom Pedrito	0.10	43,555	34,500	9,055	906	
L30-2	Cacapava do Sul	0.25	17,980	4,020	13,960	3,490	7,611
	Bage	0.25	27,116	18,000	9,116	2,279	
	Hulha Negra	0.25	8,190	1,400	6,790	1,698	
	Candiota	0.10	2,045	600	1,445	145	
L30-3	Santana da Boa Vista	0.50	7,850	435	7,415	3,708	94,296
	Pinheiro Machado	0.50	7,515	400	7,115	3,558	
	Piratini	0.50	20,715	1,320	19,395	9,698	
	Encruzilhada do Sul	0.50	10,393	1,000	9,393	4,697	
	Cangucu	0.67	82,610	1,710	80,900	54,203	
	Amaral Ferrador	1.00	6,330	650	5,680	5,680	
	Dom Feliciano	0.67	15,474	190	15,284	10,240	
	Chuívisca	1.00	0	0	0	0	
	Sao Jeronimo	0.20	13,790	1,220	12,570	2,514	
L30-4	Camaqua	0.50	42,966	25,535	17,431	8,716	26,158
	Cristal	1.00	12,159	5,920	6,239	6,239	
	Sao Lourenco do Sul	0.33	43,480	9,530	33,950	11,204	
L30-5	Barao do Triunfo	0.33	6,165	150	6,015	1,985	14,567
	Cerro Grande do Sul	1.00	6,240	656	5,584	5,584	
	Sentinela do Sul	0.80	3,788	1,801	1,987	1,590	
	Tapes	0.95	11,360	11,000	360	342	
	Camaqua	0.25	42,966	25,535	17,431	4,358	
	Arambare	1.00	11,909	11,200	709	709	
L30-6	Sao Lourenco do Sul	0.67	43,480	9,530	33,950	22,747	30,264
	Camaqua	0.25	42,966	25,535	17,431	4,358	
	Turucu	0.70	0	0	0	0	
	Arroio do Padre	0.45	0	0	0	0	
	Pelotas	0.10	42,350	10,750	31,600	3,160	
L40-1	Rio Grande	0.40	29,600	26,000	3,600	1,440	2,622
	Santa Vitoria do Palmar	0.55	92,149	90,000	2,149	1,182	
	Chuí	0.45	0	0	0	0	
L40-2	Rio Grande	0.20	29,600	26,000	3,600	720	720
L40-3	Rio Grande	0.40	29,600	26,000	3,600	1,440	2,407
	Santa Vitoria do Palmar	0.45	92,149	90,000	2,149	967	
	Chuí	0.55	0	0	0	0	
L40-4	Acegua	0.60	0	0	0	0	17,927
	Hulha Negra	0.75	8,190	1,400	6,790	5,093	
	Candiota	0.90	2,045	600	1,445	1,301	
	Pedras Altas	1.00	0	0	0	0	
	Herval	0.50	25,000	5,500	19,500	9,750	
	Jaguarao	0.60	24,973	22,000	2,973	1,784	
L40-5	Herval	0.50	25,000	5,500	19,500	9,750	29,455
	Jaguarao	0.40	24,973	22,000	2,973	1,189	
	Arroio Grande	1.00	45,716	39,000	6,716	6,716	
	Pedro Osorio	1.00	14,800	3,000	11,800	11,800	
L40-6	Pinheiro Machado	0.50	7,515	400	7,115	3,558	28,423
	Piratini	0.50	20,715	1,320	19,395	9,698	
	Cangucu	0.17	82,610	1,710	80,900	13,753	
	Cerrito	1.00	0	0	0	0	
	Capao do Leao	0.20	15,076	8,000	7,076	1,415	
L40-7	Morro Redondo	0.80	3,786	10	3,776	3,021	16,582
	Capao do Leao	0.80	15,076	8,000	7,076	5,661	
	Pelotas	0.25	42,350	10,750	31,600	7,900	
L40-8	Cangucu	0.16	82,610	1,710	80,900	12,944	33,484
	Pelotas	0.65	42,350	10,750	31,600	20,540	
L40-9	Parmares do Sul	0.00	25,390	24,500	890	0	2,292
	Mostardas	0.00	35,216	33,300	1,916	0	
	Tavares	0.00	6,240	2,120	4,120	0	
	Sao Jose do Norte	0.55	6,897	2,730	4,167	2,292	
Total						331,024	331,024

Source: Economy and Statistic Foundation (CEE)/SCP