

7.2 Water Demand Projection

Applying the same rates as the estimation of current water consumption (refer to Section 7.1), future water demand of agriculture in Iguaçú and Tibagi river basin was computed and the result is shown in Table-7.3 and Table-7.4.

(1) Iguaçú River Basin

The total volume required for agriculture in Iguaçú river basin would be 71.1 thousand m³/day in 2005 and 83.9 thousand m³/day in 2015 with increase of livestock population and expansion of fish pond area.

Among 101 municipalities in Iguaçú river basin, Bituruna would require the biggest volume (5.7 thousand m³/day) mainly due to the large area of fish ponds. Fish ponds would consume more than 40 % of the total water required for agriculture in 2015, while cattle and chicken would consume 28 % and 23 % of the total water demand. Water demand in Iguaçú river basin is much more influenced by the expansion of fish ponds. Since it was assumed that pig population in the state will be stabilized at 4 million heads by the year of 2000, its water demand would increase only 11 % more than the current water consumption.

(2) Tibagi River Basin

The total volume required for agriculture in Tibagi river basin would be 18.8 thousand m³/day in 2005 and 22.0 thousand m³/day in 2015 with increase of livestock population and expansion of fish pond area.

Among 43 municipalities in Tibagi river basin, Londrina and Tibagi would require the much more volume of water, 3.3 thousand m³/day and 2.2 thousand m³/day respectively, mainly due to the large population of cattle. As mentioned before, in Londrina and Tibagi cattle raising is practiced extensively and future trend shows an increase in cattle population. And thus the water would be required more in these municipalities compared to others.

In contrast to Iguaçú river basin, 54 % (11.8 thousand m³/day) of the total water demand of agriculture in 2015 would be consumed by cattle, while fish ponds would consume 29 % (6.4 thousand m³/day) of the total. Poultry farming and pig raising would consume 12 % (2.7 m³/day) and 5 % (1.1 m³/day) of the agricultural water in 2015. Water demand in Tibagi river basin is characterized with cattle raising.

Table-7.3 Water Demand Projection of Agricultural Water in Iguazu River Basin (1/2)

Unit: 1,000 m³/day

Div	No.	Municipality	1994					2005					2015					
			Cattle	Pig	Chicken	Fish	Total	Cattle	Pig	Chicken	Fish	Total	Cattle	Pig	Chicken	Fish	Total	
I	I-001	Campina Grande do Sul	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13
	I-002	Quatro Barras	0.01	0.00	0.00	0.06	0.07	0.01	0.00	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.12	0.13
	I-003	Piraquara	0.03	0.00	0.00	0.01	0.04	0.03	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.01	0.05
	I-004	Sao Jose dos Pinhais	0.09	0.07	0.09	0.12	0.37	0.10	0.07	0.12	0.15	0.44	0.12	0.07	0.14	0.16	0.51	0.51
	I-005	Colombo	0.01	0.01	0.00	0.08	0.10	0.06	0.01	0.00	0.08	0.02	0.01	0.00	0.00	0.10	0.12	0.12
	I-006	Pinhais	0.02	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.01	0.03
	I-007	Almirante Tamandare	0.02	0.02	0.05	0.02	0.11	0.02	0.02	0.00	0.02	0.12	0.02	0.02	0.07	0.03	0.14	0.14
	I-008	Curitiba	0.01	0.00	0.02	0.00	0.03	0.01	0.00	0.00	0.00	0.04	0.02	0.00	0.03	0.00	0.00	0.06
	I-009	Campo Largo	0.02	0.00	0.00	0.10	0.15	0.03	0.00	0.00	0.12	0.18	0.03	0.00	0.00	0.15	0.21	0.21
	I-010	Araucaria	0.03	0.01	0.12	0.25	0.41	0.03	0.01	0.15	0.31	0.60	0.04	0.01	0.19	0.38	0.62	0.62
	I-011	Fazenda Rio Grande	0.02	0.01	0.09	0.10	0.22	0.02	0.01	0.12	0.12	0.27	0.03	0.01	0.14	0.15	0.33	0.33
	I-012	Mandrituba	0.02	0.03	0.02	0.22	0.28	0.03	0.02	0.04	0.27	1.14	0.03	0.04	0.06	0.33	1.36	1.36
	I-013	Tijucas do Sul	0.03	0.02	0.11	0.02	0.16	0.03	0.02	0.14	0.05	0.22	0.04	0.02	0.17	0.04	0.27	0.27
	I-014	Beira Nova	0.01	0.00	0.00	0.15	0.16	0.02	0.00	0.00	0.19	0.21	0.02	0.00	0.00	0.20	0.25	0.25
	I-015	Contenda	0.07	0.04	0.00	0.06	0.17	0.09	0.04	0.00	0.07	0.20	0.10	0.04	0.00	0.09	0.23	0.23
	I-016	Agudos do Sul	0.03	0.02	0.01	0.30	0.36	0.03	0.00	0.02	0.37	0.44	0.04	0.02	0.02	0.45	0.53	0.53
	I-017	Pian	0.03	0.02	0.11	0.16	0.32	0.04	0.02	0.13	0.20	0.39	0.04	0.02	0.16	0.24	0.46	0.46
	I-018	Rio Negro	0.09	0.03	0.20	0.03	0.35	0.11	0.04	0.25	0.44	0.44	0.12	0.04	0.31	0.05	0.52	0.52
	I-019	Campo do Tenente	0.07	0.01	0.02	0.07	0.17	0.09	0.01	0.02	0.09	0.21	0.10	0.01	0.03	0.11	0.25	0.25
	I-020	Lapa	0.32	0.08	0.14	0.14	0.69	0.39	0.09	0.18	0.17	0.83	0.45	0.09	0.22	0.21	0.97	0.97
	I-021	Ponto Amazonas	0.02	0.01	0.03	0.01	0.07	0.03	0.01	0.04	0.01	0.06	0.03	0.01	0.05	0.02	0.11	0.11
	I-022	Palmeira	0.07	0.02	0.02	0.03	0.14	0.08	0.02	0.02	0.03	0.15	0.09	0.02	0.03	0.04	0.16	0.16
	I-023	Sao Jose do Thunfo	0.06	0.02	0.00	0.02	0.10	0.07	0.03	0.00	0.02	0.12	0.03	0.03	0.00	0.03	0.14	0.14
	I-024	Antonio Clinto	0.04	0.05	0.00	0.06	0.13	0.05	0.06	0.00	0.07	0.16	0.05	0.06	0.00	0.09	0.20	0.20
	I-025	Sao Mateus do Sul	0.15	0.07	0.05	0.10	0.37	0.18	0.08	0.06	0.12	0.44	0.21	0.08	0.06	0.15	0.52	0.52
	I-026	Reboucos	0.08	0.01	0.05	0.10	0.22	0.06	0.01	0.00	0.12	0.27	0.09	0.01	0.07	0.15	0.32	0.32
	I-027	Ireti	0.05	0.03	0.00	0.12	0.20	0.06	0.04	0.00	0.15	0.25	0.06	0.04	0.00	0.16	0.28	0.28
	I-028	Rio Azul	0.08	0.03	0.01	0.42	0.54	0.09	0.03	0.01	0.52	0.65	0.10	0.03	0.02	0.64	0.79	0.79
	I-029	Mallet	0.06	0.06	0.17	0.20	0.51	0.05	0.06	0.09	0.22	0.64	0.09	0.09	0.27	0.30	0.75	0.75
	I-030	Paulo Frontin	0.05	0.05	0.17	0.27	0.54	0.05	0.05	0.22	0.34	0.63	0.06	0.05	0.27	0.41	0.79	0.79
I-031	Paula Freitas	0.05	0.01	0.13	0.01	0.20	0.08	0.02	0.17	0.01	0.28	0.06	0.02	0.20	0.02	0.30	0.30	
I-032	Uniao da Vitoria	0.28	0.02	0.02	0.15	0.47	0.34	0.02	0.05	0.19	0.56	0.39	0.02	0.04	0.23	0.88	0.88	
I-033	Ponto Vitoria	0.03	0.01	0.00	0.04	0.08	0.04	0.01	0.00	0.05	0.10	0.04	0.01	0.00	0.06	0.11	0.11	
I-034	General Carneiro	0.20	0.02	0.00	0.10	0.32	0.24	0.02	0.00	0.12	0.38	0.28	0.02	0.00	0.15	0.45	0.45	
I-035	Blunnie	0.30	0.10	0.01	3.50	3.81	0.23	0.11	0.01	4.85	4.70	0.22	0.11	0.02	5.30	5.70	5.70	
I-036	Cruz Machado	0.16	0.23	0.03	0.58	0.98	0.19	0.25	0.04	0.70	1.18	0.22	0.25	0.04	0.85	1.36	1.36	
I-037	Inacio Martins	0.09	0.04	0.00	0.59	0.72	0.10	0.05	0.00	0.74	0.89	0.12	0.05	0.00	0.89	1.06	1.06	
I-038	Guarapuava	0.58	0.17	0.00	1.60	2.53	0.67	0.19	0.00	2.25	3.11	0.78	0.19	0.00	2.73	3.70	3.70	
I-039	Pinhao	0.67	0.11	0.00	0.00	0.78	0.81	0.13	0.00	0.94	0.94	0.89	0.13	0.00	0.00	1.06	1.06	
I-040	Palmas	0.65	0.03	0.00	1.90	2.58	0.78	0.03	0.00	2.36	3.17	0.89	0.03	0.00	2.89	3.89	3.89	
I-041	Clevelandia	0.31	0.03	0.06	1.25	1.65	0.37	0.03	0.07	1.55	2.02	0.42	0.03	0.00	1.89	2.43	2.43	
I-042	Honorio-Serpe	0.09	0.02	0.00	0.01	0.12	0.10	0.02	0.00	0.01	0.13	0.12	0.02	0.00	0.02	0.16	0.16	
I-043	Mangueirinha	0.22	0.04	0.00	0.10	0.36	0.26	0.04	0.00	0.12	0.42	0.30	0.04	0.00	0.15	0.49	0.49	
I-044	Candi	0.62	0.06	0.00	0.00	0.70	0.74	0.06	0.00	0.80	0.80	0.85	0.06	0.00	0.00	0.93	0.93	
I-045	Cantagalo	0.14	0.07	0.00	0.00	0.21	0.18	0.08	0.00	0.00	0.24	0.19	0.05	0.00	0.00	0.28	0.28	
I-046	Virmond	0.04	0.05	0.00	0.00	0.06	0.05	0.05	0.00	0.00	0.10	0.06	0.05	0.00	0.00	0.11	0.11	
I-047	Laranjeiras do Sul	0.21	0.06	0.00	0.20	0.47	0.25	0.07	0.00	0.28	0.58	0.29	0.07	0.00	0.31	0.67	0.67	
I-048	Chopinzinho	0.44	0.06	0.06	0.60	1.49	0.53	0.09	0.47	0.75	1.84	0.61	0.09	0.56	0.91	2.17	2.17	
I-049	Coronel Vivida	0.34	0.08	0.03	0.36	0.82	0.40	0.10	0.04	0.45	0.90	0.46	0.10	0.05	0.55	1.16	1.16	
I-050	Pato Branco	0.26	0.06	0.73	0.15	1.19	0.31	0.06	0.84	0.19	1.50	0.36	0.06	1.13	0.23	1.78	1.78	
I-051	Maripolis	0.10	0.02	0.10	0.06	0.28	0.12	0.02	0.12	0.07	0.33	0.13	0.02	0.06	0.15	0.39	0.39	

Table-7.3 Water Demand Projection of Agricultural Water in Iguacu River Basin (2/2)

Unit: 1,000 m³/day

Div	No.	Municipality	1994				2005				2015				Total		
			Cattle	Pig	Chicken	Fish	Total	Cattle	Pig	Chicken	Fish	Total	Cattle	Pig		Chicken	Fish
	I-053	Vitõnio	0.11	0.07	0.27	0.17	0.62	0.13	0.08	0.35	0.21	0.77	0.15	0.08	0.42	0.26	0.91
	I-054	Renasçanca	0.17	0.06	0.10	0.40	0.72	0.20	0.05	0.13	0.50	0.68	0.24	0.05	0.15	0.81	1.05
	I-055	Bom Sucesso do Sul	0.15	0.04	0.12	0.30	0.59	0.16	0.04	0.15	0.37	0.72	0.19	0.04	0.19	0.45	0.87
	I-056	Itaipava D'Oeste	0.12	0.09	0.54	0.10	0.85	0.15	0.10	0.89	0.12	1.06	0.22	0.10	0.83	0.15	1.25
	I-057	Veve	0.16	0.05	0.18	0.32	0.71	0.19	0.06	0.23	0.40	0.99	0.22	0.06	0.28	0.49	1.05
	I-058	São João	0.20	0.07	0.79	0.11	1.29	0.31	0.07	1.02	0.14	1.54	0.36	0.07	1.22	0.17	1.82
	I-059	Sulina	0.13	0.03	0.03	0.16	0.35	0.16	0.03	0.03	0.20	0.42	0.19	0.03	0.04	0.24	0.50
	I-060	Saúde do Iguacu	0.11	0.01	0.20	0.04	0.36	0.13	0.01	0.28	0.05	0.45	0.16	0.01	0.31	0.08	0.54
	I-061	Rio Bonito do Iguacu	0.08	0.03	0.00	0.00	0.09	0.07	0.03	0.00	0.00	0.10	0.08	0.03	0.00	0.00	0.11
	I-062	Nova Laranjeiras	0.17	0.03	0.01	0.00	0.21	0.21	0.03	0.01	0.00	0.28	0.24	0.03	0.01	0.00	0.28
	I-063	Guaraniazçu	0.40	0.04	0.13	0.08	0.65	0.48	0.05	0.18	0.07	0.78	0.58	0.05	0.19	0.08	0.88
	I-064	Quedas do Iguacu	0.36	0.05	0.06	0.07	0.54	0.43	0.05	0.08	0.09	0.63	0.49	0.05	0.10	0.11	0.75
	I-065	São Jorge do Oeste	0.16	0.03	0.18	0.21	0.58	0.20	0.04	0.23	0.28	0.73	0.23	0.04	0.28	0.32	0.87
	I-066	Crúzer do Iguacu	0.07	0.02	0.70	0.01	0.80	0.09	0.02	0.90	0.01	1.02	0.10	0.02	1.08	0.02	1.22
	I-067	Boa Esperança do Iguacu	0.11	0.04	0.08	0.10	0.31	0.13	0.05	0.08	0.12	0.39	0.15	0.05	0.10	0.15	0.45
	I-068	Colô Vizinhas	0.22	0.18	1.00	0.07	1.47	0.27	0.21	1.28	0.09	1.85	0.31	0.21	1.54	0.11	2.17
	I-069	Enxias Marques	0.15	0.10	0.07	0.04	0.36	0.18	0.12	0.10	0.06	0.45	0.21	0.12	0.11	0.08	0.50
	I-070	Francisco Beltrão	0.34	0.15	0.45	1.04	1.98	0.41	0.17	0.53	1.29	2.45	0.47	0.17	0.70	1.53	2.92
	I-071	Marmeleiro	0.15	0.12	0.13	0.15	0.55	0.18	0.13	0.17	0.19	0.67	0.21	0.13	0.20	0.23	0.77
	I-072	Fior da Serra do Sul	0.10	0.06	0.04	0.02	0.24	0.13	0.06	0.05	0.14	0.38	0.29	0.03	0.06	0.13	0.65
	I-073	Garracão	0.21	0.03	0.03	0.03	0.32	0.25	0.03	0.04	0.06	0.30	0.29	0.03	0.05	0.08	0.45
	I-074	Salgado Filho	0.35	0.08	0.16	0.04	0.63	0.42	0.09	0.21	0.05	0.77	0.48	0.09	0.25	0.08	0.88
	I-075	Santo Antônio do Sudoeeste	0.19	0.01	0.03	0.08	0.31	0.23	0.01	0.10	0.12	0.46	0.28	0.01	0.12	0.03	0.71
	I-076	Piançitta	0.10	0.08	0.03	0.30	0.49	0.12	0.07	0.04	0.37	0.60	0.14	0.07	0.05	0.45	0.71
	I-077	Pinhal de São Bento	0.04	0.03	0.02	0.07	0.16	0.04	0.04	0.03	0.09	0.20	0.05	0.04	0.04	0.11	0.24
	I-078	Ampare	0.15	0.07	0.92	0.04	1.18	0.18	0.06	1.18	0.06	1.49	0.20	0.08	1.42	0.06	1.78
	I-079	Novo Esperança do Sudoeeste	0.18	0.06	0.20	0.03	0.48	0.21	0.08	0.29	0.04	0.59	0.25	0.06	0.31	0.05	0.89
	I-080	São do Lorrna	0.16	0.06	0.79	0.55	1.58	0.22	0.07	1.01	0.68	1.98	0.25	0.07	1.22	0.83	2.37
	I-081	Santa Izabel do Oeste	0.16	0.07	0.24	0.04	0.51	0.19	0.06	0.31	0.05	0.63	0.22	0.06	0.37	0.09	0.73
	I-082	Nova Pritz do Iguacu	0.32	0.22	0.04	0.09	0.67	0.38	0.24	0.05	0.11	0.78	0.44	0.24	0.06	0.14	0.88
	I-083	Perola do Oeste	0.13	0.09	0.01	0.09	0.32	0.16	0.10	0.02	0.11	0.39	0.18	0.10	0.02	0.14	0.44
	I-084	Pianalto	0.34	0.08	0.00	0.03	0.47	0.41	0.09	0.00	0.06	0.58	0.47	0.09	0.00	0.08	0.64
	I-085	Roselze	0.25	0.08	0.03	0.03	0.39	0.30	0.08	0.04	0.04	0.47	0.35	0.09	0.05	0.05	0.54
	I-086	Caparnaema	0.30	0.04	0.18	0.25	0.75	0.37	0.04	0.21	0.31	0.63	0.42	0.04	0.25	0.38	1.09
	I-087	Três Barras do Paraná	0.34	0.06	0.08	0.05	0.55	0.40	0.09	0.11	0.09	0.69	0.46	0.09	0.13	0.08	0.76
	I-088	Catanduvas	0.19	0.04	0.07	0.12	0.42	0.22	0.04	0.09	0.15	0.50	0.26	0.04	0.11	0.18	0.59
	I-089	Ibema	0.09	0.01	0.07	0.11	0.28	0.10	0.01	0.09	0.14	0.34	0.12	0.01	0.11	0.17	0.41
	I-090	Cacavel	0.39	0.10	0.25	0.27	1.01	0.47	0.11	0.32	0.33	1.29	0.54	0.11	0.39	0.41	1.45
	I-091	Boa Vista da Aparecida	0.17	0.01	0.05	0.02	0.25	0.20	0.01	0.05	0.02	0.29	0.23	0.01	0.07	0.03	0.34
	I-092	Capitão Leonidas Marques	0.17	0.03	0.22	0.15	0.57	0.20	0.04	0.26	0.19	0.71	0.23	0.04	0.34	0.23	0.84
	I-093	Santa Lucia	0.21	0.01	0.04	0.00	0.28	0.25	0.02	0.05	0.00	0.32	0.29	0.02	0.06	0.00	0.37
	I-094	Lindoeeste	0.34	0.03	0.03	0.08	0.48	0.40	0.04	0.03	0.10	0.57	0.46	0.04	0.04	0.12	0.86
	I-095	Santa Tereza do Oeste	0.10	0.03	0.01	0.07	0.21	0.11	0.03	0.02	0.09	0.25	0.13	0.03	0.02	0.11	0.29
	I-096	Ceu Azul	0.21	0.11	0.08	0.08	0.46	0.25	0.12	0.10	0.08	0.59	0.29	0.12	0.12	0.09	0.82
	I-097	Mafelandia	0.32	0.15	0.17	0.12	0.91	0.32	0.17	0.15	0.40	1.10	0.44	0.17	0.18	0.48	1.27
	I-098	Medianeira	0.32	0.07	0.03	0.15	0.48	0.28	0.07	0.04	0.18	0.57	0.32	0.07	0.05	0.22	0.86
	I-099	São Miguel do Iguacu	0.23	0.01	0.01	0.02	0.14	0.11	0.01	0.01	0.03	0.16	0.13	0.01	0.01	0.03	0.18
	I-100	Santa Teresinha de Itaipu	0.10	0.01	0.01	0.08	0.20	0.11	0.01	0.01	0.10	0.23	0.13	0.01	0.01	0.12	0.27
	I-101	Foz do Iguacu	16.87	5.20	12.53	23.41	58.01	20.15	5.77	18.07	29.08	71.09	23.22	5.77	19.38	35.52	83.89
	Total																

Table-7.4 Water Demand Projection of Agricultural Water in Tibagi River Basin

Unit: 1,000 m³/day

Div.	No.	Municipality	1994				2005				2015				Total	
			Cattle	Pig	Chicken	Fish	Total	Cattle	Pig	Chicken	Fish	Total	Cattle	Pig		Chicken
	T-001	Porro Amazonas	0.01	0.00	0.01	0.00	0.02	0.01	0.00	0.02	0.00	0.01	0.00	0.02	0.00	0.03
	T-002	Palmeira	0.30	0.09	0.08	0.17	0.64	0.36	0.09	0.11	0.21	0.41	0.09	0.13	0.26	0.89
	T-003	Teutera Soares	0.20	0.08	0.00	0.24	0.52	0.24	0.09	0.00	0.30	0.63	0.09	0.00	0.37	0.74
	T-004	Irati	0.02	0.01	0.00	0.04	0.07	0.02	0.01	0.00	0.05	0.08	0.01	0.00	0.06	0.09
	T-005	Imbuva	0.14	0.05	0.00	0.02	0.21	0.17	0.06	0.00	0.03	0.26	0.06	0.00	0.04	0.30
	T-006	Ipiranga	0.18	0.03	0.00	0.34	0.55	0.22	0.03	0.00	0.42	0.67	0.25	0.03	0.00	0.80
	T-007	Ponta Grossa	0.43	0.04	0.24	0.10	0.81	0.51	0.05	0.31	0.12	0.99	0.59	0.05	0.37	1.16
	T-008	Castro	0.66	0.04	0.29	0.26	1.25	0.79	0.05	0.37	0.32	1.53	0.91	0.05	0.44	1.79
	T-009	Nvai	0.03	0.01	0.00	0.35	0.39	0.03	0.01	0.00	0.43	0.47	0.04	0.01	0.00	0.53
	T-010	Reserva	0.15	0.01	0.00	0.25	0.41	0.18	0.01	0.00	0.31	0.50	0.21	0.01	0.00	0.60
	T-011	Tibagi	1.11	0.11	0.00	0.34	1.56	1.33	0.12	0.00	0.42	1.87	1.53	0.12	0.00	2.17
	T-012	Piraí do Sul	0.31	0.05	0.20	0.05	0.61	0.38	0.05	0.25	0.06	0.74	0.43	0.05	0.30	0.86
	T-013	Ventania	0.10	0.00	0.00	0.02	0.12	0.12	0.00	0.00	0.03	0.15	0.13	0.00	0.04	0.17
	T-014	Telemaco Borba	0.08	0.01	0.00	0.50	0.59	0.10	0.01	0.00	0.62	0.73	0.12	0.01	0.00	0.89
	T-015	Orqueira	0.69	0.06	0.00	0.40	1.25	0.83	0.09	0.00	0.60	1.52	0.96	0.09	0.00	1.78
	T-016	Curva	0.01	0.00	0.01	0.01	0.03	0.02	0.00	0.01	0.01	0.04	0.02	0.00	0.01	0.04
	T-017	Sapoperna	0.28	0.01	0.00	0.00	0.29	0.33	0.01	0.00	0.00	0.34	0.38	0.01	0.00	0.39
	T-018	Sao Jeronimo de Serra	0.47	0.03	0.00	0.03	0.53	0.57	0.03	0.00	0.04	0.64	0.65	0.03	0.00	0.73
	T-019	Mau da Serra	0.02	0.00	0.01	0.00	0.03	0.02	0.00	0.01	0.00	0.03	0.02	0.00	0.01	0.03
	T-020	Marilandia do Sul	0.10	0.00	0.01	0.03	0.14	0.12	0.00	0.01	0.04	0.17	0.14	0.00	0.02	0.20
	T-021	Califomia	0.09	0.00	0.00	0.00	0.09	0.11	0.00	0.00	0.00	0.11	0.13	0.00	0.00	0.13
	T-022	Apucarana	0.10	0.01	0.01	0.02	0.14	0.12	0.01	0.02	0.02	0.17	0.13	0.01	0.02	0.19
	T-023	Arapongas	0.07	0.09	0.05	0.07	0.28	0.09	0.10	0.06	0.09	0.34	0.10	0.10	0.07	0.38
	T-024	Londrina	1.62	0.10	0.47	0.18	2.37	1.95	0.11	0.60	0.22	2.88	2.24	0.11	0.72	3.34
	T-025	Nova Santa Barbara	0.01	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.03
	T-026	Santa Cecilia do Paraiso	0.01	0.00	0.00	0.02	0.03	0.01	0.00	0.00	0.02	0.03	0.01	0.00	0.03	0.04
	T-027	Santo Antonio do Paraiso	0.08	0.00	0.00	0.02	0.10	0.10	0.00	0.00	0.02	0.12	0.12	0.00	0.03	0.15
	T-028	Congonhinhas	0.05	0.00	0.00	0.00	0.05	0.06	0.00	0.00	0.00	0.06	0.07	0.00	0.00	0.07
	T-029	Nova Fatima	0.08	0.00	0.00	0.00	0.08	0.10	0.00	0.00	0.00	0.10	0.11	0.00	0.00	0.11
	T-030	Sao Sebastiao de Amoreira	0.10	0.00	0.00	0.01	0.11	0.11	0.00	0.00	0.01	0.12	0.13	0.00	0.00	0.15
	T-031	Assai	0.11	0.01	0.03	0.04	0.19	0.13	0.01	0.03	0.05	0.22	0.15	0.01	0.04	0.20
	T-032	Nova America de Colina	0.08	0.01	0.00	0.02	0.11	0.09	0.01	0.00	0.02	0.12	0.10	0.01	0.00	0.14
	T-033	Cornelio Procopio	0.24	0.00	0.00	0.02	0.26	0.28	0.00	0.00	0.03	0.31	0.33	0.00	0.00	0.36
	T-034	Uraí	0.09	0.02	0.00	0.15	0.26	0.11	0.03	0.00	0.19	0.33	0.13	0.03	0.00	0.39
	T-035	Jatuzelinho	0.12	0.00	0.00	0.00	0.12	0.14	0.00	0.00	0.00	0.14	0.16	0.00	0.00	0.16
	T-036	Ibipora	0.11	0.03	0.01	0.16	0.31	0.13	0.03	0.02	0.20	0.36	0.15	0.03	0.02	0.44
	T-037	Rolândia	0.02	0.01	0.02	0.01	0.06	0.02	0.01	0.03	0.01	0.07	0.03	0.01	0.03	0.09
	T-038	Centelha	0.04	0.01	0.01	0.00	0.06	0.05	0.01	0.02	0.00	0.08	0.06	0.01	0.02	0.09
	T-039	Sertãozinho	0.16	0.03	0.21	0.19	0.67	0.21	0.03	0.34	0.24	0.82	0.24	0.03	0.41	0.97
	T-040	Rancho Alegre	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.05	0.05
	T-041	Leopoldina	0.03	0.01	0.00	0.00	0.04	0.03	0.01	0.00	0.00	0.04	0.04	0.01	0.00	0.05
	T-042	Sertãozinho	0.03	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.04	0.05	0.00	0.00	0.05
	T-043	Primeiro de Maio	0.04	0.01	0.02	0.00	0.07	0.04	0.01	0.03	0.00	0.08	0.05	0.01	0.03	0.09
	Total		8.59	0.99	1.74	4.18	15.50	10.28	1.08	2.24	5.18	16.78	11.84	1.08	2.96	21.97

CHAPTER 8 RECOMMENDATION

The followings are recommended for the further study to improve the water environment in Paraná.

(1) Monitoring of Agro-toxic

According to IAP, approximately 425,000 ton of chemicals have been commercialized in Paraná from 1978 to 1990. Those chemicals have been applied to field as herbicide, pesticide and so on. Some of them remain in soil profile, water, sediment and air deteriorating the water environment.

Since agricultural chemicals are used without proper control in Paraná state, monitoring of agro-toxic is recommended to identify the location and magnitude of contamination, and effects on the water environment in order to propose countermeasures. There are hundreds of agricultural chemicals currently used. Therefore, the monitoring should give priority to the most harmful and widely used chemicals.

(2) Review of Data

During the study, it was often found the discrepancy of data among the government authorities or institutions. All studies are based on the data. If the data did not have expected accuracy, studies would be in vain. Therefore, it is necessary to review and update the data by a government agency which has an authority over the data and to use each data from one reliable source.

(3) Share of Data

For the improvement of the further studies or researches, it is necessary to make easy access to data of any government authorities. It is an ideal that there is a database accessible from any government authorities or individuals who have permission.

Appendix-1
Major Crops in Paraná with EMATER Division

Table-A1.1 Major Crops in Parana with EMATER Division (1/6)

No.	Region	Items	No. of Producers	Area (ha)	Productivity (ton/ha)	Production (1000ton)	Area Mechanized (ha)	Area Conserved (ha)
1	Paranagua	Banana	1,427	4,563	9.84	44.90	470	580
1	Paranagua	Cassava	1,306	1,312	19.53	25.63	340	140
2	Curitiba	Pasture (natural)	10,525	99,478	NA	NA	NA	130
2	Curitiba	Maize	20,992	73,330	2.27	166.43	33,240	4,140
2	Curitiba	Beans	18,913	31,378	0.70	21.91	11,450	1,736
2	Curitiba	Pasture (planted)	4,040	22,161	NA	NA	NA	660
2	Curitiba	Potato	4,005	13,370	14.53	194.27	13,251	1,045
2	Curitiba	Potato(Winter)	3,410	8,008	10.40	83.25	7,904	591
2	Curitiba	Beans (winter)	1,368	4,256	0.44	1.85	1,017	293
2	Curitiba	Cassava	4,292	2,991	18.70	55.93	196	56
2	Curitiba	Onion	3,230	2,517	9.81	24.70	2,292	1,085
2	Curitiba	Orange	976	2,016	17.47	35.22	330	241
2	Curitiba	Rice	3,562	1,193	1.11	1.33	632	171
2	Curitiba	Tomato	1,285	651	45.41	29.56	568	143
3	Lapa	Pasture (natural)	8,107	85,220	NA	NA	NA	43,648
3	Lapa	Maize	10,735	50,140	2.62	131.36	29,145	13,490
3	Lapa	Pasture (planted)	1,376	29,363	NA	NA	NA	26,180
3	Lapa	Beans	8,001	25,455	0.98	25.05	19,818	8,994
3	Lapa	Potato	1,291	5,592	14.52	81.19	5,542	396
3	Lapa	Soybean	122	4,800	2.24	10.75	4,800	2,525
3	Lapa	Tobacco	2,411	4,454	2.17	9.67	2,343	548
3	Lapa	Wheat	686	2,145	1.48	3.16	1,870	840
3	Lapa	Brazilian Potato	1,040	1,121	6.82	7.65	571	140
3	Lapa	Onion	1,124	962	7.84	7.55	847	255
3	Lapa	Rice	1,502	908	1.21	1.10	782	124
3	Lapa	Cassava	2,440	370	19.00	7.03	330	0
4	Ponta Grossa	Pasture (planted)	6,141	255,187	NA	NA	NA	59,158
4	Ponta Grossa	Pasture (natural)	9,119	248,873	NA	NA	NA	10,000
4	Ponta Grossa	Maize	23,420	219,038	3.42	749.44	163,437	108,921
4	Ponta Grossa	Soybean	2,294	129,435	2.86	370.08	129,235	112,183
4	Ponta Grossa	Beans	19,653	63,475	0.90	57.11	37,000	19,960
4	Ponta Grossa	Wheat	702	54,018	2.29	123.80	53,617	48,006
4	Ponta Grossa	Black Oats	860	20,064	1.48	29.77	16,339	16,169
4	Ponta Grossa	Maize(safrinha)	3,040	11,780	2.07	24.32	10,320	5,620
4	Ponta Grossa	Beans (winter)	1,882	11,520	1.52	17.47	10,830	7,905
4	Ponta Grossa	Rice	9,440	8,149	1.85	15.05	5,616	3,094
4	Ponta Grossa	Tobacco	3,048	6,220	1.94	12.04	4,220	1,400
4	Ponta Grossa	Cassava	6,199	3,155	21.18	66.83	1,973	615
4	Ponta Grossa	White Oats	75	3,032	1.68	5.09	2,532	2,232
4	Ponta Grossa	Soybean (safrinha)	26	1,230	2.20	2.70	1,230	1,210
4	Ponta Grossa	Potato	577	1,207	19.13	23.09	1,167	250
4	Ponta Grossa	Onion	1,196	293	12.06	3.53	222	89
5	Irati	Maize	15,549	81,620	2.35	191.99	58,170	21,740
5	Irati	Beans	13,529	58,550	0.82	48.22	47,050	14,610
5	Irati	Pasture (natural)	10,390	54,200	NA	NA	NA	0
5	Irati	Soybean	602	16,750	1.99	33.37	16,750	13,160
5	Irati	Pasture (planted)	2,756	15,525	NA	NA	NA	1,017
5	Irati	Rice	9,720	6,214	1.20	7.48	5,279	535
5	Irati	Wheat	910	3,650	1.61	5.89	3,350	2,530
5	Irati	Onion	1,450	1,865	12.37	23.07	1,515	405
5	Irati	Beans (winter)	587	1,860	0.75	1.40	1,860	1,025
5	Irati	Black Oats	488	1,780	NA	NA	1,780	1,780
5	Irati	Potato	544	1,521	16.84	25.61	1,441	366
5	Irati	Cassava	7,270	823	10.35	8.52	650	160
6	Uniao da Vitoria	Pasture (natural)	11,062	110,617	NA	NA	NA	0
6	Uniao da Vitoria	Pasture (planted)	3,970	51,302	NA	NA	NA	500

Table-A1.1 Major Crops in Parana with EMATER Division (2/6)

No.	Region	Items	No. of Producers	Area (ha)	Productivity (ton/ha)	Production (1000ton)	Area Mechanized (ha)	Area Conserved (ha)
6	Uniao da Vitoria	Maize	11,450	51,210	2.12	108.33	31,456	10,610
6	Uniao da Vitoria	Beans	11,620	37,514	0.93	34.68	23,769	4,580
6	Uniao da Vitoria	Soybean	180	8,603	2.15	18.51	8,603	4,544
6	Uniao da Vitoria	Rice	7,298	5,800	1.25	7.27	2,640	660
6	Uniao da Vitoria	Black Oats	1,160	3,508	8.55	30.00	2,368	1,610
6	Uniao da Vitoria	Cassava	4,500	2,233	19.33	43.16	589	90
6	Uniao da Vitoria	Beans (winter)	98	1,330	0.55	0.73	1,330	330
6	Uniao da Vitoria	Potato	657	1,229	16.60	20.41	1,177	14
6	Uniao da Vitoria	Wheat	382	1,113	1.62	1.80	854	196
6	Uniao da Vitoria	Onion	1,855	92	8.44	0.78	27	5
6	Uniao da Vitoria	Garlic	1,509	35	2.51	0.09	20	10
7	Guarapuava	Maize	27,748	308,554	2.93	905.08	203,775	121,200
7	Guarapuava	Pasture (planted)	9,386	228,000	NA	NA	NA	4,100
7	Guarapuava	Pasture (natural)	10,646	143,066	NA	NA	NA	0
7	Guarapuava	Soybean	1,026	86,050	2.41	207.65	85,550	81,775
7	Guarapuava	Beans	23,694	65,020	0.73	47.35	36,460	14,330
7	Guarapuava	Wheat	532	16,420	2.12	34.73	15,870	15,525
7	Guarapuava	Barley	208	14,880	2.40	35.77	14,680	7,115
7	Guarapuava	Rice	17,220	10,625	1.91	20.32	6,975	2,778
7	Guarapuava	Black Oats	1,100	10,300	0.49	5.00	5,940	6,300
7	Guarapuava	White Oats	448	9,110	2.24	20.38	8,820	8,820
7	Guarapuava	Maize (safrinha)	930	7,450	1.86	13.84	4,650	610
7	Guarapuava	Potato (winter)	110	2,980	17.99	53.62	2,830	30
7	Guarapuava	Beans (winter)	727	2,645	0.64	1.68	1,365	740
7	Guarapuava	Potato	485	1,063	16.06	17.07	1,053	49
7	Guarapuava	Cassava	4,720	812	17.48	14.19	322	0
7	Guarapuava	Onion	1,635	570	7.78	4.44	365	75
7	Guarapuava	Sugarcane	2,103	385	42.60	16.40	120	50
7	Guarapuava	Orange	1,185	31	6.81	0.21	8	0
8	Pato Branco	Maize	14,872	164,570	3.11	510.93	100,150	63,596
8	Pato Branco	Pasture (natural)	3,105	139,245	NA	NA	NA	0
8	Pato Branco	Pasture (planted)	10,543	120,932	NA	NA	NA	10,600
8	Pato Branco	Soybean	6,820	109,380	2.20	240.52	105,340	80,856
8	Pato Branco	Wheat	2,167	27,360	1.57	42.82	25,490	17,168
8	Pato Branco	Beans	10,886	20,760	1.13	23.49	11,405	7,010
8	Pato Branco	Maize (safrinha)	2,915	16,844	2.25	37.86	7,270	4,220
8	Pato Branco	Black Oats	2,140	15,880	0.77	12.30	12,920	11,870
8	Pato Branco	Rice	8,536	3,338	1.45	4.83	1,595	1,075
8	Pato Branco	Cassava	7,485	3,075	19.75	60.74	1,050	709
8	Pato Branco	Barley	130	1,546	2.04	3.15	1,546	1,180
8	Pato Branco	Beans (winter)	659	1,058	0.56	0.59	631	412
8	Pato Branco	Sugarcane	3,740	865	33.55	29.02	310	430
8	Pato Branco	Potato	4,045	313	16.27	5.09	270	66
8	Pato Branco	Orange	1,070	191	11.19	2.14	5	5
8	Pato Branco	Grape	1,490	144	11.24	1.62	17	30
8	Pato Branco	Onion	1,173	41	7.05	0.29	21	13
8	Pato Branco	Peach	1,007	34	14.56	0.50	11	11
9	Francisco Beltrao	Maize	33,495	257,144	2.73	701.36	123,112	111,446
9	Francisco Beltrao	Pasture (planted)	23,118	134,078	NA	NA	NA	12,002
9	Francisco Beltrao	Soybean	7,832	102,780	2.23	228.64	87,476	75,630
9	Francisco Beltrao	Maize (safrinha)	18,372	78,592	2.10	165.07	37,660	35,806
9	Francisco Beltrao	Beans	25,670	61,750	0.92	56.72	24,602	26,276
9	Francisco Beltrao	Wheat	9,337	50,390	1.56	78.74	42,594	31,924
9	Francisco Beltrao	Pasture (natural)	8,892	38,630	NA	NA	NA	1,670
9	Francisco Beltrao	Cassava	25,470	13,955	27.08	377.93	7,123	6,380
9	Francisco Beltrao	Black Oats	4,755	13,596	0.00	0.00	4,100	3,845
9	Francisco Beltrao	Rice	21,150	7,805	1.59	12.38	3,485	3,261
9	Francisco Beltrao	Beans (winter)	4,605	6,215	0.62	3.88	1,910	1,570
9	Francisco Beltrao	Sugarcane	16,190	4,569	32.25	147.34	662	1,181

Table-A1.1 Major Crops in Parana with EMATER Division (3/6)

No.	Region	Items	No. of Producers	Area (ha)	Productivity (ton/ha)	Production (1000ton)	Area Mechanized (ha)	Area Conserved (ha)
9	Francisco Beltrao	Coffee	565	1,102	1.62	1.78	0	345
9	Francisco Beltrao	Orange	3,934	609	12.01	7.31	224	177
9	Francisco Beltrao	Grape	3,603	552	11.12	6.14	7	29
9	Francisco Beltrao	Onion	4,716	301	9.03	2.72	82	72
9	Francisco Beltrao	Peanut	7,161	274	1.20	0.33	121	128
9	Francisco Beltrao	Potato	4,126	229	5.93	1.36	99	110
9	Francisco Beltrao	Garlic	2,655	71	3.68	0.26	9	11
10	Cascavel	Pasture (planted)	27,346	356,928	NA	NA	NA	25,715
10	Cascavel	Soybean	11,797	273,130	2.25	615.16	266,530	249,100
10	Cascavel	Malze	23,574	221,605	4.44	983.63	162,190	145,320
10	Cascavel	Wheat	5,451	114,040	1.14	129.63	113,520	103,430
10	Cascavel	Maize (safrinha)	5,413	66,189	1.94	128.09	62,840	58,180
10	Cascavel	Cotton	4,313	24,242	1.73	42.03	20,309	18,093
10	Cascavel	Black Oats	2,233	21,850	0.83	18.05	19,220	17,774
10	Cascavel	Cassava	20,233	18,095	27.95	505.68	15,229	12,678
10	Cascavel	Beans	11,182	16,540	1.01	16.75	9,015	8,243
10	Cascavel	Rice	11,599	7,098	1.76	12.46	4,985	4,406
10	Cascavel	Soybean (safrinha)	358	6,500	0.79	5.14	5,550	5,350
10	Cascavel	Sugarcane	6,845	2,045	44.55	91.10	1,108	1,108
10	Cascavel	Potato	5	1,800	NA	NA	NA	NA
10	Cascavel	Peanut	3,082	296	1.97	0.58	276	273
11	Toledo	Soybean	18,455	310,050	2.18	677.18	308,950	272,180
11	Toledo	Wheat	9,757	158,050	1.01	159.21	154,102	1,132,315
11	Toledo	Maize	13,155	132,230	4.86	642.41	125,380	114,820
11	Toledo	Pasture (planted)	17,422	123,267	NA	NA	NA	39,588
11	Toledo	Maize (safrinha)	9,495	115,020	2.53	290.46	113,670	102,787
11	Toledo	Soybean (safrinha)	3,938	58,750	0.93	54.87	58,750	54,200
11	Toledo	Cotton	5,297	38,910	1.42	55.28	36,440	31,409
11	Toledo	Cassava	9,111	20,529	26.21	538.06	18,435	16,474
11	Toledo	Pasture (natural)	1,220	18,688	NA	NA	NA	2,200
11	Toledo	Black Oats	3,625	14,370	2.90	41.68	11,850	10,705
11	Toledo	Coffee	1,308	7,290	1.48	10.76	395	360
11	Toledo	Beans	2,613	5,315	0.82	4.38	3,685	3,253
11	Toledo	Rice (paddy)	294	1,725	4.41	7.61	1,709	1,182
11	Toledo	White Oats	570	1,390	3.96	5.50	1,245	1,125
11	Toledo	Rice	2,043	1,149	1.34	1.54	917	713
12	Umuarama	Pasture (planted)	21,692	1,227,377	NA	NA	NA	232,364
12	Umuarama	Coffee	7,868	48,931	0.31	15.18	1,501	12,938
12	Umuarama	Cotton	6,041	44,022	1.55	68.22	39,631	31,660
12	Umuarama	Sugarcane	616	37,049	56.69	2,100.27	36,527	36,501
12	Umuarama	Maize	6,956	29,025	3.36	97.43	18,945	16,715
12	Umuarama	Cassava	4,005	26,680	20.48	546.28	17,378	15,688
12	Umuarama	Soybean	875	24,445	2.12	51.81	16,445	22,445
12	Umuarama	Wheat	574	12,840	1.26	16.15	12,835	10,035
12	Umuarama	Beans	4,581	10,425	0.41	4.22	3,758	3,298
12	Umuarama	Mulberry	1,962	9,657	0.93	8.95	3,793	7,304
12	Umuarama	Maize (safrinha)	1,102	5,895	1.60	9.44	5,132	4,377
12	Umuarama	Beans (winter)	1,212	2,950	0.34	1.02	1,345	925
12	Umuarama	Rice (paddy)	305	2,263	3.07	6.94	2,049	2,090
12	Umuarama	Black Oats	280	1,709	0.47	0.80	796	576
12	Umuarama	Rice	1,267	1,510	0.68	1.02	713	546
13	Campo Mourao	Pasture (planted)	13,001	380,255	NA	NA	NA	67,440
13	Campo Mourao	Soybean	8,192	320,635	2.43	779.60	318,335	275,185
13	Campo Mourao	Wheat	4,481	201,750	1.38	277.95	198,500	172,400
13	Campo Mourao	Maize	12,406	124,550	3.82	476.33	106,740	91,820
13	Campo Mourao	Cotton	8,168	79,250	1.57	124.07	70,043	52,727

Table-A1.1 Major Crops in Parana with EMATER Division (4/6)

No.	Region	Items	No. of Producers	Area (ha)	Productivity (ton/ha)	Production (1000ton)	Area Mechanized (ha)	Area Conserved (ha)
13	Campo Mourao	Black Oats	1,388	30,970	0.00	0.00	30,550	28,680
13	Campo Mourao	Maize (safrinha)	1,716	27,600	1.86	51.23	25,100	21,660
13	Campo Mourao	Coffee	2,387	21,353	0.71	15.23	3,083	6,393
13	Campo Mourao	Pasture (natural)	592	21,250	NA	NA	NA	7,250
13	Campo Mourao	Sugarcane	493	19,612	74.39	1,458.95	18,562	18,317
13	Campo Mourao	Cassava	2,798	15,971	18.70	298.62	14,240	11,310
13	Campo Mourao	Beans	5,303	15,954	0.65	10.39	8,480	8,150
13	Campo Mourao	Rice	3,607	5,016	1.32	6.63	3,510	2,595
13	Campo Mourao	Soybean (safrinha)	136	3,435	0.72	2.46	3,435	3,190
13	Campo Mourao	Mulberry	269	1,202	0.25	0.30	916	945
14	Ivaipora	Pasture (planted)	17,269	338,367	NA	NA	NA	9,880
14	Ivaipora	Maize	22,933	200,335	2.39	479.36	114,600	71,910
14	Ivaipora	Beans	16,696	71,490	0.69	49.25	39,393	24,251
14	Ivaipora	Pasture (natural)	10,552	58,431	NA	NA	NA	2,000
14	Ivaipora	Soybean	2,157	56,251	2.10	118.10	49,521	43,036
14	Ivaipora	Wheat	1,888	33,399	1.24	41.24	33,211	25,738
14	Ivaipora	Cotton	4,448	30,811	1.46	45.05	25,626	19,673
14	Ivaipora	Maize (safrinha)	4,232	26,001	2.04	53.10	18,652	11,884
14	Ivaipora	White Oats	1,000	16,000	1.13	18.00	15,400	15,200
14	Ivaipora	Coffee	2,672	15,817	0.80	12.62	1,140	2,430
14	Ivaipora	Rice	5,514	10,440	1.11	11.60	4,508	2,282
14	Ivaipora	Sugarcane	2,564	6,790	85.45	580.20	6,325	6,235
14	Ivaipora	Black Oats	1,752	5,718	0.00	0.00	4,173	1,673
14	Ivaipora	Beans (winter)	1,320	4,955	0.51	2.54	4,045	827
14	Ivaipora	Cassava	2,761	2,681	12.72	34.10	861	355
15	Paranavai	Pasture (planted)	7,059	891,395	NA	NA	NA	256,997
15	Paranavai	Cassava	1,815	29,972	19.37	580.68	29,842	24,716
15	Paranavai	Coffee	2,159	25,533	0.80	20.46	11,300	9,043
15	Paranavai	Sugarcane	294	22,816	84.69	1,932.38	22,816	22,604
15	Paranavai	Cotton	1,382	20,447	1.47	30.03	20,195	17,194
15	Paranavai	Maize	1,316	11,931	1.94	23.18	10,690	9,202
15	Paranavai	Pasture (natural)	99	10,384	NA	NA	NA	3,560
15	Paranavai	Mulberry	1,107	7,437	0.91	6.76	6,349	5,310
15	Paranavai	Beans (winter)	803	7,115	0.59	4.19	6,666	5,286
15	Paranavai	Soybean	135	5,657	1.90	10.72	5,657	4,927
15	Paranavai	Orange	140	3,873	5.16	19.98	3,549	3,473
15	Paranavai	Rice (paddy)	112	3,371	3.17	10.68	3,370	3,314
15	Paranavai	Maize (safrinha)	258	2,436	1.66	4.05	2,274	1,626
15	Paranavai	Wheat	79	2,432	1.57	3.83	2,432	2,432
15	Paranavai	Beans	683	1,638	0.62	1.02	992	958
15	Paranavai	Sorghum	126	1,291	44.12	56.95	1,291	1,134
15	Paranavai	Rice	586	1,184	1.07	1.27	946	538
16	Maringa	Pasture (planted)	5,087	277,855	NA	NA	NA	66,371
16	Maringa	Soybean	4,982	160,886	2.27	365.73	160,886	145,447
16	Maringa	Wheat	2,661	80,865	1.12	90.35	80,865	72,530
16	Maringa	Maize (safrinha)	1,498	41,877	2.35	98.43	33,221	30,652
16	Maringa	Sugarcane	675	37,628	75.96	2,858.39	37,023	32,423
16	Maringa	Maize	2,017	28,427	3.12	88.70	25,974	22,212
16	Maringa	Cotton	1,229	18,238	1.26	23.01	17,418	14,085
16	Maringa	Mulberry	1,652	12,876	18.50	238.24	3,355	8,430
16	Maringa	Coffee	1,144	11,061	0.84	9.32	3,514	4,304
16	Maringa	Cassava	575	5,486	19.97	109.57	5,470	3,604
16	Maringa	Black Oats	276	5,151	1.79	9.23	4,661	4,581
16	Maringa	Pasture (natural)	189	4,310	NA	NA	NA	200
16	Maringa	Beans (winter)	380	2,280	0.43	0.98	2,252	2,045
16	Maringa	Rice	550	1,339	1.23	1.65	736	713
16	Maringa	Beans	361	1,283	0.75	0.96	1,175	911

Table-A1.1 Major Crops in Parana with EMATER Division (5/6)

No.	Region	Items	No. of Producers	Area (ha)	Productivity (ton/ha)	Production (1000ton)	Area Mechanized (ha)	Area Conserved (ha)
16	Maringa	Soybean (safrinha)	47	1,064	0.88	0.94	1,064	1,064
16	Maringa	Orange	60	1,038	7.76	8.05	786	1,036
17	Apucarana	Pasture (planted)	2,121	100,593	NA	NA	NA	5,400
17	Apucarana	Maize	4,777	56,290	3.54	199.14	45,350	32,260
17	Apucarana	Soybean	1,192	37,126	2.36	87.52	33,726	26,066
17	Apucarana	Wheat	796	20,430	1.20	24.46	20,430	16,930
17	Apucarana	Coffee	1,460	14,860	0.59	8.75	7,840	4,130
17	Apucarana	Pasture (natural)	835	11,460	NA	NA	NA	50
17	Apucarana	Cotton	1,156	11,270	1.34	15.11	10,620	7,505
17	Apucarana	Sugarcane	198	7,217	34.13	246.31	7,217	6,729
17	Apucarana	Black Oats	381	5,932	1.70	10.06	4,910	2,130
17	Apucarana	Beans	1,722	4,330	0.79	3.40	3,085	2,095
17	Apucarana	Rice	1,646	2,825	1.23	3.47	1,736	951
17	Apucarana	Maize (safrinha)	268	2,000	1.53	3.05	1,668	1,165
17	Apucarana	Persimmon	52	1,692	0.58	0.98	1,671	1,655
18	Londrina	Pasture (planted)	4,696	254,038	NA	NA	NA	39,534
18	Londrina	Soybean	3,378	151,978	2.35	356.42	147,978	129,778
18	Londrina	Wheat	1,402	55,960	1.89	105.48	55,910	50,210
18	Londrina	Maize	3,836	49,819	3.35	167.10	46,719	43,606
18	Londrina	Maize (safrinha)	1,502	48,735	2.61	127.29	28,699	26,479
18	Londrina	Sugarcane	412	40,519	69.85	2,830.21	30,293	30,161
18	Londrina	Coffee	1,289	25,080	0.70	17.57	13,506	12,691
18	Londrina	Cotton	707	13,427	1.30	17.49	13,376	11,464
18	Londrina	Black Oats	320	7,579	2.87	21.74	4,454	3,864
18	Londrina	Pasture (natural)	128	6,724	NA	NA	NA	0
18	Londrina	Beans (winter)	644	3,880	0.58	2.27	3,730	3,505
18	Londrina	Rice	1,219	2,920	1.12	3.26	2,739	2,167
18	Londrina	Cassava	615	2,407	13.86	33.36	1,962	1,902
18	Londrina	Soybean (safrinha)	73	1,666	1.13	1.88	1,666	1,586
18	Londrina	Beans	450	1,280	0.57	0.73	1,034	1,197
18	Londrina	Rice (paddy)	251	1,263	5.73	7.23	1,243	1,211
19	Comelio Procopio	Pasture (planted)	3,587	180,367	NA	NA	NA	12,519
19	Comelio Procopio	Soybean	3,210	128,907	2.46	317.19	128,117	102,112
19	Comelio Procopio	Wheat	2,676	85,770	2.18	187.23	84,190	60,553
19	Comelio Procopio	Maize	5,895	73,414	3.54	259.96	62,288	49,622
19	Comelio Procopio	Maize (safrinha)	1,879	45,867	2.49	114.21	44,497	38,479
19	Comelio Procopio	Pasture (natural)	1,025	43,425	NA	NA	NA	2,759
19	Comelio Procopio	Cotton	2,976	33,741	0.95	31.90	32,050	24,098
19	Comelio Procopio	Sugarcane	164	28,814	75.98	2,189.15	27,204	24,581
19	Comelio Procopio	Coffee	1,177	19,715	1.29	25.41	14,948	8,739
19	Comelio Procopio	Beans (winter)	1,671	8,093	0.74	5.95	6,328	5,125
19	Comelio Procopio	Soybean (safrinha)	245	3,694	1.14	4.22	3,660	3,211
19	Comelio Procopio	Rice (paddy)	1,476	2,965	4.23	12.56	1,993	704
19	Comelio Procopio	Beans	891	2,500	0.79	1.98	1,124	755

Table-A1.1 Major Crops in Parana with EMATER Division (6/6)

No.	Region	Items	No. of Producers	Area (ha)	Productivity (ton/ha)	Production (1000ton)	Area Mechanized (ha)	Area Conserved (ha)
19	Comelio Procopio	Black Oats	253	2,152	NA	NA	1,095	675
19	Comelio Procopio	Rice	988	1,148	1.70	1.95	970	689
20	Jacarezinho	Pasture (planted)	8,160	358,122	NA	NA	NA	41,530
20	Jacarezinho	Maize	15,046	103,217	2.43	250.74	65,497	45,245
20	Jacarezinho	Pasture (natural)	3,392	88,219	NA	NA	NA	2,950
20	Jacarezinho	Sugarcane	912	40,949	69.53	2,846.99	28,534	26,405
20	Jacarezinho	Coffee	4,440	31,537	1.03	32.41	16,775	15,880
20	Jacarezinho	Beans	9,317	27,339	0.86	23.37	17,443	10,925
20	Jacarezinho	Maize (safrinha)	2,759	16,965	2.23	37.83	13,010	7,317
20	Jacarezinho	Soybean	732	16,900	2.16	36.49	16,900	16,182
20	Jacarezinho	Beans (winter)	4,229	16,555	1.11	18.32	12,868	10,151
20	Jacarezinho	Wheat	633	13,465	2.36	31.73	13,465	13,115
20	Jacarezinho	Rice	5,373	9,753	1.19	11.64	4,567	2,297
20	Jacarezinho	Mulberry	968	4,565	0.65	2.95	2,479	3,013
20	Jacarezinho	Cassava	1,644	2,051	17.99	36.89	1,342	537
20	Jacarezinho	Cotton	166	1,928	1.34	2.57	1,591	1,201
20	Jacarezinho	Rice (paddy)	575	1,882	4.91	9.23	1,766	1,729
20	Jacarezinho	Black Oats	269	1,676	0.63	1.05	1,667	1,676

Source: EMATER (1993)

NA: not available

safrinha: second cultivation in summer

Appendix-2
Area, Production and Productivity of Primary Crops in Paraná

Table-A2.1 (1/4) Area, Production and Productivity of Primary Crops in Parana (1970 - 1993)

Crop	Year	Area(1000 ha)	Yield(1000 t)	Productivity (t/ha)
Cotton	1970	447.413	525.772	1.175
	1971	402.212	500.940	1.245
	1972	354.868	519.710	1.465
	1973	293.506	436.951	1.489
	1974	310.000	480.500	1.550
	1975	267.000	377.695	1.415
	1976	181.450	280.883	1.548
	1977	290.400	416.550	1.434
	1978	290.100	309.588	1.067
	1979	286.800	468.787	1.635
	1980	336.000	561.519	1.671
	1981	305.790	581.000	1.900
	1982	369.500	739.026	2.000
	1983	440.000	695.608	1.581
	1984	322.124	611.865	1.899
	1985	540.000	1,035.661	1.918
	1986	415.000	768.434	1.852
	1987	386.000	711.880	1.844
	1988	470.000	903.107	1.922
	1989	415.091	805.277	1.940
1990	490.000	852.600	1.740	
1991	618.000	1,024.111	1.657	
1992	704.498	972.804	1.381	
1993*	345.000	448.081	1.299	
Unhulled Rice (upland rice)	1970	462.191	590.237	1.277
	1971	460.911	599.445	1.301
	1972	453.471	674.899	1.488
	1973	472.339	661.184	1.400
	1974	500.000	672.000	1.344
	1975	492.800	850.573	1.726
	1976	621.860	1,088.822	1.751
	1977	564.070	904.865	1.604
	1978	383.316	210.180	0.548
	1979	323.916	286.676	0.885
	1980	390.545	638.000	1.634
	1981	275.000	493.632	1.795
	1982	204.142	257.229	1.260
	1983	216.400	368.313	1.702
	1984	196.700	242.570	1.233
	1985	200.000	296.000	1.480
	1986	140.000	206.000	1.471
	1987	202.923	342.844	1.690
	1988	188.625	316.732	1.679
	1989	163.633	295.698	1.807
1990	151.003	253.501	1.679	
1991	121.297	163.712	1.350	
1992	134.000	216.700	1.617	
1993*	108.500	150.500	1.387	
Potato	1970	43.367	410.085	9.456
	1971	41.980	378.270	9.011
	1972	38.631	354.067	9.165
	1973	44.855	326.861	7.287
	1974	40.500	420.000	10.370
	1975	42.150	426.227	10.112
	1976	51.540	645.394	12.522
	1977	59.604	709.688	11.907
	1978	63.626	700.668	11.012
	1979	54.921	615.918	11.215
	1980	42.630	521.762	12.239
	1981	39.146	459.375	11.735
	1982	50.460	598.553	11.862
	1983	45.002	422.870	9.396
	1984	40.929	509.673	12.453
	1985	38.992	497.522	12.760
	1986	40.509	416.596	10.284
	1987	50.155	662.129	13.202
	1988	49.464	654.682	13.236
	1989	39.622	502.158	12.674
1990	41.285	616.498	14.933	
1991	41.645	653.824	15.700	
1992	43.925	683.500	15.561	
1993*	40.800	624.872	15.315	

Table-A2.1 (2/4) Area, Production and Productivity of Primary Crops in Parana (1970 - 1993)

Crop	Year	Area(1000 ha)	Yield(1000 t)	Productivity (t/ha)
Coffee	1970	1,048.400	196.000	0.187
	1971	1,030.081	1,536.000	1.491
	1972	1,304.221	1,120.000	1.083
	1973	839.578	477.000	0.568
	1974	933.677	1,248.000	1.337
	1975	942.589	1,226.000	1.301
	1976	3.724	461.000	0.124
	1977	619.101	213.774	0.345
	1978	670.400	620.303	0.925
	1979	632.485	238.065	0.376
	1980	635.877	330.670	0.520
	1981	687.458	912.444	1.327
	1982	302.812	162.683	0.537
	1983	438.937	608.940	1.387
	1984	442.266	494.289	1.118
	1985	431.000	588.089	1.364
	1986	452.115	279.707	0.619
	1987	430.000	880.000	2.047
	1988	504.581	272.935	0.541
	1989	493.324	534.078	1.083
	1990	426.391	313.405	0.735
	1991	383.355	403.844	1.053
	1992	296.000	216.000	0.730
	1993*	230.000	100.000	0.435
Sugarcane	1970	36.778	2,304.629	62.663
	1971	46.986	3,282.237	69.856
	1972	42.787	2,689.336	62.854
	1973	46.987	2,333.649	49.666
	1974	40.000	2,280.000	57.000
	1975	45.503	2,280.000	50.107
	1976	52.000	2,605.564	50.107
	1977	42.760	2,998.331	70.120
	1978	47.570	2,988.860	62.831
	1979	51.425	3,191.353	62.058
	1980	57.990	4,451.480	76.763
	1981	69.126	4,888.038	70.712
	1982	89.872	6,830.330	76.001
	1983	110.930	9,664.965	87.127
	1984	121.696	8,428.836	69.261
	1985	140.878	10,425.000	74.000
	1986	140.772	10,514.290	74.690
	1987	160.420	11,911.431	74.252
	1988	156.497	11,856.032	75.759
	1989	153.539	11,401.852	74.260
	1990	159.417	11,736.412	73.621
	1991	172.296	12,218.580	70.916
	1992	184.000	13,350.000	72.554
	1993*	196.000	14,000.000	71.429
Beans	1970	790.139	729.695	0.924
	1971	826.313	757.274	0.916
	1972	845.933	817.673	0.967
	1973	719.274	472.079	0.656
	1974	835.000	562.085	0.673
	1975	768.200	607.947	0.791
	1976	822.320	587.805	0.715
	1977	809.640	576.885	0.713
	1978	744.003	507.017	0.681
	1979	746.540	503.488	0.674
	1980	815.088	462.250	0.567
	1981	852.835	570.860	0.669
	1982	879.990	666.780	0.758
	1983	699.685	347.035	0.496
	1984	741.001	471.489	0.636
	1985	723.764	499.617	0.690
	1986	628.054	130.857	0.341
	1987	754.210	391.355	0.519
	1988	741.920	457.692	0.617
	1989	528.741	223.031	0.422
	1990	550.591	279.028	0.507
	1991	624.036	348.332	0.558
	1992	595.894	461.162	0.774
	1993*	574.400	458.800	0.799

Table-A2.1 (3/4) Area, Production and Productivity of Primary Crops in Parana (1970 - 1993)

Crop	Year	Area(1000 ha)	Yield(1000 t)	Productivity (t/ha)
Cassava	1970	88.243	2,118.782	24.011
	1971	93.653	2,311.908	24.686
	1972	79.961	1,929.627	24.132
	1973	91.608	1,884.392	20.570
	1974	85.500	1,818.500	21.269
	1975	99.530	1,953.470	19.627
	1976	71.000	1,292.000	18.200
	1977	63.500	1,121.900	17.668
	1978	52.905	924.812	17.481
	1979	42.420	801.241	18.888
	1980	45.982	907.310	19.732
	1981	58.700	1,100.380	18.746
	1982	62.490	1,218.740	19.503
	1983	69.870	1,383.000	19.794
	1984	73.688	1,446.258	19.627
	1985	85.800	1,722.864	20.080
	1986	85.800	1,700.000	19.814
	1987	85.445	1,853.950	21.698
	1988	85.242	1,855.328	21.765
	1989	77.349	1,622.846	20.981
	1990	101.854	2,184.599	21.448
1991	102.265	2,261.788	22.117	
1992	100.000	2,100.000	21.000	
1993*	137.000	3,014.000	22.000	
Maize	1970	1,883.309	3,559.364	1.890
	1971	2,005.064	3,655.086	1.823
	1972	1,994.620	3,829.541	1.920
	1973	1,637.231	3,082.524	1.883
	1974	2,110.000	3,553.000	1.684
	1975	1,923.000	3,813.309	1.983
	1976	2,185.000	4,822.900	2.207
	1977	2,153.872	4,630.825	2.150
	1978	1,898.525	2,437.123	1.284
	1979	2,118.700	4,169.518	1.968
	1980	2,156.580	5,466.967	2.535
	1981	2,161.999	5,363.109	2.481
	1982	2,276.700	5,430.000	2.385
	1983	2,361.800	5,018.870	2.125
	1984	2,447.000	5,400.000	2.207
	1985	2,332.840	5,803.713	2.488
	1986	2,294.931	4,331.546	1.887
	1987	2,846.000	7,641.800	2.685
	1988	2,269.862	5,557.805	2.449
	1989	2,137.234	5,296.080	2.478
	1990	2,079.784	5,160.823	2.481
1991	2,358.797	4,827.112	2.046	
1992	2,290.000	6,750.000	2.948	
1993*	2,703.000	8,158.000	3.018	
Soybean	1970	304.211	368.006	1.210
	1971	357.701	461.746	1.291
	1972	452.692	688.158	1.520
	1973	817.627	1,326.338	1.622
	1974	1,340.000	2,588.880	1.932
	1975	1,631.897	3,624.946	2.221
	1976	2,083.300	4,500.000	2.160
	1977	2,200.000	4,700.000	2.136
	1978	2,348.541	3,150.103	1.341
	1979	2,340.460	4,000.000	1.709
	1980	2,410.800	5,400.192	2.240
	1981	2,266.200	4,983.210	2.199
	1982	2,099.996	4,200.120	2.000
	1983	2,022.000	4,315.000	2.134
	1984	2,177.900	4,121.000	1.892
	1985	2,196.370	4,413.000	2.009
	1986	1,745.000	2,600.000	1.490
	1987	1,718.000	3,810.000	2.218
	1988	2,123.379	4,771.264	2.247
	1989	2,399.993	5,031.297	2.096
	1990	2,267.638	4,649.752	2.050
1991	1,972.538	3,531.216	1.790	
1992	1,794.000	3,417.000	1.905	
1993*	2,076.000	4,817.000	2.320	

Table-A2.1 (4/4) Area, Production and Productivity of Primary Crops in Parana (1970 - 1993)

Crop	Year	Area(1000 ha)	Yield(1000 t)	Productivity (t/ha)
Wheat	1970	287.598	283.308	0.985
	1971	342.442	334.857	0.978
	1972	397.332	256.567	0.646
	1973	341.015	384.713	1.128
	1974	660.000	914.760	1.386
	1975	800.000	443.600	0.555
	1976	1,248.000	1,160.640	0.930
	1977	398.226	1,257.000	0.899
	1978	1,345.093	1,050.000	0.781
	1979	1,476.476	1,624.416	1.100
	1980	1,440.006	1,350.006	0.938
	1981	785.000	915.000	1.166
	1982	1,174.997	1,025.000	0.872
	1983	898.265	1,066.000	1.187
	1984	829.211	1,113.009	1.342
	1985	1,301.870	2,639.225	2.027
	1986	1,947.000	2,938.694	1.509
	1987	1,717.500	3,252.106	1.894
	1988	1,773.797	3,250.000	1.832
	1989	1,828.680	3,207.000	1.754
	1990	1,197.149	1,394.052	1.164
	1991	1,082.358	1,825.929	1.687
	1992	1,220.000	1,600.000	1.311
	1993*	696.000	1,023.000	1.470

*: Data is not reviewed yet. It is subject to change.
Source: SEAB CISM System

Crop	Year	Area(1000 ha)	Yield(1000 t)	Productivity (t/ha)
Paddy Rice	1988	23.265	77.542	3.333
	1989	18.453	71.229	3.860
	1990	16.868	71.756	4.254
	1991	15.269	67.733	4.436
	1992	16.877	69.263	4.104
	1993*	16.511	68.124	4.126
Upland Rice	1988	166.716	238.404	1.430
	1989	143.551	199.105	1.387
	1990	132.852	180.941	1.362
	1991	121.339	135.293	1.115
	1992	100.426	132.763	1.322
	1993*	89.758	128.085	1.427

*: Data is not reviewed yet. It is subject to change.
Source: EMATER

Appendix-3
Projection of Crop Productivity

Table-A3.1 Data for Crop Productivity Projection

Year	Productivity (t/ha)										
	Cotton	Rice (paddy)	Rice (upland)	Potato	Coffee	Sugarcane	Beans	Cassava	Maize	Soybean	Wheat
1970	*1.175	NA	NA	9.456	*0.187	62.663	*0.924	*24.011	1.890	*1.210	0.985
1971	*1.245	NA	NA	9.011	1.491	69.856	*0.916	*24.686	1.823	*1.291	0.978
1972	1.465	NA	NA	9.165	1.083	62.854	*0.967	*24.132	1.920	1.520	0.646
1973	1.489	NA	NA	*7.287	*0.568	*49.666	0.656	20.570	1.883	1.622	1.128
1974	1.550	NA	NA	10.370	1.337	57.000	0.673	21.269	1.684	1.932	1.386
1975	1.415	NA	NA	10.112	1.301	*50.107	0.791	19.627	1.983	2.221	*0.555
1976	1.548	NA	NA	12.522	*0.124	*50.107	0.715	18.200	2.207	2.160	0.930
1977	1.434	NA	NA	11.907	*0.345	70.120	0.713	*17.668	2.150	2.136	0.899
1978	*1.067	NA	NA	11.012	0.925	62.831	0.681	*17.481	*1.284	*1.341	*0.781
1979	1.635	NA	NA	11.215	*0.376	62.058	0.674	18.888	1.968	1.709	1.100
1980	1.671	NA	NA	12.239	*0.520	76.763	*0.567	19.732	2.535	2.240	*0.938
1981	1.900	NA	NA	11.735	1.327	70.712	0.669	18.746	2.481	2.199	1.166
1982	2.000	NA	NA	11.862	*0.537	76.001	0.758	19.503	2.385	2.000	*0.872
1983	1.581	NA	NA	*9.396	1.387	87.127	*0.496	19.794	2.125	2.134	1.187
1984	1.899	NA	NA	12.453	1.118	69.261	*0.636	19.627	2.207	1.892	1.342
1985	1.918	NA	NA	12.760	1.364	74.000	0.690	20.080	2.488	2.009	2.027
1986	1.852	NA	NA	*10.284	*0.619	74.690	*0.341	19.814	*1.887	*1.490	1.509
1987	1.844	NA	NA	13.202	2.047	74.252	*0.519	21.698	2.685	2.218	1.894
1988	1.922	3.333	1.430	13.236	*0.541	75.759	*0.617	21.765	2.449	2.247	1.832
1989	1.940	3.860	1.387	*12.674	1.083	74.260	*0.422	20.981	2.478	2.096	1.754
1990	1.740	4.254	1.362	14.933	*0.735	73.621	*0.507	21.448	2.481	2.050	*1.164
1991	1.657	4.436	*1.115	15.700	1.053	70.916	*0.558	22.117	*2.046	*1.790	1.687
1992	*1.381	4.104	1.322	15.561	*0.730	72.554	0.774	21.000	2.948	1.905	1.311
1993	*1.299	4.126	1.427	15.315	*0.435	71.429	0.799	22.000	3.018	2.320	1.470

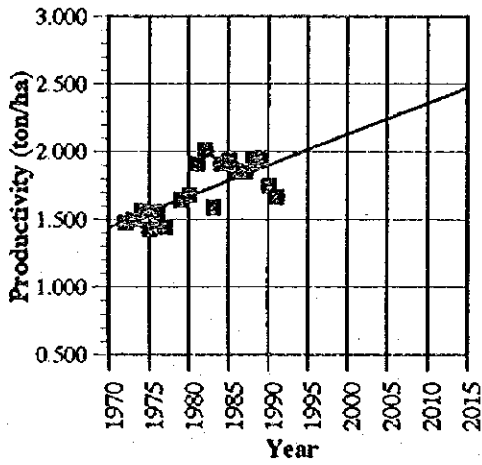
*: The data was not applied due to large deviation from the general tendency.

NA: not available

Source: SEAB CISM System, except upland rice and paddy rice, EMATER for upland rice and paddy rice

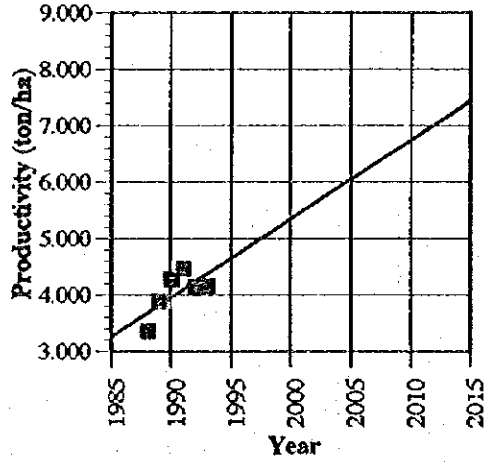
Cotton

$$f(x) = 2.300E-2 * x + .4386E+1$$



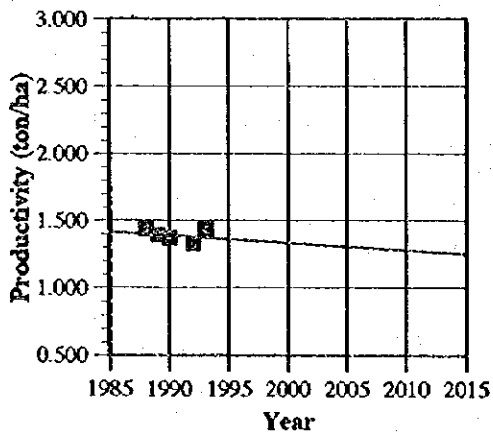
Rice (paddy)

$$f(x) = 1.394E-1 * x + -2.735E+2$$



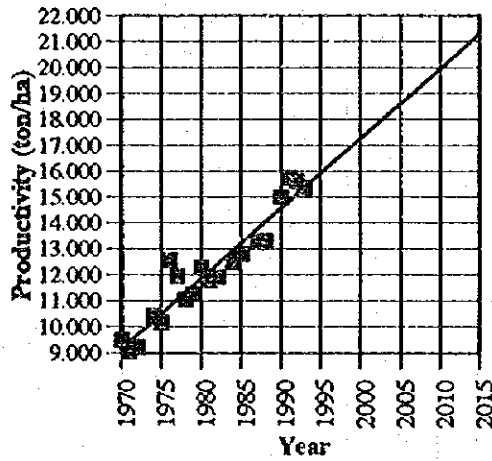
Upland Rice

$$f(x) = -5.419E-3 * x + 1.217E+1$$



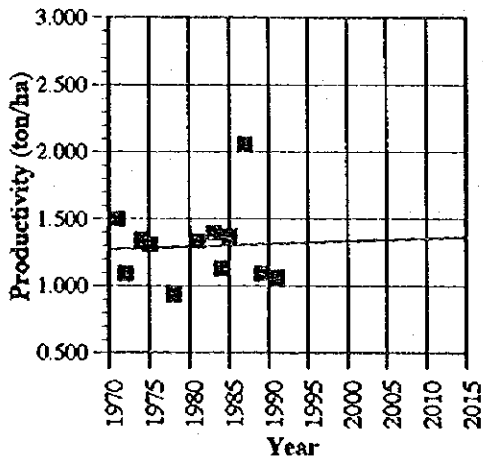
Potato

$$f(x) = 2.703E-1 * x + -5.234E+2$$



Coffee

$$f(x) = 2.083E-3 * x + -2.833E+0$$



Sugarcane

$$f(x) = 5.119E-1 * x + -9.439E+2$$

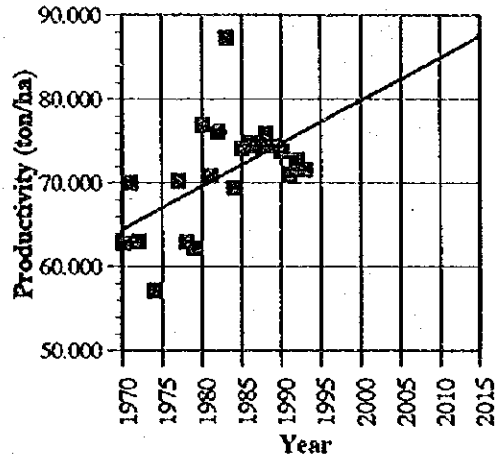
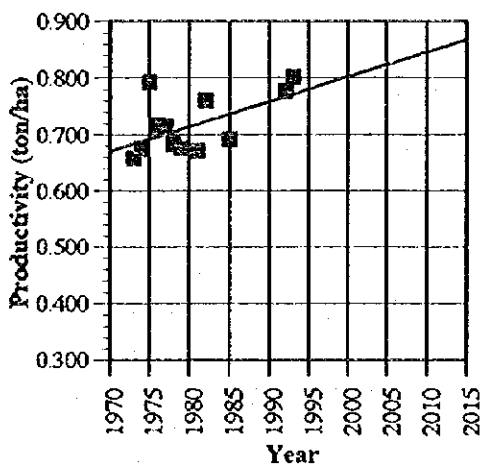


Figure-A3.1 (1/2) Projection of Crop Productivity

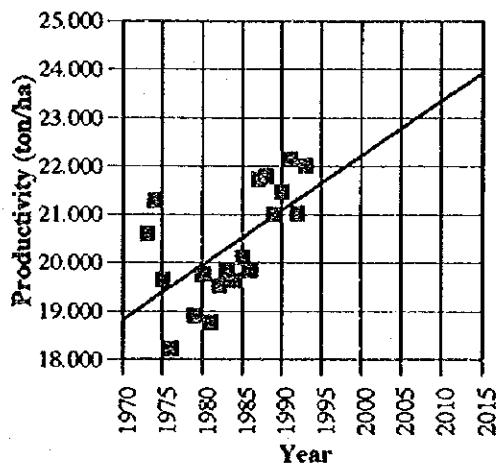
Beans

$$f(x) = 4.387E-3x + -7.971E+0$$



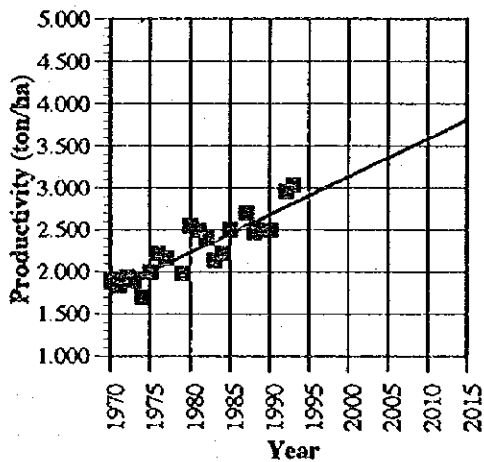
Cassava

$$f(x) = 1.132E-1x + -2.042E+2$$



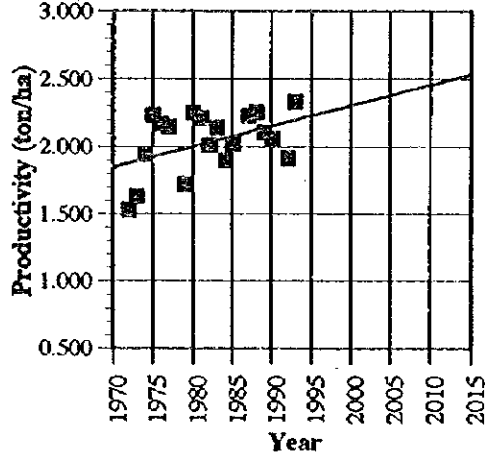
Malze

$$f(x) = 4.511E-2x + -8.709E+1$$



Soybean

$$f(x) = 1.523E-2x + -2.816E+1$$



Wheat

$$f(x) = 3.691E-2x + -7.182E+1$$

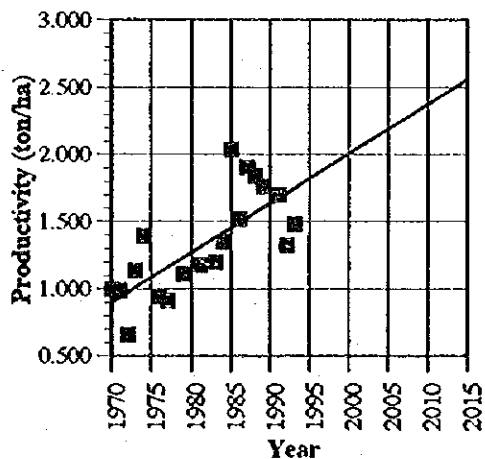


Figure-A3.1 (2/2) Projection of Crop Productivity

Appendix-4
Projection of Livestock Population

Table-A4.1 Livestock Population (1973-1993)

Year	Pig	Cattle	Unit: head/year
			Chicken
1973	6,990,449	5,086,498	36,595,415
1974	6,778,363	5,640,628	36,401,190
1975	6,067,880	6,598,151	31,659,563
1976	6,131,623	6,966,556	33,028,921
1977	5,769,536	6,699,644	31,920,587
1978	5,312,465	6,455,816	32,183,620
1979	5,650,824	6,547,526	36,441,823
1980	5,712,220	7,915,140	48,347,370
1981	5,078,701	8,050,486	51,739,313
1982	5,122,929	7,938,760	55,781,253
1983	4,210,724	7,964,042	54,038,004
1984	4,191,709	7,934,294	57,772,499
1985	4,433,151	8,046,780	61,329,081
1986	4,569,031	8,563,315	66,877,252
1987	4,140,580	8,582,536	68,097,383
1988	3,695,934	8,472,318	66,808,109
1989	3,587,854	8,603,778	71,786,981
1990	3,539,665	9,084,583	52,686,248
1991	3,698,705	8,541,933	55,783,573
1992	3,738,365	8,498,877	61,587,794
1993	2,814,826	9,736,131	60,744,373
Average	4,820,740	7,710,847	51,029,064

Source: IBGE

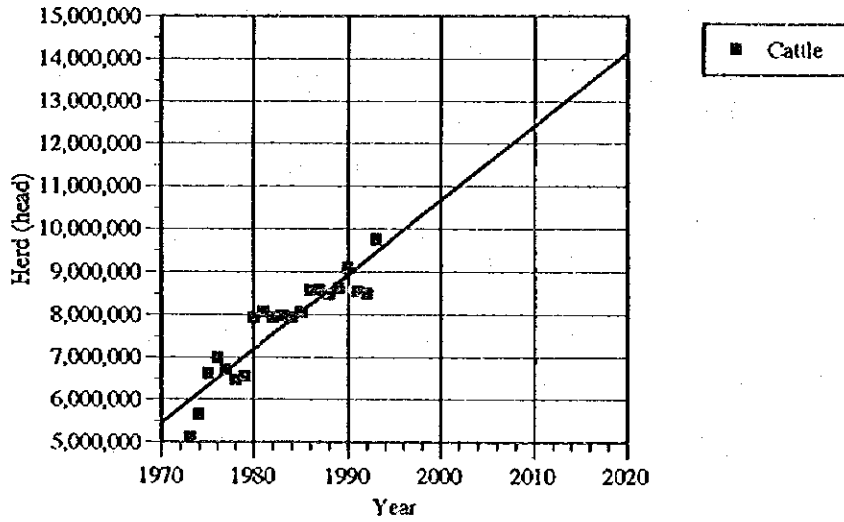
Table-A4.2 Participation of Region in Parana Livestock

NO.	EMATER Region	Pig	Cattle	Chicken
		Ratio (%)	Ratio (%)	Ratio (%)
EM-1	Paranagua	0.0	0.1	0.0
EM-2	Curiúba	3.4	1.3	5.0
EM-3	Lapa	1.9	0.8	2.8
EM-4	Ponta Grossa	6.0	5.2	11.0
EM-5	Irati	3.6	0.9	1.4
EM-6	União da Vitória	3.0	1.0	1.2
EM-7	Guarapuava	8.1	5.0	2.8
EM-8	Pato Branco	7.3	3.5	8.7
EM-9	Francisco Beltrão	12.4	3.9	16.6
EM-10	Cascavel	10.5	6.8	8.0
EM-11	Toledo	15.0	4.6	15.2
EM-12	Umuarama	4.4	16.7	2.2
EM-13	Campo Mourão	4.2	8.1	2.5
EM-14	Ivaipora	4.9	5.3	1.8
EM-15	Paranavai	1.4	12.7	2.2
EM-16	Maringá	3.1	6.9	4.5
EM-17	Apucarana	1.8	2.2	0.7
EM-18	Londrina	3.0	5.5	6.0
EM-19	Cornelio Procopio	2.0	3.3	2.4
EM-20	Jacarezinho	4.0	6.2	5.0
	Total	100.0	100.0	100.0

Source: Cropping Calendar of Parana (1990)

Division of original is 18 and was converted to 20 divisions (EMATER) by area weighted average.

$$f(x) = 1.742559E+5x + -3.378385E+8$$



$$f(x) = 1.836969E+6x + -3.591680E+9$$

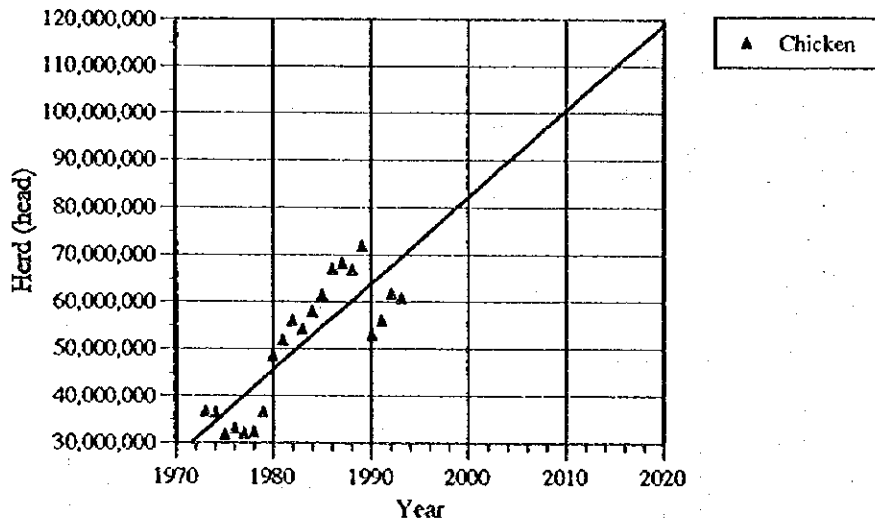


Figure-A4.1 Projection of Livestock Population

Appendix-5
Producer's Price of Agricultural Products

Table-A5.1 Producer's Price of Agricultural Products in Paraná State (1/6)

Cotton													Unit: US\$/15 kg
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1975	4.33	3.86	3.83	3.84	3.91	3.91	4.08	4.13	4.09	3.90	4.24	4.32	4.04
1976	5.54	4.70	6.07	6.56	7.27	7.36	7.55	6.61	6.90	6.49	8.25	7.43	6.73
1977	7.16	7.34	7.01	7.30	6.53	5.81	5.46	5.09	5.23	5.07	4.92	4.84	5.98
1978	4.83	5.61	6.71	6.53	7.35	6.08	5.80	6.30	5.97	6.11	6.14	5.89	6.07
1979	6.77	7.48	7.00	6.26	5.76	5.72	6.01	5.96	6.64	6.84	6.39	4.70	6.29
1980	5.20	5.36	5.58	5.48	5.37	5.59	5.66	5.66	5.27	6.54	6.54	7.04	5.77
1981	7.16	8.47	8.30	7.43	7.03	6.50	6.04	5.95	5.70	5.50	5.31	5.35	6.56
1982	5.44	4.72	6.56	6.69	6.48	6.26	6.04	5.61	5.37	5.15	6.48	6.20	5.92
1983	5.28	6.13	4.66	4.74	4.73	4.84	4.93	5.03	7.19	8.80	9.01	7.70	6.09
1984	7.25	9.75	10.63	8.79	7.11	6.70	6.11	5.75	5.22	5.29	5.25	4.81	6.89
1985	4.32	5.08	5.51	5.36	4.98	4.64	4.34	4.42	4.45	4.18	3.84		4.65
1986		6.71	5.43	5.68	5.22	5.10	5.37	5.37	5.37	5.23	5.30	5.60	5.49
1987			5.07	4.89	4.43	4.80	4.43	6.30	7.66				5.37
1988		7.38	6.91	5.99	5.32	5.36	5.26	4.96	4.94	5.09	4.93	5.09	5.57
1989	4.18	4.56	4.69	6.88	7.95	6.84	5.46	5.78	8.26	6.86	7.31	6.02	6.23
1990	6.50	5.38	6.99	4.93	7.17	6.97	6.68	7.65	7.66	6.34	5.06	4.14	6.29
1991	4.44	5.57	7.58	6.77	6.08	5.81	5.74	5.36	4.98	4.75	4.11	3.84	5.42
1992	4.35	4.22	4.08	4.05	3.90	4.20	4.41	4.74	4.94	5.16	5.31	5.58	4.58
1993	5.39	6.19	7.08	6.17	5.78	5.28	5.11	5.04	5.90	5.17	5.09	5.14	5.54
1994	5.25	5.67	6.86	7.01	6.89	5.94							6.27

Paddy Rice													Unit: US\$/50 kg
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1990				11.53	11.59	13.18	12.12	12.75	14.90	15.03	15.81	14.51	13.53
1991	14.14	19.62	19.67	18.24	17.89	17.22	16.63	14.72	14.59	14.11	14.65	12.53	16.17
1992	12.33	12.84	10.57	8.83	9.43	9.56	9.88	9.81	10.22	10.07	10.07	10.04	10.37
1993	10.73	10.82	10.37	9.27	9.33	8.96	9.34	9.56	10.59	11.70	12.48	11.05	10.39
1994	11.56	10.28	10.59	10.23	10.33	10.93							10.65

Upland Rice													Unit: US\$/60 kg
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1975	15.69	14.78	10.42	11.66	12.37	13.63	13.24	13.96	14.68	14.40	12.95	12.64	13.37
1976	11.09	9.39	8.27	7.73	7.37	7.45	7.64	7.53	7.52	7.62	7.74	7.59	8.08
1977	7.27	7.81	7.94	7.90	8.51	8.61	8.61	8.75	8.65	9.62	10.17	10.70	8.71
1978	11.41	12.08	13.43	14.96	15.92	14.43	14.84	14.04	14.61	14.36	14.07	14.43	14.05
1979	13.92	13.26	14.88	15.09	14.57	14.50	14.74	15.90	17.88	19.59	21.48	16.82	16.05
1980	17.78	14.79	13.95	13.94	13.44	13.73	13.80	13.57	14.22	15.29	15.86	15.81	14.68
1981	15.12	12.83	11.51	10.70	11.63	11.52	11.43	12.27	13.54	13.80	15.56	15.30	12.93
1982	17.09	16.84	16.59	16.79	16.31	16.30	15.96	15.77	14.90	14.93	15.45	16.75	16.14
1983	17.91	16.72	11.23	10.53	9.51	9.95	10.99	11.46	12.84	12.35	11.47	11.12	12.17
1984	11.51	11.35	11.02	10.09	9.37	9.32	8.89	9.93	9.83	10.42	12.74	11.59	10.51
1985	11.14	10.39	11.57	10.09	10.29	10.19	10.11	11.03	11.37	11.79	11.90	13.16	11.09
1986	15.92	13.85	10.99	10.09	10.38	10.24	10.31	10.60	11.11	10.97	11.26	10.44	11.35
1987	10.06	8.19	8.16	7.43	6.45	6.73	6.22	7.71	6.67	7.20	7.33	6.86	7.42
1988	7.71	7.58	8.29	8.53	8.78	9.14	9.90	10.22	11.92	11.73	13.34	12.57	9.98
1989	10.86	11.31	10.67	10.63	10.65	10.61	8.34	7.48	8.08	8.95	11.04	10.41	9.92
1990	12.32	14.60	12.52	9.74	10.93	11.02	9.40	10.43	11.45	11.52	13.33	10.94	11.52
1991	11.85	15.28	14.84	15.37	14.56	14.48	13.84	12.89	12.79	12.73	11.26	9.94	13.32
1992	10.15	9.64	8.30	7.76	7.68	8.45	8.67	9	10.47	10.47	10.02	10.98	9.30
1993	10.80	9.37	8.61	8.40	8.57	8.80	8.72	9.18	9.63	10.02	10.65	12.06	9.57
1994	12.49	10.65	9.92	9.67	9.50	9.77							10.33

Source: SEAB/DERAI/DEB

Table-A5.1 Producer's Price of Agricultural Products in Paraná State (2/6)

	Potato												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	4.60	2.66	4.09	2.82	3.28	7.44	6.56	13.36	12.27	11.92	6.42	6.32	6.81
1976	5.64	8.32	10.16	13.11	11.92	9.91	11.56	9.74	8.05	8.74	9.86	6.76	9.47
1977	9.90	8.75	9.94	10.61	11.59	11.27	11.62	10.92	9.99	8.50	9.33	5.48	9.83
1978	4.26	7.08	9.62	10.39	14.30	15.63	11.82	10.92	8.53	6.95	7.93	4.52	9.33
1979	5.59	5.50	6.82	5.26	6.98	6.23	5.16	4.65	5.19	6.57	7.19	4.37	5.79
1980	5.58	4.99	6.87	6.29	10.91	11.74	17.33	19.78	25.06	33.97	31.23	17.53	15.94
1981	14.37	10.26	11.78	9.69	10.78		10.78	12.78	10.37	14.17	16.33	7.31	11.69
1982	5.87	5.53	5.84	3.82	3.19	10.17	9.52	6.83	6.46	5.15	5.95	4.68	6.08
1983	7.05	10.04	14.63	17.03	15.51	17.03	15.81	21.95	24.07	17.78	11.79	7.06	14.98
1984	6.31	6.91	7.38	6.70	8.17	5.73	5.17	5.04	4.43	5.01	6.24	6.31	6.12
1985	4.03	3.65	3.57	3.58	4.02	6.73	8.50	16.77		10.20	8.29	6.04	6.85
1986	11.97	12.77	10.94	16.85	18.01	17.72	20.99	27.96			19.97	14.37	17.16
1987	8.25	10.68	5.79	11.01	17.51	8.26	7.18	6.96	6.06	5.88	3.66	2.34	7.80
1988	1.72	3.36	2.77	2.51		10.35	6.94	7.54	8.13	12.45	10.54	6.59	6.63
1989	8.67	13.44	16.72	26.37	28.05	26.10	15.89	14.84	13.60	10.27	8.77	4.63	15.61
1990	7.02	4.97	8.06	6.74	10.87	11.86	9.99	10.62	14.93	32.72	23.17	13.67	12.89
1991	11.13	11.26	15.37	24.22	25.02	16.96	7.75	7.34	5.80	5.14	3.76	3.42	11.43
1992	3.94	4.07	4.51	4.51	4.63	4.19	5.83	11.01	14.76		10.23	7.23	6.81
1993	6.39	4.51	4.52	3.94	11.57	15.55	8.81	6.44	6.05		9.43	7.43	7.60
1994	6.29	13.28	11.85		16.49	10.93							11.77

	Coffee												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	0.75	0.75	0.73	0.71	0.74	0.81	0.80	1.23	1.18	1.20	1.16	1.19	0.94
1976	1.50	1.60	1.57	2.07	2.28	2.19	2.08	2.10	2.11	2.09	2.42	2.56	2.05
1977	2.73	3.05	4.66	4.81	3.79	3.13	2.45	2.15	2.03	1.93	2.42	2.27	2.95
1978	2.31	2.01	2.00	1.93	1.86	1.96	1.85	1.76	1.89	1.79	1.75	1.56	1.89
1979	1.54	1.56	1.61	1.65	1.65	1.97	2.04	1.73	1.68	1.61	1.66	1.24	1.66
1980	1.17	1.29	1.59	1.72	1.76	1.66	1.50	1.47	1.63	1.54	1.39	1.36	1.51
1981	1.42	1.43	1.38	1.23	1.16	1.12	1.06	1.16	1.16	1.12	1.13	1.19	1.21
1982	1.24	1.19	1.20	1.27	1.26	1.44	1.32	1.23	1.21	1.18	1.24	1.35	1.26
1983	1.25	1.18	0.93	0.94	0.87	0.80	0.76	0.68	0.73	0.78	0.71	0.77	0.87
1984	0.80	0.77	0.77	0.79	0.93	1.10	1.11	1.11	1.20	1.07	1.06	1.14	0.99
1985	1.39	1.61	1.62	1.50	1.47	1.23	1.10	1.14	1.08	1.33	1.96	3.62	1.59
1986	4.13	2.89	3.42	2.92	3.06	2.99	2.75	3.34	3.56	2.90	2.96	2.07	3.09
1987	1.68	1.44	1.21	1.10	0.98	0.71	0.65	0.73	0.73	0.83	0.78	0.76	0.97
1988	0.77	0.80	0.82	0.87	0.82	0.99	0.95	0.90	1.00	0.98	1.00	1.26	0.93
1989	1.11	1.07	1.02	1.47	1.63	1.56	0.99	0.75	0.78	0.66	0.93	0.79	1.06
1990	0.92	1.16	1.42	1.01	1.22	1.20	0.96	1.07	1.15	0.89	0.71	0.64	1.03
1991	0.69	0.78	0.94	0.94	0.87	0.82	0.83	0.71	0.81	0.76	0.70	0.61	0.79
1992	0.69	0.66	0.66	0.68	0.60	0.58	0.59	0.57	0.59	0.75	0.80	0.96	0.68
1993	1.00	0.81	0.89	0.74	0.76	0.82	0.92	1.00	1.00	0.95	0.96	0.98	0.90
1994	0.94	0.98	1.11	1.18	1.53	1.66							1.24

	Sugarcane												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1982						11.61	11.23		9.74	10.39	11.56	10.96	10.91
1983	11.51	10.82	8.01	7.47	8.39	8.82	8.29	0.31	6.12	7.96	7.83	7.27	7.73
1984	6.89	6.90	7.69	0.72	7.24	8.65	7.78	7.16	6.37	9.36	8.44	7.65	7.07
1985	4.21				6.49	8.24	7.90	7.10	6.25	8.00	7.29	6.16	6.85
1986	8.12	7.31		6.79	4.97	6.38	6.38	6.39	6.39	6.39	6.46	8.75	6.76
1987	8.16	8.96	7.82	6.84	9.76	7.91	6.71	7.74	8.40	9.10	8.92	8.80	8.26
1988	8.78	8.73	8.60	8.52	10.18	8.62	8.41	8.35	8.32	8.08	8.32	8.17	8.59
1989	8.50	8.50	8.50	8.48	8.78	8.92	8.81	7.69	11.22	10.63	12.46	11.12	9.47
1990	11.15	10.45	12.49	11.78	11.20	10.01	8.68	9.55	10.84	10.42	9.82	9.20	10.46
1991	8.68	11.04	11.20	10.20	9.43	9.24	9.18	9.29	9.19	8.97	8.72	9.44	9.55
1992	10.00	9.95	9.50	9.48	9.94	9.66	10.04	10.64	10.33	10.07	8.64	8.67	9.74
1993	8.78	8.95	9.15	9.13	8.81	9.97	9.84	9.82	10.05	10.42	10.54	10.51	9.66
1994	10.49	10.60	11.97	11.40	10.32	10.02							10.80

Source: SEAB/DERAL/DEB

Table-A5.1 Producer's Price of Agricultural Products in Paraná State (3/6)

Beans													Unit: US\$/60 kg
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1976		25.51			46.83	39.43	40.26	46.03	47.26	59.48	34.95	36.46	41.80
1977	35.46	27.97	29.28	39.79	39.33	34.67	28.01	24.22	21.31	17.46	14.25	14.65	27.20
1978	13.79	13.85	16.88	16.15	17.78	20.23	19.02	17.27	19.20	20.47	21.75	17.62	17.83
1979	16.62	17.32	19.93	21.44	20.30	19.79	23.45	27.15	25.90	30.69	21.09	16.89	21.71
1980	23.58	23.05	27.04	31.16	35.05	37.74	44.90	50.36	49.88	73.27	67.37	61.51	43.74
1981	55.99	47.89	53.42	58.39	59.13	51.43	41.95	46.44	44.37	43.32	41.78	25.48	47.46
1982	23.66	23.20	23.06	22.11	22.59	24.37	22.98	21.33	19.53	20.41	20.05	18.51	21.82
1983	22.06	19.80	15.50	18.30	19.28	19.21	25.80	27.59	26.50	33.76	33.99	30.91	24.39
1984	27.68	32.36	50.67	61.10	46.78	38.76	35.72	31.22	43.21	27.45	23.68	25.06	36.97
1985	21.92	19.53	18.82	18.58	20.66	20.91	20.39	20.21	19.81	20.63	23.12	24.78	20.78
1986	30.68	23.30	20.58	20.70	20.62	20.62	21.42	22.80	25.34	27.81	27.16	25.02	23.84
1987	20.95	17.76	20.18	21.52	26.50	25.25	23.49	27.84	26.48	25.02	22.50	22.36	23.32
1988	20.81	20.92	23.92	24.09	21.27	23.71	22.87	23.12	30.63	34.13	32.67	33.46	25.97
1989	24.13	27.63	30.11	36.78	45.09	78.00	51.57	44.10	35.53	25.46	31.29	23.22	37.74
1990	29.57	22.25	29.35	24.49	31.31	35.16	33.48	32.25	31.03	30.25	27.75	21.96	29.07
1991	22.62	23.99	26.12	33.29	38.30	38.04	35.80	26.66	23.71	24.24	19.96	17.06	27.48
1992	19.38	19.20	19.72	18.85	18.98	17.38	18.30	21.52	26.57	27.80	28.94	24.41	21.75
1993	20.74	16.67	23.70	30.39	30.95	28.44	22.63	22.76	25.19	26.22	28.59	30.53	25.57
1994	31.19	48.92	63.53	55.66	30.33	24.15							42.30

Cassava													Unit: US\$/ton
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1975	47.33	67.91	100.26	34.59	40.38	25.24	30.94	78.93	44.52	28.34	27.51	33.26	46.60
1976	55.43	53.91	62.83	39.14	48.47	75.47	49.39	49.61	47.79	48.48	46.77	41.72	51.54
1977	51.12	42.97	45.15	51.45	57.37	50.39	41.53	39.15	32.17	30.38	30.13	30.45	41.85
1978	27.08	28.48	25.29	24.04	22.47	20.91	20.41	20.29	19.89	23.50	22.88	21.60	23.07
1979	20.08	19.82	25.78	34.23	22.85	22.77	23.14	23.85	23.49	24.24	20.51	17.15	23.16
1980	13.32	15.74	32.19	39.26	45.46	49.59	47.59	56.77	51.82	45.64	46.44	40.69	40.42
1981	45.81	56.58	53.01	47.32	52.34	38.08	33.97	37.31	33.42	31.24	32.24	43.91	42.10
1982	35.42	34.84	34.21	32.41	31.99	31.23	29.02	25.08	25.69	23.55	21.62	22.45	28.96
1983	22.57	22.64	20.75	19.78	18.37	20.48	17.46	16.78	20.63	22.42	29.36	32.09	21.94
1984	35.02	36.08	36.40	43.95	44.05	42.05	41.78	37.27	34.95	29.13	41.12	32.21	37.83
1985	44.43	39.65	40.10	32.19	27.61	24.78	21.20	19.61	18.06	16.18	18.02	21.62	26.95
1986	16.73	19.12	22.18	25.13	25.27	25.27	25.13	24.55	24.47	25.71	25.34	20.94	23.32
1987	24.11	21.91	23.23	24.47	22.36	19.57	17.76	22.48	23.85	24.83	30.68	37.26	24.38
1988	45.52	32.19	61.84	54.36	51.31	45.79	39.34	39.75	53.51	68.11	62.76	49.31	50.32
1989	67.74		80.73	116.18	88.52	86.88	48.62	40.45	30.57	29.38	17.63	21.50	57.11
1990	32.34	30.96	21.40	20.61	29.37	30.09	26.89	26.07	26.88	26.26	21.66	19.27	25.98
1991	20.67	25.91	29.56	28.32	27.99	25.78	24.29	24.33	23.91	25.57	27.74	23.62	25.64
1992	43.11	40.45	51.86	45.99	37.94	36.72	34.92	37.10	42.78	49.16	54.39	55.51	44.33
1993	56.27	47.26	43.81	40.18	32.50	24.90	23.24	25.48	35.36	38.17	34.93	30.07	36.01
1994	34.56	30.78	30.12	27.61	27.10	25.39							29.26

Maize													Unit: US\$/60 kg
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1975	5.59	5.33	4.62	4.36	4.29	4.54	4.70	5.22	5.54	5.67	5.73	5.43	5.11
1976	5.54	5.23	4.82	4.50	4.65	4.72	4.75	4.69	4.78	4.68	4.85	4.67	4.82
1977	4.63	4.61	4.24	4.21	4.04	3.88	3.71	3.80	3.82	4.22	4.41	4.71	4.19
1978	5.03	5.43	5.26	6.47	6.37	6.76	6.64	6.19	6.92	7.15	8.39	8.15	6.52
1979	6.72	5.50	5.45	6.22	6.21	5.84	6.04	6.41	6.71	7.27	7.64	5.79	6.32
1980	5.79	5.48	5.41	5.15	4.89	5.20	6.81	7.07	7.11	8.85	10.37	10.35	6.87
1981	10.33	9.59	7.78	6.57	6.66	6.61	5.81	5.53	5.35	5.47	6.34	6.43	6.87
1982	6.15	5.78	5.78	6.04	5.80	5.73	5.43	5.04	4.87	5.10	5.73	5.83	5.61
1983	6.05	5.65	4.49	4.28	4.00	5.03	5.51	5.83	6.78	11.15	9.48	8.92	6.43
1984	8.30	6.94	6.10	5.69	5.25	4.81	4.78	5.04	5.59	5.87	5.98	5.81	5.85
1985	5.54	5.63	6.09	6.05	4.44	4.90	4.61	4.61	4.43	4.36	6.08	6.22	5.33
1986	8.08	6.56	5.69	5.60	5.53	5.53	5.53	5.66	5.74	5.81	5.95	5.87	5.96
1987	5.48	4.48	4.88	4.47	4.07	4.09	3.62	3.70	3.86	4.38	5.23	5.20	4.46
1988	5.15	5.33	5.15	5.48	5.86	5.99	5.93	5.34	6.35	7.21	8.15	8.51	6.20
1989	6.93	6.88	6.67	6.71	7.41	8.77	5.69	5.28	7.35	5.99	6.28	6.89	6.74
1990	7.32	6.26	6.16	5.92	7.35	8.05	7.05	8.30	8.55	7.84	8.80	7.29	7.41
1991	6.22	5.93	6.17	6.84	6.85	6.38	6.38	6.68	6.59	7.19	6.89	5.77	6.49
1992	6.40	5.68	4.74	4.46	4.78	5.30	5.24	5.54	6.39	6.55	6.58	6.93	5.72
1993	6.63	5.73	5.43	5.70	5.80	5.84	6.15	6.76	6.59	6.62	6.86	7.09	6.27
1994	6.59	5.46	5.48	5.44	5.51	5.35							5.64

Source: SRAB/DERAL/DEB

Table A5.1 Producer's Price of Agricultural Products in Paraná State (4/6)

	Soybean												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	10.01	9.32	8.58	9.10	8.71	8.58	9.03	10.20	10.11	9.68	9.05	8.54	9.24
1976	8.54	8.32	7.96	7.34	8.73	10.09	11.09	11.02	12.92	12.55	13.01	13.02	10.38
1977	11.98	12.11	13.71	16.17	14.75	13.57	10.22	9.23	8.98	9.49	10.11	10.38	11.73
1978	10.66	10.13	11.98	12.05	11.99	11.59	11.66	11.35	11.57	12.17	13.05	12.71	11.74
1979	12.45	13.12	13.20	12.88	11.81	13.25	14.36	15.26	15.31	15.46	15.03	11.27	13.62
1980	10.87	11.19	10.73	10.18	10.11	10.25	11.13	11.26	11.83	12.75	13.39	13.18	11.41
1981	12.75	12.71	12.15	11.55	12.24	11.86	11.75	11.86	11.43	11.62	11.78	11.62	11.94
1982	11.37	11.64	11.43	11.42	12.19	12.94	11.80	10.64	9.79	9.69	9.80	11.82	11.21
1983	11.28	10.48	7.96	9.69	9.51	9.75	9.70	12.04	19.20	18.43	16.42	15.61	12.51
1984	14.78	14.45	14.75	13.69	14.55	13.22	11.11	11.25	11.96	12.72	12.67	11.99	13.10
1985	10.93	10.49	10.43	10.00	9.03	8.79	9.63	9.57	9.37	10.24	11.05	10.11	9.97
1986	10.56	9.67	9.53	9.22	9.37	9.30	9.30	9.30	9.44	9.73	10.17	9.88	9.62
1987	9.15	8.46	8.02	7.43	9.47	10.63	9.53	10.84	11.97	11.73	11.79	13.46	10.21
1988	13.66	12.79	10.50	11.64	13.00	18.04	15.89	15.75	15.82	15.43	17.07	17.29	14.74
1989	13.86	13.53	13.90	15.12	13.54	11.77	10.98	9.23	11.36	11.15	12.16	12.80	12.45
1990	11.99	10.43	10.57	9.54	10.98	10.10	9.86	10.08	10.11	10.30	10.02	10.34	10.36
1991	9.75	10.65	10.47	10.39	10.33	10.05	9.58	10.14	11.19	11.95	10.25	9.31	10.34
1992	10.62	10.41	10.08	9.30	9.36	9.97	10.03	10.57	12.26	11.99	11.44	11.79	10.65
1993	11.59	10.72	10.13	9.79	9.69	10.30	12.24	12.35	11.73	11.70	11.71	11.97	11.16
1994	12.05	11.43	11.31	10.28	10.35	10.60							11.00

	Wheat												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	11.36	11.19	11.08	10.76	10.60	10.60	12.40	12.17	12.06	11.83	11.48	11.11	11.39
1976	11.11	10.69	10.49	9.80	9.71	12.06	11.91	11.74	11.31	11.06	10.87	10.66	10.95
1977	10.21	9.98	9.85	9.61	9.38	13.65	13.32	12.90	12.75	12.53	12.32	12.11	11.55
1978	11.92	11.60	11.51	11.29	11.01	14.15	13.89	13.40	13.28	13.00	12.74	12.22	12.50
1979	11.79	11.50	11.03	10.83	10.11	12.70	12.47	12.15	11.14	10.70	10.45	7.65	11.04
1980	7.42	7.18	6.95	6.73	6.49	14.04	13.63	13.01	12.56	12.19	11.62	11.12	10.24
1981	10.63	10.13	23.42	21.52	20.72	19.50	18.44	17.34	16.42	15.53	14.70	13.70	16.84
1982	13.22	12.36	11.77	15.96	16.21	16.22	16.21	15.87	15.80	15.93	15.93	15.99	15.12
1983	15.00	13.34	9.66	11.77	11.74	11.73	10.62	11.69	11.71	11.58	11.86	11.91	11.88
1984	11.80	10.55	9.43	12.97	13.02	13.00	12.94	12.95	12.92	12.69	12.79	11.93	12.25
1985	12.95	13.36	12.21	14.16	14.27	14.30	14.37	14.32	13.95	14.33	14.37	14.14	13.89
1986	14.24	14.56	13.66	14.55	14.55	14.55	14.55	14.55	14.55	14.55	14.55	13.85	14.40
1987	12.92	11.09	9.68	11.39	9.80	9.96	8.44	8.08	10.95	10.85	10.65	10.51	10.36
1988	10.48	10.42	10.41	10.31	10.26	10.23	10.13	10.14	10.08	7.96	9.84	9.81	10.17
1989	8.36	9.38	9.38	9.72	9.89	9.04	8.07	9.21	9.03	8.98	8.99	8.38	9.04
1990	8.60	7.58	8.30	9.13	8.79	8.47	7.80	8.00	8.47	8.74	7.89	7.34	8.26
1991	7.16	7.59	7.42	6.93	6.74	6.70	6.60	6.85	6.64	6.01	5.98	5.85	6.71
1992	6.32	7.00	7.63	8.29	8.61	8.84	9.19	8.47	8.66	8.61	8.46	8.38	8.20
1993	8.13	7.92	8.27	8.10	8.07	8.15	8.14	7.67	7.13	7.10	7.02	7.00	7.72
1994	7.18	6.98	6.80	6.61	6.70	6.50							6.80

	Cattle												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	15.01	14.38	13.32	13.84	13.63	12.87	13.00	12.99	13.84	14.40	15.47	14.08	13.90
1976	15.41	13.87	14.14	13.50	13.28	11.79	12.86	13.41	13.72	13.59	13.35	13.27	13.52
1977	12.30	12.03	12.48	12.34	12.11	11.70	11.90	12.48	12.73	15.62	16.07	16.31	13.17
1978	16.49	16.22	16.09	15.32	15.46	16.19	19.97	20.18	21.87	25.43	24.97	24.50	19.39
1979	24.91	23.97	23.78	25.05	24.03	23.71	26.64	29.70	33.84	33.36	33.54	24.33	27.24
1980	24.49	22.39	21.67	21.81	21.83	22.33	25.14	24.91	25.29	29.51	28.13	25.51	24.42
1981	25.60	23.09	22.33	20.89	20.11	17.67	18.55	18.35	21.13	21.70	23.55	19.79	21.06
1982	19.18	16.55	16.18	15.81	16.06	16.85	19.33	20.16	20.27	18.82	16.63	16.21	17.67
1983	15.40	14.52	11.90	12.84	13.60	12.74	13.78	14.77	18.05	20.88	18.96	18.18	15.47
1984	17.76	17.55	16.34	15.13	17.48	16.94	17.67	19.16	23.27	21.17	19.20	17.71	18.28
1985	15.70	13.77	12.34	11.07	9.88	9.19	12.30	17.37	17.79	17.42	23.00	19.68	14.96
1986	18.44	16.56	15.32	15.47	16.19	15.98	19.24	21.86	23.24	20.70	31.15	38.29	21.04
1987	33.65	25.72	21.68	19.37	19.34	15.04	16.58	19.64	19.06	20.85	22.16	16.40	20.79
1988	14.31	12.77	12.79	15.37	12.81	16.20	17.99	17.81	23.59	23.02	26.85	24.47	18.15
1989	17.63	19.21	19.81	25.04	28.75	37.20	27.68	34.62	26.59	23.01	28.43	25.12	26.09
1990	30.58	29.27	31.18	21.70	24.30	29.45	22.78	28.93	36.62	30.19	22.26	17.36	27.47
1991	17.39	19.24	19.30	19.05	18.27	18.73	22.39	25.10	24.50	26.23	24.17	18.98	21.11
1992	19.96	18.50	17.03	18.26	19.72	18.09	17.55	20.89	23.93	23.32	19.80	21.72	19.90
1993	22.34	20.52	22.14	22.48	21.35	19.81	22.71	25.80	26.53	25.22	24.23	24.55	23.14
1994	24.02	21.98	24.46	22.58	20.07	23.15							22.71

Source: SEAB/DERAL/DEB

Table-A5.1 Producer's Price of Agricultural Products in Paraná State (5/6)

	Pig												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	0.67	0.61	0.65	0.60	0.59	0.62	0.64	0.55	0.57	0.51	0.45	0.46	0.58
1976	0.52	0.48	0.59	0.55	0.52	0.46	0.58	0.48	0.51	0.58	0.59	0.59	0.54
1977	0.67	0.64	0.72	0.81	0.81	0.83	0.84	0.76	0.75	0.68	0.68	0.70	0.74
1978	0.66	0.65	0.69	0.66	0.64	0.68	0.62	0.55	0.54	0.59	0.75	0.76	0.65
1979	0.78	0.88	0.88	0.84	0.74	0.74	0.80	0.87	0.91	0.69	0.96	0.74	0.84
1980	0.80	0.82	0.80	0.74	0.68	0.73	0.73	0.66	0.62	0.58	0.57	0.64	0.70
1981	0.64	0.57	0.59	0.67	0.62	0.52	0.46	0.54	0.54	0.54	0.58	0.63	0.57
1982	0.66	0.72	0.79	0.73	0.74	0.81	0.79	0.74	0.70	0.67	0.65	0.64	0.72
1983	0.62	0.59	0.45	0.42	0.40	0.40	0.39	0.39	0.54	0.74	0.65	0.59	0.52
1984	0.58	0.84	0.74	0.69	0.66	0.67	0.61	0.61	0.69	0.66	0.59	0.60	0.66
1985	0.62	0.63	0.60	0.49	0.42	0.46	0.52	0.66	0.61	0.54	0.63	0.66	0.57
1986	0.67	0.58	0.54	0.49	0.54	0.62	0.64	0.72	0.80	0.80	0.87	0.90	0.68
1987	0.77	0.52	0.42	0.37	0.36	0.32	0.31	0.41	0.38	0.38	0.39	0.42	0.42
1988	0.39	0.38	0.50	0.53	0.46	0.50	0.55	0.51	0.54	0.60	0.71	0.79	0.54
1989	0.73	0.87	0.98	1.22	1.54	1.91	1.06	0.97	0.70	0.52	0.64	0.70	0.99
1990	0.58	0.58	0.71	0.54	0.79	1.01	0.98	0.87	0.88	0.74	0.57	0.45	0.72
1991	0.52	0.68	0.68	0.62	0.65	0.67	0.63	0.61	0.55	0.49	0.54	0.43	0.59
1992	0.45	0.48	0.45	0.41	0.42	0.46	0.49	0.52	0.59	0.55	0.53	0.75	0.51
1993	0.69	0.64	0.73	0.62	0.58	0.67	0.68	0.60	0.62	0.61	0.61	0.75	0.65
1994	0.55	0.53	0.50	0.47	0.50	0.45							0.50

	Chicken												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	0.77	0.59	0.70	0.61	0.66	0.74	0.69	0.75	0.69	0.67	0.72	0.68	0.69
1976	0.74	0.65	0.67	0.62	0.61	0.59	0.67	0.71	0.64	0.63	0.65	0.67	0.65
1977	0.62	0.63	0.72	0.67	0.62	0.62	0.60	0.59	0.74	0.66	0.65	0.64	0.65
1978	0.63	0.61	0.73	0.71	0.69	0.68	0.61	0.65	0.69	0.73	0.82	0.88	0.70
1979	0.85	0.83	0.80	0.78	0.73	0.71	0.69	0.82	0.86	0.89	0.87	0.66	0.79
1980	0.64	0.67	0.69	0.69	0.64	0.67	0.67	0.70	0.71	0.69	0.69	0.77	0.68
1981	0.81	0.86	0.81	0.78	0.73	0.68	0.67	0.68	0.69	0.67	0.63	0.61	0.72
1982	0.62	0.64	0.68	0.64	0.60	0.58	0.59	0.59	0.58	0.56	0.54	0.60	0.60
1983	0.59	0.52	0.44	0.46	0.46	0.51	0.48	0.46	0.48	0.66	0.59	0.60	0.52
1984	0.62	0.72	0.68	0.60	0.56	0.55	0.53	0.61	0.69	0.70	0.59	0.53	0.61
1985	0.52	0.48	0.45	0.36	0.41	0.44	0.53	0.67	0.63	0.51	0.67	0.70	0.53
1986	0.69	0.57	0.55	0.57	0.59	0.60	0.68	0.67	0.65	0.65	0.73	0.83	0.65
1987	0.77	0.61	0.58	0.52	0.62	0.49	0.45	0.49	0.55	0.55	0.55	0.48	0.55
1988	0.44	0.46	0.56	0.56	0.51	0.56	0.61	0.58	0.69	0.68	0.73	0.82	0.60
1989	0.60	0.69	0.73	0.89	1.14	1.30	0.83	0.94	0.87	0.64	0.82	0.90	0.86
1990	0.81	0.83	0.87	0.72	0.69	0.79	0.88	0.98	1.20	0.99	0.68	0.53	0.83
1991	0.60	0.71	0.75	0.66	0.64	0.64	0.66	0.67	0.61	0.59	0.61	0.51	0.64
1992	0.55	0.57	0.51	0.43	0.49	0.54	0.51	0.52	0.57	0.65	0.63	0.62	0.55
1993	0.60	0.53	0.57	0.59	0.53	0.52	0.62	0.67	0.67	0.65	0.60	0.62	0.60
1994	0.61	0.54	0.65	0.57	0.52	0.51							0.57

	Egg												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	12.58	11.19	14.78	13.97	13.75	14.13	13.49	12.75	11.79	10.74	12.84	12.42	12.87
1976	10.75	14.09	16.86	15.36	14.15	13.96	15.84	15.25	13.19	13.51	13.35	11.68	14.00
1977	12.70	12.97	15.33	15.95	16.73	16.22	16.32	14.99	13.40	12.26	14.19	13.89	14.58
1978	15.42	14.09	15.73	16.15	16.27	16.36	17.51	16.68	16.75	14.73	12.95	13.35	15.50
1979	12.17	14.27	16.74	16.79	13.88	14.38	15.32	16.50	15.31	14.20	14.87	11.58	14.67
1980	11.88	11.35	14.64	14.56	13.80	12.41	13.76	13.64	11.73	13.64	13.15	14.43	13.25
1981	13.86	17.10	18.90	18.25	15.75	14.48	15.53	15.01	12.77	13.08	14.27	14.02	15.25
1982	13.30	14.35	16.18	19.68	15.42	17.03	14.42	14.71	13.02	11.33	11.47	9.85	14.23
1983	10.59	9.97	9.55	11.43	10.15	9.26	11.68	10.65	10.63	16.75	10.60	15.08	11.36
1984	14.88	15.78	14.43	14.77	13.02	14.63	12.67	13.62	15.28	11.86	11.38	11.49	13.65
1985	9.63	9.99	10.27	7.98	7.63	8.84	8.14	10.78	10.57	7.65	10.24	10.91	9.38
1986	8.24	10.14	11.83	12.42	12.42	12.42	12.49	12.78	13.07	14.02	14.46	14.03	12.33
1987	14.25	13.11	11.88	10.25	11.13	8.60	6.90	7.15	7.44	8.68	5.83	9.36	9.56
1988	5.93	9.49	12.21	8.79	9.92	10.23	12.63	14.96	10.14	12.12	11.76	11.87	10.84
1989	11.17	11.72	13.48	17.99	28.86	32.04	19.03	18.98	12.15	8.49	11.84	10.88	
1990	11.36	11.68	18.72	15.14	14.21	15.89	17.08	19.65	16.45	12.80	8.72	7.75	14.12
1991	9.35	5.59	10.12	12.75	11.93	11.43	11.81	10.60	10.12	7.16	7.84	8.49	10.10
1992	7.03	11.90	11.83	8.74	9.49	8.99	9.18	10.24	10.29	11.33	10.98	11.38	10.11
1993	10.68	13.10	14.04	13.00	13.03	13.51	12.10	13.94	13.69	10.04	8.81	10.04	12.17
1994	10.63	10.85	12.20	11.41	10.23	9.89							10.87

Source: SEAB/DERAL/DEB

Table-A5.1 Producer's Price of Agricultural Products in Paraná State (6/6)

	Milk												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1975	0.19	0.20	0.18	0.18	0.18	0.16	0.19	0.18	0.18	0.20	0.16	0.17	0.18
1976	0.18	0.17	0.16	0.17	0.17	0.18	0.20	0.18	0.18	0.19	0.18	0.18	0.18
1977	0.18	0.18	0.21	0.21	0.21	0.22	0.24	0.23	0.22	0.22	0.22	0.22	0.21
1978	0.21	0.20	0.21	0.19	0.20	0.22	0.25	0.24	0.23	0.20	0.21	0.22	0.21
1979	0.20	0.19	0.19	0.19	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.17	0.20
1980	0.17	0.18	0.16	0.17	0.22	0.24	0.23	0.24	0.24	0.22	0.25	0.23	0.21
1981	0.25	0.26	0.23	0.21	0.28	0.26	0.31	0.29	0.27	0.25	0.24	0.22	0.26
1982	0.21	0.20	0.16	0.19	0.21	0.18	0.22	0.22	0.21	0.20	0.19	0.20	0.20
1983	0.19	0.17	0.16	0.15	0.14	0.17	0.16	0.14	0.13	0.15	0.15	0.14	0.15
1984	0.15	0.14	0.15	0.15	0.15	0.13	0.15	0.14	0.14	0.15	0.14	0.14	0.15
1985	0.14	0.13	0.15	0.14	0.13	0.12	0.12	0.14	0.13	0.12	0.15	0.15	0.13
1986	0.15	0.13	0.12	0.12	0.12	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.15
1987	0.22	0.19	0.16	0.23	0.18	0.23	0.21	0.21	0.20	0.21	0.20	0.18	0.20
1988	0.18	0.17	0.18	0.19	0.18	0.19	0.18	0.18	0.19	0.21	0.20	0.20	0.19
1989	0.18	0.19	0.22	0.21	0.21	0.22	0.22	0.22	0.23	0.23	0.24	0.22	0.22
1990	0.27	0.30	0.38	0.29	0.29	0.27	0.24	0.24	0.26	0.23	0.20	0.18	0.26
1991	0.18	0.20	0.21	0.20	0.20	0.21	0.22	0.22	0.21	0.19	0.18	0.18	0.20
1992	0.17	0.16	0.18	0.20	0.21	0.22	0.21	0.19	0.18	0.17	0.15	0.15	0.18
1993	0.15	0.17	0.20	0.22	0.25	0.26	0.26	0.24	0.22	0.21	0.18	0.18	0.21
1994	0.16	0.15	0.16	0.18	0.20	0.19							0.17

Source: SEAB/DERAI/DEB

Appendix-6
Agricultural Data Regarding Pilot River Basins

Table-A6.1 Landuse of Iguacu River Basin (1/2)

Dk.	No.	Municipality	Area Involved (km ²)	2nd				2nd				Others (%)				
				Forest (km ²)	Vegetation (km ²)	Reforestation (km ²)	Pasture (km ²)	Crop (km ²)	Others (km ²)	Forest (%)	Vegetation (%)		Reforestation (%)	Pasture (%)	Crop (%)	
I	I-001	Campes Grande do Sul	79.2		38.7	9.7	20.0	10.0	2.8		0.0	46.3	12.2	25.3	12.6	3.6
	I-002	Cueto Barma	99.8	25.7	7.4	0.1	34.4	26.1	5.8		25.8	7.4	0.1	34.6	26.2	5.9
	I-003	Piquetara	171.9	63.1	14.9		54.5	54.5	9.7		36.7	8.7	0.0	17.3	31.7	5.6
	I-004	Sao Jose dos Pinhais	674.2	37.6	57.9	1.7	160.2	293.8	53.6		13.0	11.5	0.3	23.8	43.6	7.8
	I-005	Colombo	127.6		31.6		15.8	22.3			0.0	45.4	0.0	24.8	12.4	17.4
	I-006	Pinhais	98.2		11.1		21.2	38.4	27.5		0.0	11.3	0.0	21.6	39.1	28.0
	I-007	Amirante Tamandare	189.3		90.9		45.3	37.3	15.6		0.0	48.0	0.0	23.9	19.7	8.4
	I-008	Curitiba	431.7		23.8		23.2	45.4	339.3		0.0	5.5	0.0	5.4	10.5	78.6
	I-009	Campo Largo	297.2		97.2	0.4	28.4	161.7	19.5		0.0	22.5	0.1	9.6	51.0	6.6
	I-010	Araucaria	503.7		133.5		67.9	244.4	77.9		0.0	22.5	0.0	13.5	48.5	15.5
	I-011	Fazenda Rio Grande	110.9		19.4		26.0	54.0	10.7		0.0	17.5	0.0	24.2	48.7	9.6
	I-012	Mandrituba	392.3		80.4		97.9	188.3	2.2		0.0	20.5	6.0	25.0	48.0	0.5
	I-013	Tijucas do Sul	422.6	26.3	107.7		83.4	111.9	80.3	13.0	6.2	25.5	19.7	26.5	19.0	3.1
	I-014	Balsa Nova	319.7		83.4	2.1	162.2	72.0			0.0	26.1	0.7	50.7	22.5	0.0
	I-015	Corituba	222.2		56.3		39.0	123.7	3.2		0.0	26.3	0.0	17.6	56.7	1.4
	I-016	Cubandinha	419.4	19.8	142.9	2.8	35.2	216.0	2.7	4.7	4.7	34.1	0.7	8.4	51.5	0.6
	I-017	Agudos do Sul	259.6	0.4	68.2		2.2	134.6	16.6		0.2	34.0	6.8	0.8	51.8	6.4
	I-018	Pien	261.7	13.0	82.4		4.1	120.0	15.1		5.0	31.5	8.9	1.8	49.3	5.7
	I-019	Rio Negro	603.2		177.3		210.0	32.3	140.7	42.9	0.0	29.4	34.8	5.4	23.3	7.1
	I-020	Campo do Tenente	314.0	8.5	116.2		18.5	37.6	131.2		2.7	37.6	5.9	12.0	41.8	0.0
	I-021	Lapa	2,203.9	26.0	874.8	145.5	264.9	879.1	13.6		1.2	39.7	6.6	12.0	39.9	0.6
	I-022	Porto Amazonas	153.0		49.3		10.1	45.8	48.0		0.0	32.2	6.6	29.8	31.4	0.0
	I-023	Palmeira	273.4	2.5	139.2		4.6	25.9			0.9	50.9	1.7	9.5	36.8	0.2
	I-024	Sao Joao do Trunfo	708.1	158.1	340.8		142.8	0.5			22.3	48.1	0.0	0.0	20.2	0.1
	I-025	Antonio Olinto	482.5	60.3	216.2		155.2	50.8			12.5	44.8	0.0	0.0	32.2	10.5
	I-026	Sao Mateus do Sul	1,332.8	265.4	595.5		436.2	60.1			15.4	44.7	2.6	0.0	32.9	4.5
	I-027	Reboucas	498.9	16.0	190.2		290.7				3.6	38.1	0.0	0.0	58.3	0.0
	I-028	Irap	408.1	33.5	146.8		7.2	220.4	0.2		8.2	36.0	1.8	0.0	54.0	0.0
	I-029	Rio Azul	642.6	76.4	249.6						11.9	39.8	0.0	0.1	49.2	0.0
	I-030	Mallet	672.6	139.3	249.3		284.2				20.7	37.1	0.0	0.0	42.2	0.0
Total / Average			13,374.2	963.9	4,538.6	664.8	1,348.1	5,062.3	805.3		7.2	33.9	4.9	10.1	37.9	6.0
II	I-031	Paulo Frontin	377.5	20.8	136.2	0.4	204.7	16.4		5.5	33.8	0.1	0.0	54.2	4.4	
	I-032	Paula Freitas	417.0	42.5	153.8	9.1	161.7	49.9		10.2	36.9	2.2	0.0	38.8	11.9	
	I-033	Uniao da Victoria	773.9	243.7	298.9		150.8	82.0		31.5	38.4	0.0	0.1	19.5	10.5	
	I-034	Porto Vitoria	220.2	32.7	103.2		56.3	28.0		14.9	46.9	0.0	0.0	25.8	12.6	
	I-035	General Carneiro	1,063.7	371.5	342.6		243.3	82.1		34.9	32.2	0.0	5.1	22.9	4.9	
	I-036	Bituruna	1,209.7	447.4	446.3		269.1	30.9		37.0	36.9	0.0	1.3	22.2	2.6	
	I-037	Cruz Machado	1,500.5	274.1	425.3		143.7	597.6	69.9		18.3	29.3	0.0	9.6	39.2	4.6
	I-038	Inacio Martins	879.9	325.8	256.3		79.2	216.5		37.0	29.4	0.0	9.0	24.6	0.0	
	I-039	Guarapuava	3,402.7	464.8	482.2		338.5	1,545.4	42.4		13.7	14.2	1.8	23.7	46.4	1.2
	I-040	Pinhao	2,875.2	758.4	798.4		978.9	529.7	62.4		26.4	24.6	0.0	11.8	35.0	2.2
	I-041	Palmas	3,125.5	753.7	791.1		878.9	529.7	72.1		24.1	25.3	0.0	31.3	16.9	2.4
	I-042	Clevelândia	708.4	30.0	163.5		155.2	318.4	41.3		4.2	23.1	0.0	21.9	44.9	6.9
	I-043	Honorio-Serpa	808.6	22.2	267.5		160.4	353.6	2.9		2.8	33.2	0.0	19.9	43.8	0.3
	I-044	Monte-Serpia	801.3	86.5	270.2		116.7	338.6	7.3		8.5	33.7	0.0	14.6	42.3	0.9
I-045	Candel	999.8	99.5	240.7		201.6	394.9	73.1		10.0	24.1	0.0	20.1	38.1	7.2	
I-046	Camargos	774.1	80.9	209.1		179.1	307.5	2.4		10.5	27.0	0.0	23.1	36.5	0.3	
Total / Average			19,936.0	4,036.5	5,294.3	72.0	3,229.4	6,870.8	833.0		20.2	26.6	0.4	16.2	33.4	3.2

Table-A6.1 Landuse of Iguacu River Basin (2/2)

Div.	No.	Municipality	Area Involved (km ²)	Forest (km ²)	2nd Vegetation (km ²)	Reforestation (km ²)	Pasture (km ²)	Crop (km ²)	Others (km ²)	Forest (%)	2nd Vegetation (%)	Reforestation (%)	Pasture (%)	Crop (%)	Others (%)
	I-047	Vimondou	198.4	0.2	26.8		50.4	91.0		0.1	28.6		25.4	45.9	0.0
	I-048	Laranjeiras do Sul	1,052.7	63.1	281.6		204.8	395.6	113.7	6.0	26.8		22.3	34.2	10.7
	I-049	Chopininho	992.5	40.1	247.2	5.7	246.6	416.8	37.1	4.0	24.9	0.6	24.7	42.0	3.8
	I-050	Coronel Vidua	651.5	3.3	214.2	1.2	159.2	288.4	14.2	0.6	31.4	0.2	23.4	42.5	2.0
	I-051	Pato Branco	570.2	3.3	176.5		130.1	251.3	9.0	1.5	22.8	0.0	11.3	44.1	1.5
	I-052	Manoelito	232.1	1.6	81.5		26.3	113.4	29.3	0.7	26.5	0.0	11.3	48.9	12.6
	I-053	Vitorino	336.1	0.8	95.1		29.7	144.6	66.9	0.2	29.2	0.0	14.7	44.3	17.2
	I-054	Renascença	434.7	5.7	125.9	36.9	63.7	105.0	27.5	1.3	28.0	6.2	23.4	50.7	6.2
	I-055	Bom Sucesso do Sul	135.3		35.0		31.7	68.8		0.0	23.9	0.0	27.4	52.7	1.5
	I-056	Itaipava D'Oeste	246.0		45.2		67.5	129.8	3.7	0.0	10.4	0.0	29.6	54.3	1.3
	I-057	Vere	346.6		51.1		102.3	187.8	4.7	1.3	0.0	0.0	30.4	56.0	3.0
	I-058	Sao Jose	408.9	1.7	41.7		124.3	228.9	12.3	0.4	10.2	0.0	30.0	56.0	0.0
	I-059	Sulina	158.5		23.8		47.5	87.2		0.0	15.0	0.0	27.3	52.8	3.3
	I-060	Saúde do Iguacu	147.6	4.3	20.3		40.4	78.1	4.7	2.9	13.7	0.0	6.5	12.8	5.3
	I-061	Rio Sombro do Iguacu	459.3	323.8	22.7		29.9	58.6	24.3	70.5	4.9	0.0	16.9	13.9	0.0
	I-062	Nova Laranjeiras	578.8	196.3	202.5	1.3	98.0	98.7		33.9	35.1	0.2	28.6	41.4	2.0
	I-063	Guaranicuri	495.0	12.2	222.0		141.4	117.6	1.8	2.5	44.8	0.0	28.6	23.8	0.3
	I-064	Quedas do Iguacu	1,192.9	275.1	370.9	108.3	137.7	245.2	85.7	23.1	31.1	9.1	11.5	20.6	4.6
	I-065	Sao Jorge do Oeste	395.1	1.6	77.4		100.0	176.9	29.2	0.4	20.1	0.0	26.0	45.9	7.6
	I-066	Cruselo do Iguacu	96.6	2.9	13.0		25.9	47.6	7.2	3.0	13.5	0.0	26.8	49.3	7.4
	I-067	Bos Esperanca do Iguacu	248.4	1.2	39.1		73.8	133.3		0.5	15.7	0.0	29.6	64.2	0.0
	I-068	Dona Vitoria	372.7		64.9		108.6	200.7	7.5	0.0	14.7	0.0	29.4	53.9	2.0
	I-069	Ereos Marques	234.7		67.1		70.4	97.2		0.0	28.6	0.0	30.0	41.4	0.0
	I-070	Francisco Beltrao	696.7	10.2	137.3		160.9	359.9	8.4	1.5	19.7	0.0	26.0	51.7	1.1
	I-071	Marmeleiro	449.9	7.0	132.9	1.4	63.3	205.1	40.2	1.6	29.5	0.3	14.1	46.6	8.9
	I-072	Flor de Serra do Sul	94.7		25.8		5.4	32.2		0.0	27.2	0.0	5.7	34.0	33.1
	I-073	Barracao	386.3		74.5		91.6	149.4	70.8	0.0	19.3	0.0	23.7	38.7	18.3
	I-074	Salgado Filho	698.4		42.4		148.4	83.0	4.2	0.0	63.9	0.0	28.9	16.4	0.8
	I-075	Santo Antonio do Subpoete	313.8		42.4		88.5	189.0	23.9	0.0	13.5	0.0	28.2	50.7	7.6
	I-076	Pranchita	297.1		46.3		87.2	139.9	21.7	0.0	16.3	0.0	29.4	47.1	7.2
	I-077	Pinhai de Sao Bento	107.6		59.1		32.3	16.2		0.0	54.9	0.0	30.0	15.1	0.0
	I-078	Ampera	307.9		82.3		100.3	125.3		0.0	26.7	0.0	32.6	40.7	0.0
	I-079	Nova Esperanca do Subpoete	176.9		26.4		51.7	94.4		2.5	14.9	0.0	29.2	53.4	0.0
	I-080	Salto do Lorrto	336.9	4.6	67.4		98.7	163.6	2.6	1.4	20.0	0.0	29.3	48.6	0.7
	I-081	Santa Izabel do Oeste	330.5	5.9	56.6		108.8	185.9	3.7	1.8	17.1	0.8	32.0	47.2	1.1
	I-082	Nova Praia do Iguacu	330.0	5.1	45.1		105.6	178.7	5.5	1.8	11.2	0.0	31.7	53.7	1.6
	I-083	Parola do Oeste	337.1		35.8		112.1	181.9	7.3	0.0	10.6	0.0	30.1	48.3	6.4
	I-084	Planalto	361.9	13.4	11.0		99.3	159.3	21.3	1.5	13.7	0.0	30.1	54.0	2.1
	I-085	Realiza	403.9	1.0	16.6		126.4	228.7	33.2	0.2	4.1	0.0	31.0	58.7	2.2
	I-087	Tres Barras do Parana	521.7	24.1	123.6	1.1	109.1	242.9	20.9	4.6	23.7	0.2	20.9	46.6	4.0
	I-088	Catanduvas	593.9	23.6	192.6	8.9	120.4	248.4		4.0	32.4	1.5	20.3	41.8	0.0
	I-089	Ibama	148.3	4.2	71.5	6.8	22.8	42.0	0.9	2.8	48.2	4.6	15.4	28.3	0.7
	I-090	Cascavel	1,198.9	9.7	306.0	20.3	256.9	503.5	19.7	0.8	25.8	1.7	21.4	48.7	1.6
	I-091	Bos Vista de Aparecida	232.2		46.9		53.2	119.6	12.5	0.0	20.2	0.0	22.9	51.5	5.4
	I-092	Capitao Leonidas Marques	279.8		5.8		84.0	166.5	19.6	0.0	2.1	0.0	30.0	55.9	7.0
	I-093	Santa Lucia	137.1	1.4			47.5	88.2		1.0	0.0	0.0	34.6	64.4	0.0
	I-094	Lindóiate	273.2	23.3	18.9		71.3	139.7		8.5	7.0	0.0	26.1	58.4	0.0
	I-095	Santa Tereza do Oeste	235.5	15.0	11.2	4.2	71.4	133.7		6.4	4.7	1.8	30.3	56.8	0.0
	I-096	Ceu Azul	937.2	818.0	26.1		31.0	41.0	22.1	87.3	2.7	0.0	3.3	4.4	2.3
	I-097	Mistandia	601.4	306.0	143.5		84.2	59.4		50.9	23.9	0.0	14.0	9.9	1.3
	I-098	Medianeira	621.1	241.0	73.5		103.8	165.5	37.6	38.8	11.8	0.0	16.7	26.6	6.1
	I-099	Sao Miguel do Iguacu	455.7	73.1	75.5		109.7	166.9	10.5	16.0	16.6	0.0	24.1	41.0	2.3
	I-100	Santa Tereza de Itaipu	162.1	3.6	23.3		45.8	84.3		2.2	14.4	0.0	28.3	52.0	3.1
	I-101	Poz do Iguacu	312.2	91.1	31.1		46.9	86.9		26.2	10.0	0.0	16.0	27.8	18.0
		Total / Average	22,465.8	2,642.7	4,868.4	188.7	5,006.0	8,826.4	931.6	11.8	21.7	0.8	22.3	39.2	4.2
		Div. / Average for Whole Basin	26,776.0	7,843.1	14,701.3	915.6	9,683.5	20,581.7	2,370.9	13.7	26.4	1.6	17.2	36.8	4.3

Note: Since the summation of landuse with municipality wise deviates from one computed for the whole river basin, difference of several % the figures in the above table were readjusted and result is shown in the main text.

Table-A6.2 Landuse of Tibagi River Basin

TIBAGI BASIN

Div.	No.	Municipality	Area Involved (km ²)	Forest (km ²)	2nd Vegetation (km ²)	Reforestation (km ²)	Pasture (km ²)	Crop (km ²)	Others (km ²)	Forest (%)	2nd Vegetation (%)	Reforestation (%)	Pasture (%)	Crop (%)	Others (%)
I	T-001	Ponto Amazonas	53.9		5.9		27.8	20.1		0.0	11.0	0.0	51.6	37.4	0.0
	T-002	Palmeira	1,227.4	11.6	401.4	50.4	208.7	527.7	2.6	0.9	32.7	4.1	17.0	45.0	0.3
	T-003	Teixeira Soares	1,303.5	192.3	522.7	119.6	61.0	407.9		14.8	40.0	9.2	4.7	31.3	0.0
	T-004	Itaiti	139.6	2.0	53.5	2.0	76.2		5.9	1.4	38.3	1.4	0.0	54.6	4.3
	T-005	Imbituva	811.3	109.4	391.2	67.5	5.8	237.4		13.5	48.2	8.3	0.7	29.3	0.0
	T-006	Ipiranga	932.0	71.0	388.5	72.8	89.0	310.7		7.6	41.8	7.6	9.5	33.3	0.0
	T-007	Ponta Grossa	1,870.8	5.3	329.8	75.0	580.6	826.4		0.3	17.6	4.0	31.0	44.2	2.9
	T-008	Castro	2,278.4	54.6	734.7	20.7	725.7		3.3	2.4	32.2	0.9	31.9	32.5	0.1
	T-009	Mai	212.2	9.3	113.5		12.9	76.5		4.4	53.4	0.0	6.1	36.1	0.0
	T-010	Reserva	555.9	3.3	104.0	66.5	136.4	245.7		0.6	18.7	12.0	24.5	44.2	0.0
	T-011	Tibagi	2,926.6	130.5	864.2	256.3	758.9	866.6		4.5	30.5	8.8	25.9	29.3	1.0
	T-012	Piraí do Sul	965.2	19.2	285.1	10.5	426.0	219.5		2.9	29.5	1.1	44.3	22.7	0.4
	T-013	Verdiana	380.1	12.2	65.1	68.5	90.3	144.0		3.2	17.1	18.0	23.8	37.9	0.0
	T-014	Telemaco Borba	1,625.3		107.6	1,331.2	46.8	97.9		0.0	6.6	81.9	2.9	6.0	2.6
	Total / Average	15,282.1	620.7	4,397.4	2,141.0	3,171.9	4,511.0		4.1	28.8	14.0	20.8	31.4	0.9	
II	T-015	Onduruva	1,568.5	6.3	508.0	138.7	271.8	655.7		0.4	32.0	8.7	17.1	41.3	0.5
	T-016	Cunha	361.8	9.6	89.4	74.9				2.7	24.7	20.7	16.6	35.2	0.1
	T-017	Sapopema	531.9	50.7	161.2		99.9	220.1		9.5	30.3	0.0	18.8	41.4	0.0
	T-018	Sao Jeronimo da Serra	851.3	8.0	100.7		136.9	601.3		0.9	11.8	0.0	16.1	70.6	0.6
	T-019	Maua da Serra	48.0	5.1	21.5		10.4	11.0		10.6	44.8	0.0	21.7	22.9	0.0
	T-020	Mantlandia do Sul	152.2	16.0	60.8		9.2	66.2		10.5	40.0	0.0	6.0	43.5	0.0
	T-021	California	97.2	22.7	48.7		1.3	24.5		23.4	50.1	0.0	1.3	25.2	0.0
	T-022	Apucarana	162.2	31.8	75.6		0.1	74.7		17.5	41.4	0.0	0.1	41.0	0.0
	T-023	Arapongas	191.9	24.0	67.3		4.6	94.0		12.5	35.1	0.0	2.4	49.0	1.0
	T-024	Londrina	2,095.6	120.0	841.8		310.3	772.7		5.7	40.2	0.0	14.8	36.9	2.4
	T-025	Nova Santa Barbara	112.2		5.7		5.8	100.7		0.0	5.1	0.0	5.2	89.7	0.0
	T-026	Santa Cecilia do Pavao	68.3					68.5		0.0	0.0	0.0	0.0	100.0	0.0
	T-027	Santo Antonio do Paraiso	151.9	2.0	7.3		33.9	108.7		1.3	4.8	0.0	22.3	71.6	0.0
	T-028	Concunhinhas	104.6		6.7		17.9	80.0		0.0	6.4	0.0	17.1	76.5	0.0
	T-029	Nova Fama	83.5		7.1		26.1	50.3		0.0	8.5	0.0	31.3	60.2	0.0
	T-030	Sao Sebastiao da Amoreira	217.4	8.0	10.6		38.3	180.5		3.7	4.8	0.0	17.6	73.9	0.0
	T-031	Assai	450.5	0.3	33.9		39.8	363.1		13.4	0.1	7.5	0.0	8.8	3.0
	T-032	Nova America da Colina	133.3		10.7		33.7	88.9		0.0	0.0	8.0	0.0	25.3	66.7
	T-033	Comelio Procopio	336.7	2.5	49.2		112.9	166.2		0.8	14.6	0.0	0.0	33.5	49.4
	T-034	Urai	209.6	2.1	0.8		25.3	181.4		1.0	0.4	0.0	12.1	86.5	0.0
	T-035	Jatuzinho	199.1	0.8	6.4		71.7	107.6		0.4	3.2	0.0	36.0	54.0	6.4
	T-036	Ibipora	295.4		19.8		3.1	36.8		0.8	0.0	0.0	0.0	62.8	4.1
	T-037	Rolandia	57.4		50.2			93.3		0.0	34.5	0.0	0.0	64.1	1.4
	T-038	Cambe	143.5		6.0		23.7	296.0		0.0	35.0	0.0	0.0	65.0	0.0
T-039	Sertanopolis	478.9		140.4			150.8		1.3	29.3	0.0	4.9	61.8	2.7	
T-040	Rancho Alegre	187.4		0.2			36.4		0.0	0.1	0.0	0.0	80.5	19.4	
T-041	Leopolis	68.9		5.0		7.9	55.5		0.7	7.3	0.0	11.5	80.5	0.0	
T-042	Sertaneja	226.7		0.9		1.2	152.5		0.4	0.5	0.0	0.0	67.3	31.8	
T-043	Primeiro de Maio	142.8		23.4			96.2		0.0	16.4	0.0	0.0	87.4	16.2	
	Total / Average	9,763.9	317.4	2,448.3	213.6	1,344.3	5,190.0		3.2	25.1	2.2	13.8	33.1	2.6	
	Total / Average for Whole Basin	25,051.0	938.1	6,845.7	2,354.6	4,516.2	10,001.0		3.7	27.4	9.4	18.0	39.9	1.6	

Div.: Division, Area involved; Area within the river basin
 Note: Since the summation of landuse with municipality wise deviates from one computed for the whole river basin, difference of several %, the figures in the above table were readjusted and result is shown in the main text.
 Source: SANEPAIS GIS Computation based on IAP Satellite Imagery Analysis

Table-A6.5 Number of Farmers and Productivity of Dominant Crops in Iguaçu River Basin (1/2)

Div.	No.	Municipality	Cotton P. No. of Farmers (ton/ha)	Sugarcane No. of Farmers (ton/ha)	Beans P. No. of Farmers (ton/ha)	Maize P. No. of Farmers (ton/ha)	Soybean P. No. of Farmers (ton/ha)	Cassava No. of Farmers (ton/ha)	Potato P. No. of Farmers (ton/ha)	Coffee P. No. of Farmers (ton/ha)	Wheat P. No. of Farmers (ton/ha)
I	L-001	Campina Grande do Sul	0	0	57	68	150	0	3	7.00	0
	L-002	Quatro Barras	0	0	109	136	1.80	0	0	0.00	0
	L-003	Pratânia	0	0	0	128	1.80	0	6	11.50	0
	L-004	São João dos Pinhais	0	0	1472	1546	2.40	0	37	9.85	0
	L-005	Carombó	0	0	336	538	2.25	0	13	8.00	0
	L-006	Pinhais	0	0	0	72	1.60	0	4	11.50	0
	L-007	Almirante Tamandare	0	0	626	635	1.33	0	65	12.00	0
	L-008	Curitiba	0	0	0	270	2.00	0	18	12.00	0
	L-009	Campo Largo	0	0	585	612	2.00	0	212	12.00	0
	L-010	Araruama	0	0	1750	1700	2.70	0	1050	15.00	105
	L-011	Fazendas Rio Grande	0	0	290	340	3.20	0	30	15.00	0
	L-012	Manduriá	0	0	850	960	1.10	0	180	15.00	120
	L-013	Tijucas do Sul	0	0	822	1276	2.03	0	10	18.80	0
	L-014	Balsa Nova	0	0	429	422	3.67	0	248	16.00	0
	L-015	Contenda	0	0	1363	1363	3.72	0	1170	16.00	0
	L-016	Quilombinha	0	0	1600	1900	2.60	0	490	15.00	290
	L-017	Agulhas do Sul	0	0	1400	1400	3.10	0	60	11.00	0
	L-018	Pian	0	0	990	1310	2.82	0	50	15.00	280
	L-019	Rio Negro	0	0	653	905	1.25	0	30	18.00	0
	L-020	Campo do Tenente	0	0	316	295	2.40	0	50	12.00	0
	L-021	Lapa	0	0	2000	2500	3.60	100	500	15.00	20
	L-022	Ponto Amazonas	0	0	22	111	2.50	0	7	18.00	0
	L-023	Palmares	0	0	228	364	3.60	87	7	15.00	15
	L-024	São João do Triunfo	0	0	1253	3038	3.00	8	20	18.00	0
	L-025	Antônio Olinto	0	0	1575	1300	2.10	600	55	17.00	0
	L-026	São Mateus do Sul	0	0	2900	3200	3.00	75	30	20.00	30
	L-027	Rebouças	0	0	1829	1858	3.00	30	55	16.50	48
	L-028	Itai	0	0	1282	1274	2.68	14	32	12.00	20
	L-029	Rio Açu	0	0	1984	1964	2.90	15	50	12.00	65
	L-030	Mallet	0	0	1400	1400	2.90	20	150	12.00	0
	L-031	Pauco Frontin	0	0	1300	1230	2.50	63	4	12.00	0
	L-032	Paula Freitas	0	0	500	500	2.20	60	3	15.00	0
	L-033	União da Vitória	0	0	610	630	2.23	4	0	0.00	0
	L-034	Ponto Vitória	0	0	290	315	2.00	0	0	0.00	0
	L-035	General Carneiro	0	0	489	469	1.50	0	0	0.00	0
	L-036	Situbona	0	150	1000	1100	2.30	0	0	0.00	0
	L-037	Cruz Machado	0	0	2276	2276	1.60	0	200	12.00	200
	L-038	Inacio Martins	0	0	691	691	1.60	0	0	0.00	0
	L-039	Quatipuru	0	0	1844	2524	4.50	270	34	24.00	123
	L-040	Pinhão	0	0	2700	3200	4.25	100	15	25.00	223
	L-041	Palmas	0	0	650	900	3.50	90	10	20.00	15
	L-042	Clevalândia	0	0	700	680	0.90	500	0	0.00	60
	L-043	Honório-Serpa	0	0	960	960	2.45	390	0	0.00	120
	L-044	Miranguelândia	0	0	1430	1850	3.40	760	1400	15.00	20
	L-045	Candel	0	0	2148	2669	4.06	425	0	0.00	125
	L-046	Caritágua	39	4200	1049	1721	2.30	21	3	15.00	13
	L-047	Wilmouring	0	0	400	660	1.68	0	0	0.00	0
	L-048	Laranjeiras do Sul	0	0	1620	1789	2.75	107	0	0.00	73
	L-049	Chopinzinho	0	0	2000	1800	3.70	690	60	10.00	250
	L-050	Consel Velha	0	0	2050	2540	3.70	1250	0	0.00	0
	L-051	Pato Branco	0	0	900	1600	3.77	950	200	17.00	60
	L-052	Merópolis	0	0	500	570	3.00	480	0	0.00	60
	L-053	Vitorino	0	0	150	475	4.00	300	0	0.00	110
	L-054	Renasçanca	0	0	700	930	4.56	300	0	0.00	100
	L-055	Som Sucesso do Sul	0	0	400	700	4.00	350	0	0.00	70
	L-056	Itaipava D'Oeste	0	0	500	1000	2.80	750	0	0.00	100
	L-057	Vere	0	0	1200	1200	0.60	320	0	0.00	400
	L-058	São João	0	400	410	1080	4.00	710	0	0.00	146

Table-A6.5 Number of Farmers and Productivity of Dominant Crops in Iguazu River Basin (2/2)

Div.	No.	Municipality	Cotton P. No. of Farmers (thous)	Sugarcane No. of Farmers (thous)	Beans P. No. of Farmers (thous)	Maize P. No. of Farmers (thous)	Soybean P. No. of Farmers (thous)	Cassava P. No. of Farmers (thous)	Potato P. No. of Farmers (thous)	Coffee P. No. of Farmers (thous)	Wheat P. No. of Farmers (thous)
	I-050	Subita	0	690	500	900	180	860	0	0	280
	I-060	Saude do Iguacu	0	350	310	395	30	395	0	0	0
	I-061	Rio Bonito do Iguacu	0	0	580	740	80	0	0	0	35
	I-062	Nova Laranjeiras	0	0	595	612	9	0	0	0	4
	I-063	Guaranicau	94	0	1317	1458	235	1270	30,000	0	108
	I-064	Quedas do Iguacu	0	0	1800	2700	185	0	0	0	100
	I-065	Sao Jose do Oeste	0	1090	940	862	15	1100	15,000	0	48
	I-066	Cruzeiro do Iguacu	0	0	550	510	100	100	32,000	0	100
	I-067	Boa Esperanca do Iguacu	0	0	550	615	80	600	20,000	0	98
	I-068	Cos Vizinhas	0	1200	1250	1700	250	1900	35,000	0	160
	I-069	Eneas Marques	0	0	820	1007	0	800	20,000	0	150
	I-070	Francisco Berto	0	1200	1900	2990	92	2050	27,000	0	390
	I-071	Marmeleiro	0	800	1000	2000	35	1900	20,000	0	15
	I-072	Flor de Serra do Sul	0	0	950	1100	20	770	27,000	0	20
	I-073	Barracão	0	1350	1800	1900	15	1750	19,000	0	900
	I-074	Salgado Filho	0	800	850	1000	165	720	13,500	65	125
	I-075	Santo Antonio do Sudoeste	0	0	545	1590	0	1200	20,000	0	800
	I-076	Prancha	0	300	600	850	30	30	20,000	0	30
	I-077	Pinhal de Sao Bento	0	0	210	360	7	0	0	0	20
	I-078	Ampera	0	1200	1200	1450	200	1200	15,000	0	600
	I-079	Nova Esperanca do Sudoeste	0	0	496	882	5	530	27,000	0	86
	I-080	Salto do Lontra	70	0	1600	1900	100	1500	25,000	0	100
	I-081	Santa Izabel do Oeste	0	900	660	1420	450	1000	25,000	0	400
	I-082	Nova Prata do Iguacu	0	1680	1200	1250	350	1650	30,000	0	65
	I-083	Pantofla do Oeste	0	1650	1900	2250	1900	2000	20,000	0	1600
	I-084	Planalto	0	0	2182	2182	1065	1302	25,000	0	250
	I-085	Rosalva	0	796	750	1100	720	430	24,000	0	530
	I-086	Capitania	100	1300	1600	1500	1900	1600	20,000	0	300
	I-087	Tres Barras do Planalto	130	220	580	1400	76	750	30,000	0	26
	I-088	Catanduvas	155	0	220	1100	150	1030	30,000	0	25
	I-089	Barna	0	45	166	290	22	147	30,000	0	0
	I-090	Casaovel	47	722	417	722	1223	1167	30,000	0	192
	I-091	Boa Vista de Aparecida	300	600	1800	1600	150	1000	30,000	0	20
	I-092	Capitao Leônidas Marques	200	1000	800	1000	300	1025	30,000	0	70
	I-093	Santa Lucia	80	0	300	478	130	420	30,000	0	12
	I-094	Urubesse	450	200	300	950	15	450	22,000	0	10
	I-095	Santa Teresinha do Oeste	31	111	0	206	111	139	30,000	0	72
	I-096	Cruzeiro do Oeste	79	0	79	593	395	356	25,000	0	119
	I-097	Cruzeiro do Oeste	76	0	0	895	521	695	25,000	0	106
	I-098	Medianeira	33	0	0	505	699	622	25,000	0	303
	I-099	Sao Miguel do Iguacu	27	777	0	548	868	274	28,000	0	229
	I-100	Santa Teresinha de Itaipu	7	95	0	73	105	179	20,000	0	28
	I-101	Foz do Iguacu	0	0	0	177	308	249	25,000	0	37

No. of Farmers: Number of Farmers involved. P.: Productivity with Regular Tillage
Source: EMATER (1994)

Table-A6.6 Number of Farmers and Productivity of Dominant Crops in Tibagi River Basin

CM No.	Municipality	Cotton P. No. of Farmers	Cotton P. (t/ha)	Soybeans No. of Farmers	Soybeans P. (t/ha)	Maize No. of Farmers	Maize P. (t/ha)	Soybean No. of Farmers	Soybean P. (t/ha)	Cassava No. of Farmers	Cassava P. (t/ha)	Potato No. of Farmers	Potato P. (t/ha)	Coffee No. of Farmers	Coffee P. (t/ha)	Wheat No. of Farmers	Wheat P. (t/ha)
I																	
T-001	Ponta Anastacia	0	0.00	8	1.20	39	2.50	4	2.50	0	0.00	3	18.00	0	0.00	0	0.00
T-002	Palmira	0	0.00	1022	0.75	1635	3.60	393	2.70	0	0.00	33	15.00	0	0.00	65	1.60
T-003	Touros Soares	0	0.00	2435	1.50	2623	3.70	437	2.50	0	0.00	80	13.20	0	0.00	146	1.60
T-004	Itap	0	0.00	428	0.90	435	2.80	6	2.50	0	0.00	11	12.00	0	0.00	7	1.60
T-005	Imbituba	0	0.00	1735	1.00	2720	3.70	48	2.00	793	25.00	11	13.00	0	0.00	17	1.70
T-006	Itapiranga	0	0.00	1600	1.00	1999	4.40	60	2.80	1600	15.00	315	14.00	0	0.00	40	1.90
T-007	Ponta Grossa	0	0.00	675	0.95	723	4.50	275	2.50	272	30.00	13	14.00	0	0.00	65	1.60
T-008	Centro	0	0.00	2078	0.97	2235	5.58	653	2.85	108	30.00	90	25.00	0	0.00	105	2.10
T-009	Itai	0	0.00	522	1.05	679	2.85	9	2.70	139	15.00	0	0.00	0	0.00	3	2.10
T-010	Reserva	9	0.40	785	0.80	828	1.80	4	2.20	163	30.00	3	20.00	0	0.00	5	2.00
T-011	Tibagi	0	0.00	445	1.00	966	6.00	129	3.00	158	25.00	0	0.00	0	0.00	60	2.50
T-012	Prai do Sul	0	0.00	522	1.25	671	4.40	145	2.60	113	20.00	9	25.00	0	0.00	9	2.40
T-013	Ventania	0	0.00	120	0.62	136	2.50	12	2.50	0	0.00	0	0.00	0	0.00	12	2.30
T-014	Talmeico Borba	0	0.00	75	0.90	310	2.30	5	2.20	200	21.00	15	13.00	0	0.00	0	0.00
T-015	Orquieta	0	0.00	2314	0.80	1607	1.60	19	2.00	1265	20.00	3	10.00	0	0.00	8	1.80
T-016	Culveira	0	0.00	249	0.85	311	2.20	0	0.00	44	18.00	0	0.00	42	1.00	0	0.00
T-017	Sopopinha	0	0.00	265	0.85	521	1.91	0	0.00	0	0.00	0	0.00	27	0.60	0	0.00
T-018	Sao Jeronimo da Serra	470	0.74	450	0.37	710	2.98	60	2.23	0	0.00	0	0.00	250	1.20	50	1.98
T-019	Meia de Serra	0	0.00	0	0.00	9	7.20	8	2.70	0	0.00	0	0.00	0	0.00	3	1.95
T-020	Marietta do Sul	0	0.00	84	0.80	257	5.10	64	2.50	0	0.00	0	0.00	10	0.40	14	1.80
T-021	Calitomia	25	1.40	215	0.85	297	3.00	0	0.00	0	0.00	0	0.00	39	0.42	0	0.00
T-022	Apucarana	5	1.62	115	0.60	197	4.14	66	2.40	0	0.00	0	0.00	121	0.60	33	1.00
T-023	Ararongas	8	1.40	92	0.60	235	4.20	168	2.60	0	0.00	0	0.00	135	1.50	84	1.37
T-024	Londrina	30	1.75	320	0.80	2509	3.85	563	2.35	263	20.00	0	0.00	375	0.56	370	1.70
T-025	Nova Santa Barbara	140	0.99	0	0.00	128	3.58	35	1.74	0	0.00	0	0.00	0	0.00	35	1.24
T-026	Santa Cecilia do Paro	0	0.00	52	0.85	185	3.72	37	2.23	0	0.00	0	0.00	0	0.00	35	0.99
T-027	Santo Antonio do Paraiso	19	1.65	0	0.00	120	3.72	110	1.88	0	0.00	0	0.00	0	0.00	55	1.35
T-028	Congonhinhas	7	0.50	14	0.55	25	2.40	6	1.98	0	0.00	0	0.00	21	0.75	6	1.61
T-029	Nova Fátima	1	1.15	11	0.72	30	3.47	36	2.11	0	0.00	0	0.00	26	0.80	22	1.60
T-030	Sao Sebastiao de Amoreira	40	1.00	0	0.00	60	3.70	191	2.23	0	0.00	0	0.00	15	1.50	143	0.60
T-031	Alta	320	1.23	160	0.60	1120	3.60	590	2.20	0	0.00	0	0.00	38	1.07	750	2.18
T-032	Nova America de Colina	70	0.90	30	0.42	60	2.48	66	1.98	0	0.00	0	0.00	12	0.14	65	1.49
T-033	Cornelio Procopio	17	1.20	2	115.70	139	3.60	158	2.23	0	0.00	0	0.00	72	1.80	70	1.20
T-034	Unai	82	0.74	0	0.00	250	3.72	223	1.74	0	0.00	0	0.00	55	0.50	128	0.62
T-035	Jarazono	58	0.85	0	0.00	120	3.40	130	2.36	0	0.00	0	0.00	0	0.00	125	0.60
T-036	Ibipora	0	0.00	0	0.00	10	4.50	180	2.40	0	0.00	0	0.00	30	1.60	90	2.30
T-037	Rosandia	0	0.00	16	0.60	24	5.00	54	2.60	4	25.00	0	0.00	16	0.96	36	2.23
T-038	Cambe	0	0.00	4	96.00	123	4.70	116	2.60	0	0.00	0	0.00	47	1.20	79	1.20
T-039	Sertãozinho	0	0.00	0	0.00	124	4.10	908	2.36	0	0.00	0	0.00	48	0.60	133	1.49
T-040	Rancho Alegre	5	2.38	0	0.00	30	4.50	190	2.23	0	0.00	0	0.00	0	0.00	100	1.98
T-041	Leopoldo	17	1.58	0	0.00	45	4.40	30	2.20	0	0.00	0	0.00	0	0.00	30	1.74
T-042	Sertãozinho	0	0.00	0	0.00	27	4.48	118	2.25	0	0.00	0	0.00	0	0.00	25	1.33
T-043	Primeiro de Maio	10	1.86	0	0.00	35	2.98	192	2.23	0	0.00	0	0.00	7	2.00	12	1.74

No. of Farmers: Number of Farmers involved, P.: Productivity with Regular Tillage
Source: EMATER (1994)

Table A6.7 Productivity of Non Tillage and Regular Tillage in Iguacu River Basin (1/2)

Div.	No.	Municipality	Beans R.P. (ton/ha)	Beans N.P. (ton/ha)	Maize R.P. (ton/ha)	Maize N.P. (ton/ha)	Soybean R.P. (ton/ha)	Soybean N.P. (ton/ha)	Wheat R.P. (ton/ha)	Wheat N.P. (ton/ha)
I	I-001	Campina Grande do Sul	0.42		1.50					
	I-002	Quatro Barras	0.72		1.80					
	I-003	Piraquara			1.60					
	I-004	Sao Jose dos Pinhais	0.81		2.40					
	I-005	Colombo	0.60		2.25					
	I-006	Pinhais			1.60					
	I-007	Almirante Tamandare	0.50		1.33					
	I-008	Curitiba			2.00					
	I-009	Campo Largo	0.90		2.00					
	I-010	Arucaria	1.20		2.70	4.50	2.20	2.35	1.86	
	I-011	Fazenda Rio Grande	1.00		3.20		1.80			
	I-012	Mandirituba	1.10		3.00				1.00	
	I-013	Tijucas do Sul	0.60		2.03					
	I-014	Balsa Nova	0.99		3.67					
	I-015	Contenda	1.24		3.72					
	I-016	Quitandinha	0.92		2.60				0.90	
	I-017	Agudos do Sul	0.90		3.10					
	I-018	Pien	0.85		2.82				1.05	
	I-019	Rio Negro	1.20		2.80		2.40	2.40		
	I-020	Campo do Tenente	1.00		2.40		2.40	3.00		
	I-021	Lapa	1.20		3.60	6.50	2.25	2.60	1.50	1.30
	I-022	Porto Amazonas	1.20		2.50		2.50	2.70		
	I-023	Palmeira	0.75		3.60	6.00	2.70	3.20	1.60	2.00
	I-024	Sao Joao do Triunfo	0.80		3.00	4.44	2.50	2.40		
	I-025	Antonio Olinto	1.10		2.10					
	I-026	Sao Mateus do Sul	0.90		2.50		2.40		2.00	
	I-027	Reboucas	1.20		3.00	4.80	2.40	2.50	1.65	
	I-028	Irati	0.90		2.80		2.50	2.80	1.60	
	I-029	Rio Azul	0.99		2.50		2.30	2.50	1.60	
	I-030	Mallet	1.05	1.05	2.90	2.90	2.50	2.50		
II	I-031	Paulo Frontin	0.89		2.50		1.98			
	I-032	Paula Freitas	1.20		2.20		1.90			
	I-033	Uniao da Vitoria	0.90		2.23		2.10			
	I-034	Porto Vitoria	1.50		2.00					
	I-035	General Carneiro	0.80		1.50					
	I-036	Bituruna	1.00		2.30					
	I-037	Cruz Machado	0.90		1.60				1.20	
	I-038	Inacio Martins	0.65		1.60					
	I-039	Guarapuava	0.70		4.50	6.40	2.65	2.80	2.24	2.30
	I-040	Pinhao	0.55		4.25	5.85	2.70	2.70	2.23	2.23
	I-041	Palmas	0.90		3.50	6.00	2.25	2.25	1.60	1.60
	I-042	Clevelandia	0.90		0.30		2.30		1.40	1.50
	I-043	Honorio-Serpa	1.10		2.45	4.00	2.40	2.50	1.78	1.70
	I-044	Manguelrinha	1.10		3.49	6.50	2.10	3.00	1.70	
	I-045	Candoi	0.94		4.05	4.05	2.40	2.40	2.42	2.42
	I-046	Cantagalo	0.86		2.30	4.00	2.30	2.60	1.20	
III	I-047	Vimournd	0.70		1.60	2.80			1.10	
	I-048	Laranjeiras do Sul	0.90		2.75	5.40	2.35	2.35	1.39	1.39
	I-049	Chopinzinho	1.20		3.70	6.50	2.40	2.60	1.80	1.92
	I-050	Coronel Vivida	0.40		2.80		2.49	2.49		
	I-051	Pato Branco	1.24		3.77		2.50		1.56	
	I-052	Mariopolis	1.50		3.00	3.50	2.35	2.50	2.24	NA
	I-053	Vitorino	1.48		4.00		2.40		1.40	
	I-054	Renascenca	1.00		4.50	5.00	2.40		1.50	1.60
	I-055	Bom Sucesso do Sul	2.10		4.50		2.20	2.25	1.50	
	I-056	Itapejara D'Oeste	1.20		2.80	4.00	1.80	2.10	1.50	
	I-057	Vere	0.60		3.00		2.70		1.20	
	I-058	Sao Joao	1.10		4.00	6.19	2.48	2.73	1.46	1.88
	I-059	Sulina	0.75		3.20		2.10		1.48	
	I-060	Saudade do Iguacu	1.00		3.81	5.20	1.80			
	I-061	Rio Bonito do Iguacu	0.90		3.30	6.20	2.35	2.70	1.20	2.20
	I-062	Nova Laranjeiras	0.70		2.00	6.00	2.20	2.70	1.50	1.80
	I-063	Guaraniaçu	0.80		2.50		2.50	3.20	0.60	
	I-064	Quedas do Iguacu	0.90	1.20	2.70	4.50	2.48	2.72	1.10	1.30
	I-065	Sao Jorge do Oeste	0.60		4.00	5.00	1.98	2.50	1.49	2.00
	I-066	Cruzeiro do Iguacu	1.00		2.80		2.09		1.50	
	I-067	Boa Esperanca do Iguacu	1.58		3.20		1.80		1.24	
I-068	Dois Vizinhos	1.32		3.26		2.10		1.80		
I-069	Eneas Marques	0.80		2.40				1.10		
I-070	Francisco Beltrao	1.00		2.80	3.30	2.40	2.10	1.10	1.30	
I-071	Marmeleiro	0.90		2.75	2.75	2.30	2.30	1.50		
I-072	Fior da Serra do Sul	0.90		2.60	4.00	2.50		1.50		
I-073	Barracao	0.70		2.20		1.80		0.85		

Table-A6.7 Productivity of Non Tillage and Regular Tillage in Iguacu River Basin (2/2)

Div.	No.	Municipality	Beans R.P. (ton/ha)	Beans N.P. (ton/ha)	Maize R.P. (ton/ha)	Maize N.P. (ton/ha)	Soybean R.P. (ton/ha)	Soybean N.P. (ton/ha)	Wheat R.P. (ton/ha)	Wheat N.P. (ton/ha)
	I-074	Salgado Filho	1.00		2.60				1.20	
	I-075	Santo Antonio do Sudoeste	0.90		2.50		2.20		1.45	
	I-076	Pranchita	1.20		3.00		2.50		2.20	
	I-077	Pinhal de Sao Bento	0.75		2.50		1.50		1.20	
	I-078	Ampere	0.70		2.20		2.20		1.70	
	I-079	Nova Esperanca do Sudoeste	1.00		2.80		2.40		1.20	
	I-080	Salto do Lontra	1.30	3.50	3.00	4.00	2.50		1.25	1.50
	I-081	Santa Izabel do Oeste	0.90		3.00	3.00	2.10	2.00	1.80	
	I-082	Nova Prata do Iguacu	1.20	1.20	3.50	3.50	2.40	2.40	1.60	
	I-083	Perola do Oeste	0.75		3.60		2.00		1.70	
	I-084	Planalto	1.00		3.00		1.80		1.50	
	I-085	Realeza	1.00		3.80	6.20	2.30		2.10	
iii	I-086	Capanema	1.20		3.20		2.00		1.60	
	I-087	Tres Barras do Parana	1.20		3.60		2.10		1.50	
	I-088	Catanduvas	0.90		4.88	4.90	2.70	2.20	0.90	
	I-089	Ibema	1.30		4.50	5.45	2.45	2.55		
	I-090	Cascavel	1.10		5.00	6.00	2.36	2.70	0.90	0.90
	I-091	Boa Vista da Aparecida	0.60		2.50		2.10		1.50	
	I-092	Capitao Leonidas Marques	1.60		3.70		2.60		1.10	
	I-093	Santa Lucia	1.40		3.60		2.40		1.20	
	I-094	Lindoele	0.60		2.15		2.00		1.45	
	I-095	Santa Tereza do Oeste			5.00	5.70	2.48	3.00	1.70	2.00
	I-096	Ceu Azul			5.00	5.00	2.60	2.80	1.20	
	I-097	Matelandia			5.50		2.70		0.70	
	I-098	Medianeira			5.20		2.23		1.00	
	I-099	Sao Miguel do Iguacu			5.50	0.60	2.40	2.98	2.22	
	I-100	Santa Terezinha de Itaipu			6.00		2.20		1.60	
	I-101	Foz do Iguacu			4.80		2.30	2.40	1.35	

R.P.: Productivity of Regular Tillage, N.P.: Productivity of Non Tillage, NA: not available
Source: EMATER (1994)

Table-A6.8 Productivity of Non Tillage and Regular Tillage in Tibagi River Basin

Div.	No.	Municipality	Beans R.P. (ton/ha)	Beans N.P. (ton/ha)	Maize R.P. (ton/ha)	Maize N.P. (ton/ha)	Soybean R.P. (ton/ha)	Soybean N.P. (ton/ha)	Wheat R.P. (ton/ha)	Wheat N.P. (ton/ha)
I	T-001	Porto Amazonas	1.20		2.50		2.50	2.70		
	T-002	Palmeira	0.75		3.60	6.00	2.70	3.20	1.60	2.00
	T-003	Teixeira Soares	1.50	1.98	3.70	6.20	2.50	2.48	1.60	1.60
	T-004	Irati	0.90		2.80		2.50	2.80	1.60	
	T-005	Imbituva	1.00	1.65	3.76	5.80	2.00	2.50	1.70	1.65
	T-006	Ipiranga	1.00		4.40	6.00	2.80	2.80	1.90	1.90
	T-007	Ponta Grossa	0.95	1.90	4.50	6.10	2.50	2.70	1.60	2.10
	T-008	Castro	0.97	2.20	5.58	7.00	2.86	3.00	2.10	2.10
	T-009	Ivaí	1.05		2.95	5.50	2.70	2.70	2.10	
	T-010	Reserva	0.80		1.80		2.20		2.00	
	T-011	Tibagi	1.00	1.80	5.00	6.50	3.00	3.20	2.50	2.80
	T-012	Pirai do Sul	1.25		4.40	5.40	2.60	2.60	2.40	2.40
	T-013	Ventania	0.62		2.50	5.00	2.50	2.50	2.30	2.30
	T-014	Telamaco Borba	0.90		2.30		2.20			
II	T-015	Ortigueira	0.80		1.60	3.20	2.00	2.40	1.80	
	T-016	Curiúva	0.85		2.20					
	T-017	Sapopema	0.85		1.91					
	T-018	Sao Jeronimo da Serra	0.37		2.98		2.23		1.98	
	T-019	Maua da Serra			7.20		2.70		1.95	
	T-020	Marilandia do Sul	0.80		5.10	6.20	2.50	2.50	1.80	1.80
	T-021	California	0.85		3.00					
	T-022	Apucarana	0.60		4.14	6.45	2.40	2.73	1.00	1.00
	T-023	Arapongas	0.60		4.20	4.20	2.60	2.60	1.37	1.37
	T-024	Londrina	0.60		3.80	3.80	2.35	2.35	1.70	1.80
	T-025	Nova Santa Barbara			3.50	4.95	1.74	2.48	1.24	1.73
	T-026	Santa Cecilia do Pavao	0.85		3.72		2.23	2.48	0.99	1.00
	T-027	Santo Antonio do Paraíso			3.72		1.86	2.98	1.36	
	T-028	Congonhinhas	0.55		2.40		1.98		1.61	
	T-029	Nova Fatima	0.72		3.47	6.50	2.11	3.00	1.60	1.74
	T-030	Sao Sebastiao da Amoreira			3.70	5.00	2.23	2.20	2.18	2.50
	T-031	Assai	0.60		3.60		2.20		0.60	
	T-032	Nova America da Colina	0.42		2.48		1.98		1.49	
	T-033	Cornelio Procopio			3.60	6.00	2.23		1.20	
	T-034	Uraí			3.72		1.74		0.62	
	T-035	Jataizinho			3.40	4.46	2.36	2.60	0.60	
	T-036	Ibipora			4.50		2.40		2.30	
	T-037	Rolândia			5.00	6.00	2.60	0.30	2.23	2.50
	T-038	Cambe			4.70	5.00	2.60	2.80	1.20	1.20
	T-039	Sertanópolis			4.10		2.36		1.49	
	T-040	Rancho Alegre			4.50		2.23		1.98	
	T-041	Leopoldo			4.40		2.20	2.36	1.74	
	T-042	Sertaneja			4.49		2.25	2.25	1.33	1.73
	T-043	Primeiro de Maio			2.98		2.23		1.74	

R.P.: Productivity of Regular Tillage, N.P. Productivity of Non Tillage
Source: EMATER (1994)

Table-A6.9 Application of Non Tillage in Iguaçu River Basin (1/2)

Div.	No.	Municipality	Cotton		Beans		Maize		Soybean		Wheat		
			Total Area (ha)	N.T. imple. (%)	Total Area (ha)	N.T. imple. (%)	Total Area (ha)	N.T. imple. (%)	Total Area (ha)	N.T. imple. (%)	Total Area (ha)	N.T. imple. (%)	
I	I-001	Campana Grande do Sul	0	0	300	0	700	0	0	0	0	0	
	I-002	Quatro Barras	0	0	1200	0	1400	0	0	0	0	0	
	I-003	Piraquara	0	0	0	0	4700	0	0	0	0	0	
	I-004	Sao Jose dos Pinhais	0	0	6600	0	21700	0	0	0	0	0	
	I-005	Colombo	0	0	700	0	900	0	0	0	0	0	
	I-006	Pinhais	0	0	0	0	2500	0	0	0	0	0	
	I-007	Almirante Tamandare	0	0	1200	0	2200	0	0	0	0	0	
	I-008	Curitiba	0	0	0	0	4000	0	0	0	0	0	
	I-009	Campo Largo	0	0	3300	0	9200	0	0	0	0	0	
	I-010	Araucaria	0	0	4100	0	15500	310	2	200	134	67	
	I-011	Fazenda Rio Grande	0	0	1400	0	3100	0	0	700	0	0	
	I-012	Mandritube	0	0	5300	0	12700	0	0	0	150	0	
	I-013	Tijucas do Sul	0	0	700	0	7100	0	0	0	0	0	
	I-014	Balsa Nova	0	0	2300	0	3300	0	0	0	0	0	
	I-015	Contenda	0	0	3200	0	6000	0	0	0	0	0	
	I-016	Guilandinha	0	0	6700	0	11700	0	0	0	210	0	
	I-017	Agudos do Sul	0	0	2200	0	10600	0	0	0	0	0	
	I-018	Plan	0	0	2300	0	10200	0	0	0	230	0	
	I-019	Rio Negro	0	0	5100	0	8600	0	0	300	100	0	
	I-020	Campo do Tenente	0	0	3000	0	0	0	0	500	44	21	
	I-021	Lapa	0	0	30900	0	36000	720	2	14100	1269	9	
	I-022	Poro Amazonas	0	0	700	0	2900	0	0	1100	880	80	
	I-023	Palmeira	0	0	500	0	4200	2100	50	5300	2985	56	
	I-024	Sao Jose do Tinhoró	0	0	3600	0	9800	980	10	600	402	67	
	I-025	Antonio Olinto	0	0	7400	0	7400	0	0	0	0	0	
	I-026	Sao Mateus do Sul	0	0	17100	0	18800	0	0	6800	0	0	
	I-027	Rebouças	0	0	10500	0	14900	295	2	2600	260	10	
	I-028	Ired	0	0	10100	0	11200	0	0	700	56	8	
	I-029	Rio Azul	0	0	13900	0	16200	0	0	900	216	24	
	I-030	Mallet	0	0	13100	383	13300	1330	10	1400	140	100	
	II	I-031	Pau Fronton	0	0	7200	0	9800	0	0	3500	0	0
		I-032	Paula Freitas	0	0	3900	0	6800	0	0	5000	0	0
		I-033	União de Vitória	0	0	4100	0	9600	0	0	500	0	0
I-034		Poro Vitória	0	0	1200	0	3600	0	0	0	0	0	
I-035		General Carneiro	0	0	2700	0	21600	0	0	0	0	0	
I-036		Blumenau	0	0	5900	0	16800	0	0	0	0	0	
I-037		Cruz Machado	0	0	28800	0	28800	0	0	0	0	0	
I-038		Inacio Martins	0	0	7400	0	14300	0	0	0	250	0	
I-039		Guarapuava	0	0	10800	0	78000	54372	69	64900	61655	96	
I-040		Pinheiro	0	0	6000	0	49400	29640	60	45400	45400	100	
I-041		Palmeira	0	0	2700	0	24900	1494	6	24400	12932	53	
I-042		Clevelândia	0	0	2900	0	12100	0	0	16500	0	0	
I-043		Honório-Sampa	0	0	2600	0	16900	1692	9	13600	4692	34	
I-044		Mangueirinha	0	0	2400	0	13900	2602	18	14900	2682	18	
I-045		Candi	0	0	3100	0	24200	4840	20	31200	3360	30	
I-046	Cambazub	0	0	2700	0	24500	245	1	2400	144	6		
III	I-047	Vitória	0	0	1600	0	7300	73	1	0	0	0	
	I-048	Laranjeiras do Sul	0	0	6000	0	26300	8756	22	4700	4700	100	
	I-049	Chopinópolis	0	0	3800	0	24600	2214	9	12900	8643	67	
	I-050	Coronel Vivida	0	0	1200	0	10900	0	0	8100	3240	40	
	I-051	Pato Branco	0	0	2500	0	9000	0	0	13300	0	0	
	I-052	Mariópolis	0	0	1200	0	3900	2067	53	6100	5951	91	
	I-053	Vitorino	0	0	700	0	6000	0	0	7600	0	0	
	I-054	Ranunciação	0	0	1100	0	7000	280	4	10000	0	0	

Table-A6.9 Application of Non Tillage in Iguacu River Basin (2/2)

Div.	Municipality	Cotton Total Area (ha)	Cotton N.T. Area (ha)	Cotton Impl. (%)	Beans Total Area (ha)	Beans N.T. Area (ha)	Beans Impl. (%)	Maize Total Area (ha)	Maize N.T. Area (ha)	Maize Impl. (%)	Soybean Total Area (ha)	Soybean N.T. Area (ha)	Soybean Impl. (%)	Wheat Total Area (ha)	Wheat N.T. Area (ha)	Wheat Impl. (%)
I-005	Bom Sucesso do Sul	0	0	0	1500	0	0	3300	0	0	2100	1575	75	1500	0	0
I-006	Itapajaras D'Oeste	0	0	0	1000	0	0	6100	244	4	5900	236	4	800	0	0
I-007	Vere	0	0	0	3000	0	0	11100	0	0	4300	0	0	5000	0	0
I-008	Sao-Joao	0	0	0	900	0	0	11900	476	4	9400	1974	21	3300	330	10
I-009	Sulzira	0	0	0	400	0	0	6100	0	0	1000	0	0	750	0	0
I-010	Saude do Iguacu	0	0	0	1000	0	0	6000	900	15	460	0	0	0	0	0
I-011	Rio Bonito do Iguacu	0	0	0	700	0	0	4400	924	21	800	400	50	500	300	60
I-012	Nova Laranjeiras	0	0	0	1100	0	0	6600	136	2	200	126	63	135	68	50
I-013	Guaranicu	200	0	0	900	0	0	9000	0	0	1500	750	50	1270	0	0
I-014	Quedas do Iguacu	0	0	0	2700	513	19	17900	5549	31	3900	3081	79	500	120	24
I-015	Sao Jorge do Oeste	0	0	0	1900	0	0	14300	429	3	500	235	47	484	121	25
I-016	Cruzeiro do Iguacu	0	0	0	600	0	0	2700	0	0	1400	0	0	2000	0	0
I-017	Boa Esperanca do Iguacu	0	0	0	1800	0	0	3100	0	0	2200	0	0	1000	0	0
I-018	Dois Vizinhos	0	0	0	1600	0	0	13600	0	0	3600	0	0	2000	0	0
I-019	Ereias Marques	0	0	0	4200	0	0	5100	0	0	0	0	0	300	0	0
I-020	Francisco Beltrao	0	0	0	26300	263	1	26300	263	1	3200	603	19	1500	225	15
I-021	Maranhao	0	0	0	4700	0	0	12900	1032	8	2100	1050	50	100	0	0
I-022	Flor de Serra do Sul	0	0	0	300	0	0	2700	54	2	100	0	0	150	0	0
I-023	Barracao	0	0	0	1600	0	0	12300	0	0	100	0	0	1000	0	0
I-024	Salgado Filho	0	0	0	1300	0	0	6700	0	0	0	0	0	350	0	0
I-025	Santo Antonio do Sudoeste	0	0	0	4600	0	0	8400	0	0	2400	0	0	1500	0	0
I-026	Franchia	0	0	0	2200	0	0	5000	0	0	6600	0	0	5000	0	0
I-027	Prinhal de Sao Bento	0	0	0	300	0	0	1200	0	0	100	0	0	450	0	0
I-028	Ampere	0	0	0	1100	0	0	7300	0	0	3300	0	0	1500	0	0
I-029	Nova Esperanca do Sudoeste	0	0	0	2100	0	0	6900	0	0	100	0	0	150	0	0
I-030	Saio do Lontia	700	0	0	4400	88	2	9600	190	2	1500	0	0	1900	105	7
I-031	Santa Izabel do Oeste	0	0	0	1100	0	0	6600	130	2	7200	72	1	4000	0	0
I-032	Nova Prita do Iguacu	0	0	0	5000	250	5	7400	518	7	5000	250	5	1000	0	0
I-033	Perola do Oeste	0	0	0	2100	0	0	7600	0	0	4800	0	0	4570	0	0
I-034	Planalto	0	0	0	2000	0	0	5800	0	0	10000	0	0	3000	0	0
I-035	Realiza	0	0	0	5300	0	0	7500	0	0	9200	0	0	3000	0	0
I-036	Capitania	700	0	0	3600	0	0	16900	0	0	1900	0	0	400	0	0
I-037	Tres Barras do Parana	1000	0	0	500	0	0	17600	1602	9	4500	1170	26	350	0	0
I-038	Itambua	0	0	0	100	0	0	3100	713	23	600	562	68	0	0	0
I-039	Cascavel	0	0	0	600	0	0	18600	6510	35	37400	13090	35	6668	3334	50
I-040	Boa Vista de Aparecida	1000	0	0	2300	0	0	5000	0	0	1300	0	0	200	0	0
I-041	Caprao Leonidas Marques	1100	0	0	1700	0	0	6300	0	0	5600	0	0	700	0	0
I-042	Santa Lucia	400	0	0	1200	0	0	3900	0	0	2900	0	0	130	0	0
I-043	Linchoeste	2900	0	0	500	0	0	11300	0	0	500	0	0	230	0	0
I-044	Santa Tereza do Oeste	400	0	0	0	0	0	5100	765	15	7900	4500	60	1669	1001	60
I-045	Cou Aza	200	0	0	0	0	0	1700	68	4	2100	126	6	2768	0	0
I-046	Matelandia	100	0	0	0	0	0	2500	0	0	3000	0	0	1967	0	0
I-047	Medianeira	200	0	0	0	0	0	4900	0	0	11000	0	0	4683	0	0
I-048	Sao Miguel do Iguacu	400	0	0	400	0	0	3700	165	5	12500	750	6	548	0	0
I-049	Santa Terezinha de Itaipu	100	0	0	0	0	0	1700	0	0	6300	0	0	639	0	0
I-050	Poz do Iguacu	0	0	0	0	0	0	1900	0	0	6300	252	4	625	0	0
Total		9400	0	0	349400	1244	0.41	1116300	131719	11.8	567000	191901	37.2	105168	23229	22.1

Total area of each crop is adjusted to the result of SANEPAR GIS computation. Application % of non tillage based on EMATER data (1994) was used to obtain the area of non tillage. NT: non tillage, Impl. %: implementation % of non tillage. Source: EMATER (1994) for non tillage implementation %.

Table-A6.10 Application of Non Tillage in Tibagi River Basin

DV	No	Municipality	Cotton Total Area (ha)	Cotton N.T. Area (ha)	Cotton Impl. (%)	Beans Total Area (ha)	Beans N.T. Area (ha)	Beans Impl. (%)	Maize Total Area (ha)	Maize N.T. Area (ha)	Maize Impl. (%)	Soybean Total Area (ha)	Soybean N.T. Area (ha)	Soybean Impl. (%)	Wheat Total Area (ha)	Wheat N.T. Area (ha)	Wheat Impl. (%)
I	T-001	Ponto Alto	0	0	0	300	0	0	1100	0	0	500	400	80	0	0	0
	T-002	Pinheira	0	0	0	2800	0	0	23100	11550	50	28500	16128	56	2045	654	32
	T-003	Tekeles Soares	0	0	0	3600	4115	42	16300	7861	47	13900	11120	80	1164	1164	100
	T-004	Itai	0	0	0	3500	0	0	3900	0	0	200	16	0	0	0	0
	T-005	Imbituba	0	0	0	5700	114	2	11400	2384	21	6200	4340	70	680	408	60
	T-006	Ipanga	0	0	0	2200	0	0	22100	7072	32	6500	4875	75	1989	1989	100
	T-007	Ponta Grossa	0	0	0	5000	348	6	36500	13431	37	40500	27540	68	3956	3956	60
	T-008	Castro	0	0	0	4400	618	14	28100	19670	70	41400	36846	89	11798	11798	100
	T-009	Ivaí	0	0	0	3100	0	0	4100	451	11	400	302	83	87	0	0
	T-010	Reserva	0	0	0	15000	0	0	15000	0	0	500	0	0	377	0	0
	T-011	Tibagi	0	0	0	2600	856	33	26500	14840	56	55700	51244	92	13945	11953	86
	T-012	Petal do Sul	0	0	0	2600	0	0	12900	3600	30	6800	5576	82	600	428	71
	T-013	Ventania	0	0	0	600	0	0	8000	416	8	8600	7482	87	1345	1162	83
	T-014	Telemaco Borba	0	0	0	1200	0	0	7700	0	0	400	0	0	0	0	0
	T-015	Orquestra	0	14400	0	0	0	0	46600	932	2	2600	390	15	771	0	0
T-016	Cunha	0	0	0	3600	0	0	7100	0	0	0	0	0	0	0	0	
T-017	Sapopema	0	0	0	4300	0	0	16500	0	0	7800	0	0	1209	0	0	
T-018	Sao Jeronimo da Serra	9000	0	0	2400	0	0	23500	0	0	0	0	0	215	0	0	
T-019	Nasus de Serra	0	0	0	0	0	0	600	0	0	500	0	0	593	0	100	
T-020	Marianhã do Sul	0	0	0	300	0	0	3800	2318	61	2400	2400	100	0	0	0	
T-021	California	100	0	0	400	0	0	1900	0	0	0	0	0	667	263	40	
T-022	Apucarana	100	0	0	200	0	0	3600	720	20	2200	304	14	2187	481	22	
T-023	Antongas	100	40	40	100	0	0	2500	175	7	5600	770	14	1200	3240	27	
T-024	Londrina	600	0	0	1500	0	0	27000	3614	13	40200	6432	16	15000	285	19	
T-025	Nova Santa Barbara	4000	0	0	0	0	0	1600	304	19	4600	675	15	1200	155	13	
T-026	Santa Cecilia do Pavão	0	0	0	200	0	0	2100	0	0	4600	275	6	4000	0	0	
T-027	Santo Antonio do Paralelo	300	0	0	0	0	0	2300	0	0	8000	488	6	0	0	0	
T-028	Companhinas	300	0	0	200	0	0	2400	0	0	3200	0	0	196	0	0	
T-029	Nova Fátima	200	0	0	100	0	0	1200	336	28	2800	364	13	792	158	20	
T-030	Sao Sebastiao de Amoreira	500	0	0	0	0	0	1500	180	12	6900	621	9	3568	285	8	
T-031	Assaí	2200	0	0	400	0	0	9000	0	0	24300	0	0	12000	0	0	
T-032	Nova America da Colina	400	0	0	300	0	0	1100	0	0	3000	0	0	1800	0	0	
T-033	Cornelio Procopio	300	0	0	0	0	0	1600	108	6	11300	0	0	2683	0	0	
T-034	Uraí	1400	0	0	0	0	0	5000	0	0	11000	0	0	3100	0	0	
T-035	Jataizinho	500	0	0	0	0	0	4400	392	8	16600	296	5	2000	0	0	
T-036	Ibipora	0	0	0	0	0	0	300	0	0	16600	0	0	0	0	0	
T-037	Roranda	0	0	0	0	0	0	700	210	30	2000	780	38	1211	363	30	
T-038	Cambe	0	0	0	0	0	0	2000	560	28	6400	1344	21	5083	2394	47	
T-039	Sertãozinho	200	0	0	0	0	0	2100	0	0	26000	0	0	2914	0	0	
T-040	Rancho Alegre	200	0	0	0	0	0	2500	0	0	12400	0	0	6000	0	0	
T-041	Leopoldo	200	0	0	0	0	0	2000	0	0	3400	204	6	989	0	0	
T-042	Sertãozinho	0	0	0	0	0	0	3200	0	0	12100	1694	14	2199	176	8	
T-043	Primeiro de Maio	100	0	0	0	0	0	900	0	0	8500	0	0	461	0	0	
Total			20700	40	0.2	82600	6052	7.3	392800	90914	23.1	443400	182500	41.1	112358	41984	37.3

Total area of each crop is adjusted to the result of SANEPA GIS computation. Application % of non tillage based on EMATER data (1994) was used to obtain the area of non tillage.

N.T.: non tillage, Impl. %: implementation % of non tillage

Source: EMATER (1994) for non tillage implementation %

Table-A6.11 Size of Farmers in Iguacu River Basin (1/2)

Div.	No.	Municipality	Number (household)			Ratio (%)		
			Small Size Farmer	Medium Size Farmer	Large Size Farmer	Small Size Farmer	Medium Size Farmer	Large Size Farmer
I	I-001	Campina Grande do Sul	167	11	12	88	6	6
	I-002	Quatro Barras	275	25	4	91	8	1
	I-003	Piraquara	404	40	3	90	9	1
	I-004	Sao Jose dos Pinhais	1873	184	4	91	9	0
	I-005	Colombo	592	11	3	98	2	0
	I-006	Pinhais	228	23	2	90	9	1
	I-007	Almirante Tamandare	559	129	20	79	18	3
	I-008	Curitiba	468	0	0	100	0	0
	I-009	Campo Largo	517	123	7	80	19	1
	I-010	Araucaria	1883	113	4	94	6	0
	I-011	Fazenda Rio Grande	549	7	4	98	1	1
	I-012	Mandirituba	1032	115	0	90	10	0
	I-013	Tijucas do Sul	1340	231	6	85	15	0
	I-014	Balsa Nova	269	122	57	60	27	13
	I-015	Confenda	1419	43	0	97	3	0
	I-016	Quitandinha	2173	99	8	96	4	0
	I-017	Agudos do Sul	1390	10	0	99	1	0
	I-018	Pien	1371	26	3	98	2	0
	I-019	Rio Negro	954	118	48	85	11	4
	I-020	Campo do Tenente	327	42	11	86	11	3
	I-021	Lapa	2376	446	148	80	15	5
	I-022	Porto Amazonas	30	7	7	68	16	16
	I-023	Palmeira	364	137	27	69	26	5
	I-024	Sao Joao do Triunfo	1848	110	80	91	5	4
	I-025	Antonio Olinto	1457	103	15	92	7	1
	I-026	Sao Mateus do Sul	3040	570	190	80	15	5
	I-027	Reboucas	1724	103	43	92	6	2
	I-028	Irati	1286	158	9	88	11	1
	I-029	Rio Azul	1765	160	39	90	8	2
	I-030	Mallet	1453	71	16	94	5	1
	Sub-total		33133	3337	770	89	9	2
II	I-031	Paulo Frontin	1285	58	26	94	4	2
	I-032	Paula Freitas	590	86	18	85	12	3
	I-033	Uniao da Vitoria	373	243	24	58	38	4
	I-034	Porto Vitoria	330	110	10	74	24	2
	I-035	General Carneiro	430	120	60	70	20	10
	I-036	Bituruna	833	238	119	70	20	10
	I-037	Cruz Machado	2455	109	5	96	4	0
	I-038	Inacio Martins	517	123	52	74	18	8
	I-039	Guarapuava	2098	389	176	78	15	7
	I-040	Pinhao	2580	820	400	67	22	11
	I-041	Palmas	1061	305	239	66	19	15
	I-042	Clevelandia	794	87	122	79	9	12
	I-043	Honorio-Serpa	886	196	38	79	18	3
	I-044	Mangueirinha	1800	45	150	90	2	8
	I-045	Candoi	2148	600	321	70	20	10
	I-046	Cantagalo	991	734	37	56	42	2
	Total		19171	4263	1797	78	17	7
III	I-047	Virmond	500	130	50	74	19	7
	I-048	Laranjeiras do Sul	1727	196	36	88	10	2
	I-049	Chopininho	2866	189	94	91	6	3
	I-050	Coronel Vivida	2364	213	42	90	8	2
	I-051	Palo Branco	2866	189	94	91	6	3
	I-052	Mariopolis	500	79	1	86	14	0
	I-053	Vitorino	419	88	39	77	16	7
	I-054	Renascenca	826	80	24	88	9	3
	I-055	Bom Sucesso do Sul	650	35	15	93	5	2
	I-056	Itapejara D'Oeste	1170	154	6	88	12	0
	I-057	Vere	1005	340	5	75	25	0
	I-058	Sao Joao	1990	122	4	94	6	0
	I-059	Sulina	921	37	2	96	4	0
	I-060	Saudado do Iguacu	378	22	10	93	5	2
	I-061	Rio Bonito do Iguacu	630	132	18	81	17	2
	I-062	Nova Laranjeiras	676	136	45	79	16	5
I-063	Guaraniacu	1313	234	75	81	14	5	
I-064	Quedas do Iguacu	2395	300	15	88	11	1	
I-065	Sao Jorge do Oeste	1082	63	15	94	5	1	

Table-A6.11 Size of Farmers in Iguacu River Basin (2/2)

Div.	No.	Municipality	Number (household)			Ratio (%)		
			Small Size Farmer	Medium Size Farmer	Large Size Farmer	Small Size Farmer	Medium Size Farmer	Large Size Farmer
III	I-066	Cruzeiro do Iguacu	565	13	2	98	2	0
	I-067	Boa Esperanca do Iguacu	577	95	8	85	14	1
	I-068	Dols Vizinhos	1551	144	5	92	8	0
	I-069	Eneas Marques	926	80	1	92	8	0
	I-070	Francisco Beltrao	3066	142	3	96	4	0
	I-071	Marmeleiro	1900	200	25	90	9	1
	I-072	Flor da Serra do Sul	1057	31	12	96	3	1
	I-073	Barracao	1730	300	15	84	15	1
	I-074	Salgado Filho	1245	110	25	90	8	2
	I-075	Sario Antonio do Sudoeste	1784	69	7	96	4	0
	I-076	Pranchita	1136	81	6	93	7	0
	I-077	Pinhal de Sao Bento	365	12	3	96	3	1
	I-078	Ampere	1429	148	11	90	9	1
	I-079	Nova Esperanca do Sudoeste	933	62	42	90	6	4
	I-080	Salto do Lontra	1890	200	10	90	10	0
	I-081	Santa Izabel do Oeste	1300	130	10	90	9	1
	I-082	Nova Prata do Iguacu	1160	80	40	91	6	3
	I-083	Perola do Oeste	1920	394	15	82	17	1
	I-084	Piansito	2100	280	11	88	12	0
	I-085	Realeza	1225	210	28	84	14	2
	I-086	Capanema	1600	91	7	95	5	0
	I-087	Tres Barras do Parana	2426	114	15	95	4	1
	I-088	Catanduvas	943	160	47	82	14	4
	I-089	Ibema	290	49	18	81	14	5
	I-090	Cascavel	1464	272	100	80	15	5
	I-091	Boa Vista da Aparecida	1766	65	0	96	4	0
	I-092	Capitao Leonidas Marques	1103	93	10	91	8	1
	I-093	Santa Lucia	445	33	2	93	7	0
	I-094	Lindoeste	974	112	80	83	10	7
	I-095	Santa Tereza do Oeste	172	76	3	69	30	1
	I-096	Ceu Azul	724	93	11	88	11	1
I-097	Matelandia	849	106	32	86	11	3	
I-098	Medianeira	1747	117	5	94	6	0	
I-099	Sao Miguel do Iguacu	807	181	20	80	18	2	
I-100	Santa Terezinha de Itaipu	117	78	6	58	39	3	
I-101	Foz do Iguacu	869	22	20	96	2	2	
	Sub-total	68493	7181	1245	89	9	2	
	Total	120797	14781	3812	86	11	3	

Source: EMATER

Table-A6.12 Size of Farmers in Tibagi River Basin

No.	Municipality	Number (household)			Ratio (%)		
		Small Size Farmer	Medium Size Farmer	Large Size Farmer	Small Size Farmer	Medium Size Farmer	Large Size Farmer
T-002	Palmeira	1636	613	123	69	26	5
T-003	Teixeira Soares	2798	372	86	86	11	3
T-004	Irati	440	54	3	88	11	1
T-005	Imbituva	2776	326	17	89	10	1
T-006	Ipiranga	1708	185	165	83	9	8
T-007	Ponta Grossa	932	256	136	71	19	10
T-008	Castro	1818	736	201	66	27	7
T-009	Ivaí	449	224	75	60	30	10
T-010	Reserva	745	181	45	76	19	5
T-011	Tibagi	1327	293	290	70	15	15
T-012	Piraí do Sul	774	76	117	80	8	12
T-013	Ventania	124	65	39	54	29	17
T-014	Telemaco Borba	608	74	12	87	11	2
Sub-total		16135	3455	1309	77	17	6
T-015	Ortigueira	2636	341	125	85	11	4
T-016	Curituba	592	62	25	87	9	4
T-017	Sapopema	499	198	87	64	25	11
T-018	Sao Jeronimo da Serra	1119	320	160	70	20	10
T-019	Maua da Serra	15	17	18	30	34	36
T-020	Mariandia do Sul	406	62	19	83	13	4
T-021	California	281	71	3	79	20	1
T-022	Apucarana	514	44	7	91	8	1
T-023	Arapongas	406	63	16	84	13	3
T-024	Londrina	3582	252	340	86	6	8
T-025	Nova Santa Barbara	326	28	11	89	8	3
T-026	Santa Cecilia do Pavao	381	37	12	88	9	3
T-027	Santo Antonio do Paraiso	246	45	9	82	15	3
T-028	Congonhinhas	59	24	16	60	24	16
T-029	Nova Fatima	90	13	5	83	12	5
T-030	Sao Sebastiao da Amoreira	165	53	27	70	20	10
T-031	Assai	1153	387	10	74	25	1
T-032	Nova America da Colina	241	63	45	69	18	13
T-033	Cornelio Procopio	209	60	31	70	20	10
T-034	Uraí	746	85	11	89	10	1
T-035	Jataizinho	297	64	10	80	17	3
T-036	Ibipora	761	96	11	88	11	1
T-037	Rolandia	68	51	5	55	41	4
T-038	Cambe	174	56	19	70	22	8
T-039	Sertanopolis	740	195	15	77	21	2
T-040	Rancho Alegre	320	50	30	79	13	8
T-041	Leopolis	61	30	10	60	30	10
T-042	Sertaneja	84	48	20	55	32	13
T-043	Primeiro de Maio	179	49	20	72	20	8
Sub-total		16369	2864	1117	81	14	5
Total		32504	6319	2426	79	15	6

Source: EMATER

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