

Evaluation of social-economic and environmental impacts on the diffusion of genetic modified maize cultivars in Brazil

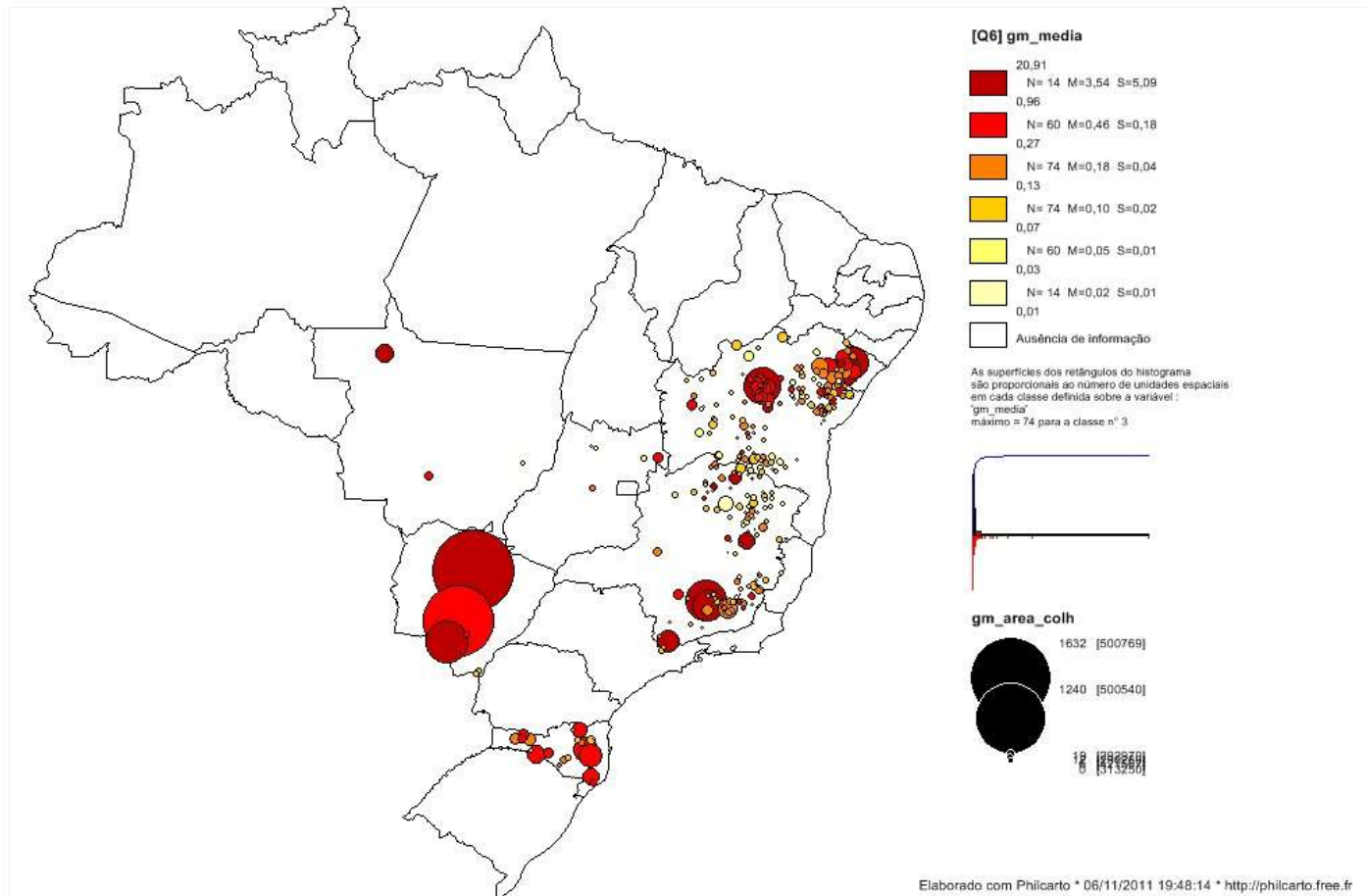
Two investigations: a) applying CGE model to evaluate socio-economic and environmental impacts (ESALQ-team); b) A conjoint analysis to study choices on varieties and seed prices (Unicamp team).

I. Objectives

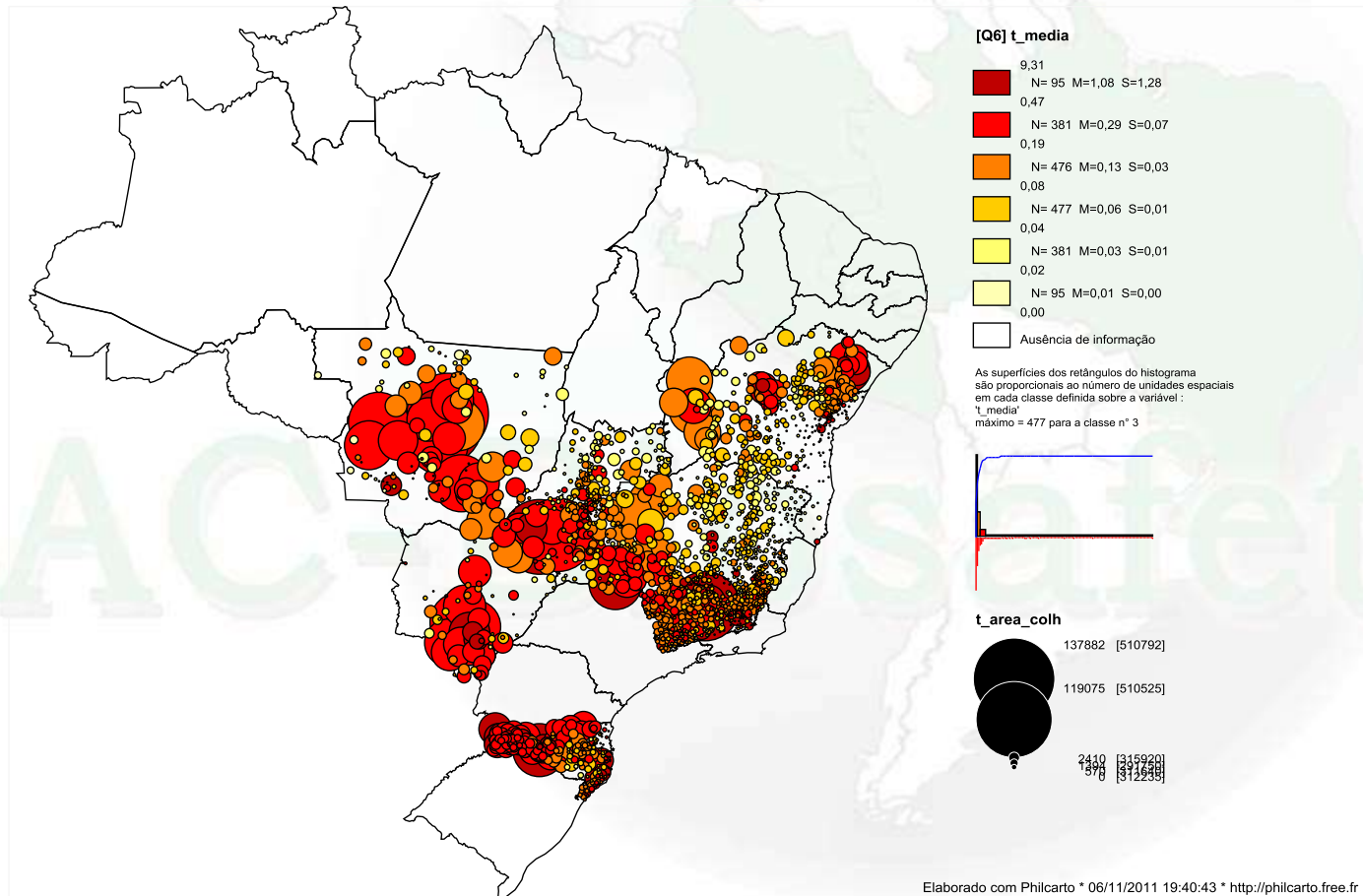
- Evaluate cost differentials of GM corn in Brazil, 2010/2011 harvest.
- Comparison between conventional x GM production systems.

LAC-Biosafety

GM corn in Brazil



Corn in Brazil



Methodology

- First step: field survey by CEPEA on the main corn production regions. Cost differentials.
 - Sorriso (MT)
 - Campo Novo Parecis (MT)
 - Campo Verde (MT)
 - Mineiros (GO)
 - Luiz Eduardo Magalhães (BA).
- Surveys: “Panel” method. Costs and area with GM and conventional varieties estimates.

Survey results: regions and adoption

- Surveyed 28 production structures: 8 first harvest conventional and 10 GM; 5 second harvest conventional and 5 GM.
- About 50% of the corn produced in the surveyed regions were GM.
- Most of the GM corn is BT corn (Insect resistance). Stacked varieties are starting.

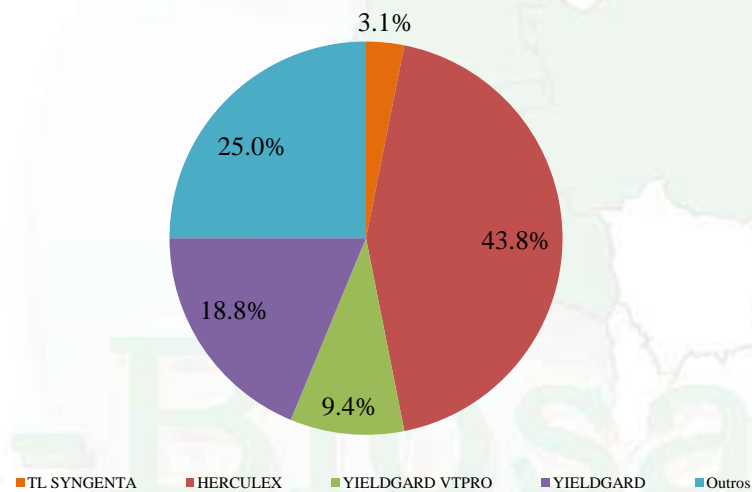
Region	State	Season	GM seeds use
Rio Verde	GO	First harvest	Yes (Bt)
		Second harvest	Yes (Bt)
Mineiros	GO	First harvest	Yes (Bt)
		Second harvest	Yes (Bt)
Uberaba	MG	First harvest	Yes (Bt)
Unaí	MG	First harvest	Yes (Bt)
		Second harvest	Yes (Bt)
Xanxerê	SC	First harvest	Yes (Bt)
Campos Novos	SC	First harvest	Yes (Bt)
Castro	PR	First harvest	Yes (Bt)
Guarapuava	PR	First harvest	Yes (Bt)
Cascavel	PR	First harvest	Yes (Bt)
		Second harvest	Yes (Bt)
Londrina	PR	First harvest	Yes (Bt)
		Second harvest	Yes (Bt)

Size of the typical production units, by region.



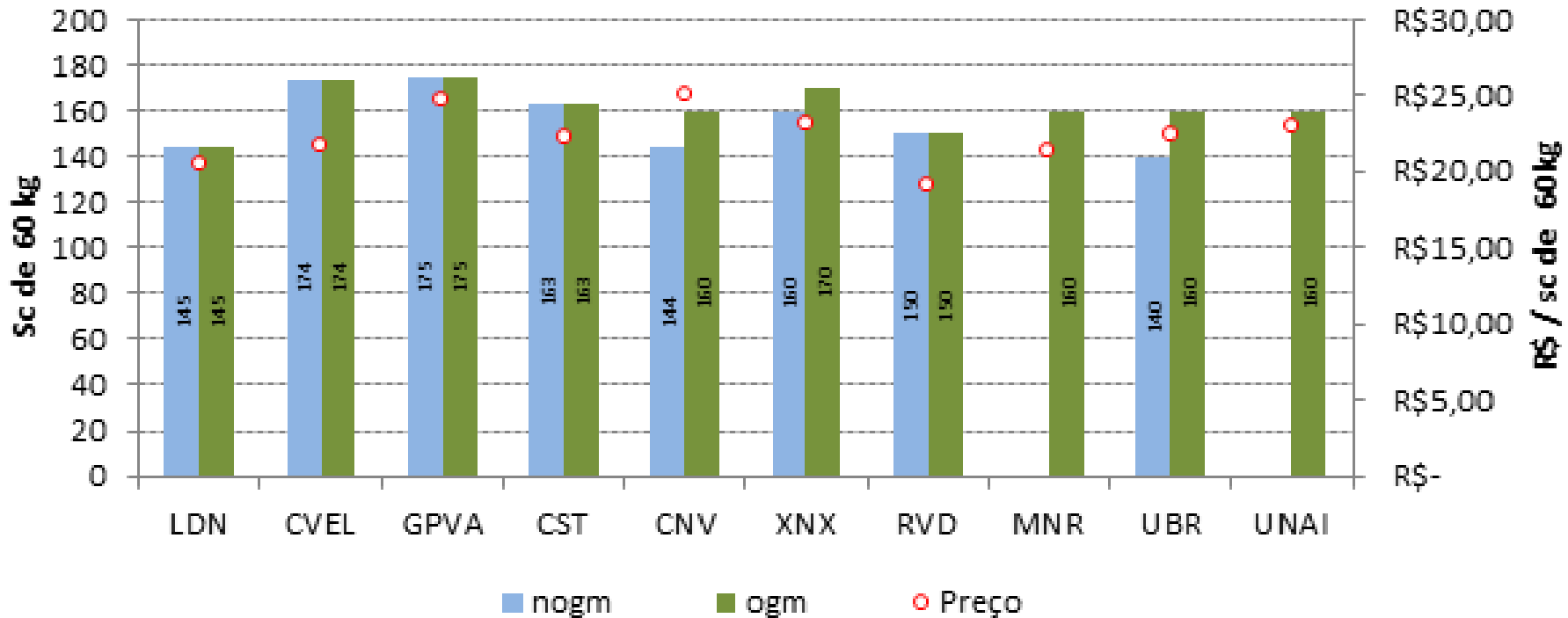
	GO		MG		SC			PR		
	RVD	MNR	UBR	UNAI	XNX	CNV	CST	GPVA	CVEL	LDN
Milho Verão	100,0	50,0	133,3	180,0	20,0	60,0	87,6	74,9	16,0	7,3
Transgênico	70,0	50,0	120,0	180,0	15,0	30,0	61,3	67,5	11,2	6,9
Convencional	30,0	-	13,3	-	5,0	30,0	26,3	7,4	4,8	0,4
Milho 2ª Safra	520,0	700,0	-	60,0	-	-	-	-	80,0	50,8
Transgênico	260,0	350,0	-	42,0	-	-	-	-	64,0	48,3
Convencional	260,0	350,0	-	18,0	-	-	-	-	16,0	2,5

Types of GM corn



Obs.: Outros = soma de híbridos citados uma vez

In some regions GM corn showed higher productivity in the 2010/2011 first harvest. Market price of corn showed no difference. No difference in productivity were observed in the 2nd harvest.





Cost comparison for conventional and GM corn.

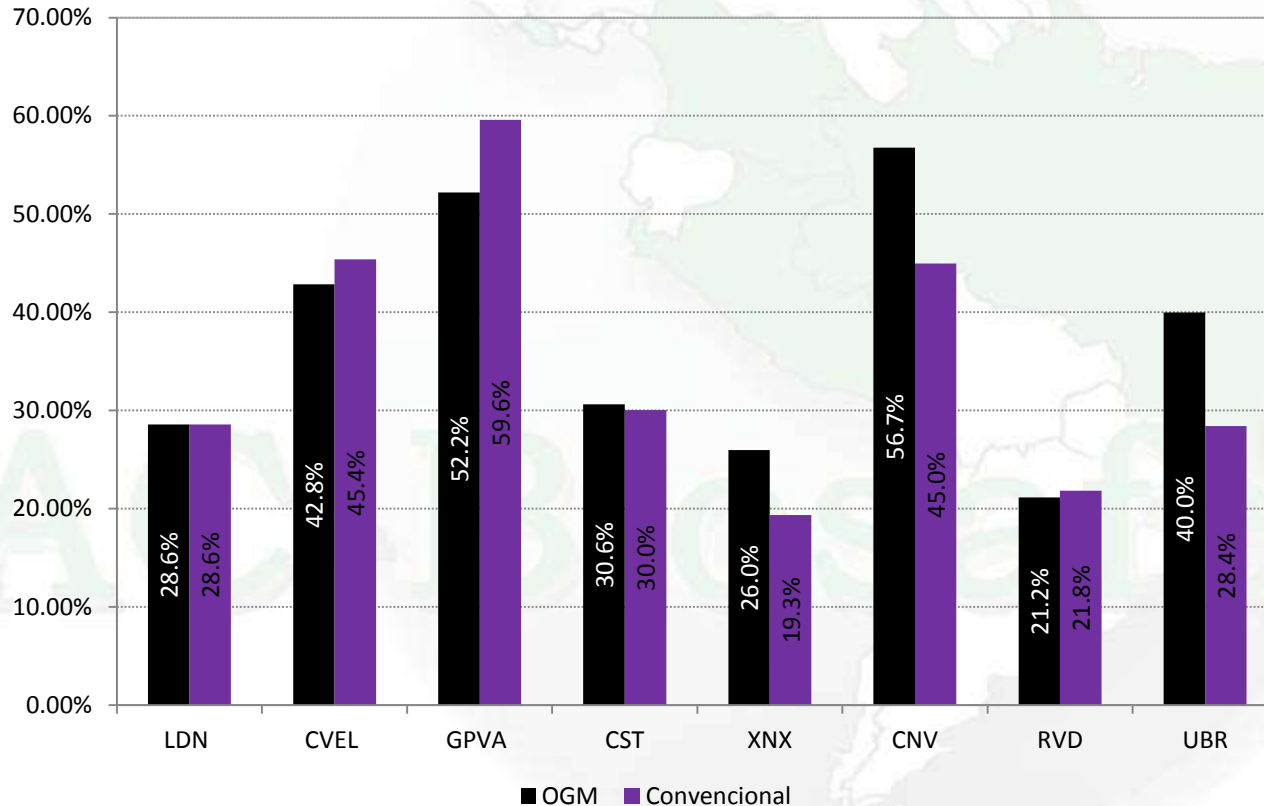
First harvest, Brazil. 2010/1011. R\$/ha.

Item	LDN		CVEL		GPVA		CST		XNX		CNV		RVD		UBR	
	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM
Fertilizers	486,98	486,98	518,74	518,74	647,06	647,06	752,52	752,52	969,52	969,52	616,15	616,15	607,08	607,08	652,92	652,92
Chemical inputs	157,64	232,40	158,65	200,57	213,78	217,80	174,36	252,98	179,69	213,59	178,15	208,75	187,20	280,40	186,40	248,40
Herbicides	76,24	76,24	86,50	86,50	108,00	108,00	70,80	70,80	98,75	98,75	109,75	109,75	68,50	68,50	101,50	101,50
Insecticides	12,40	87,15	8,93	50,85	3,90	7,92	20,43	99,05	31,80	65,70	25,50	40,50	2,70	95,90	0,00	62,00
Fungicides	31,82	31,82	0,00	0,00	50,00	50,00	32,45	32,45	0,00	0,00	0,00	0,00	62,00	62,00	55,20	55,20
Seed treatment	37,19	37,19	63,22	63,22	51,88	51,88	50,68	50,68	49,14	49,14	42,90	58,50	54,00	54,00	29,70	29,70
Seeds	392,56	309,92	433,88	309,92	437,50	312,50	390,00	299,00	444,60	396,50	437,50	337,50	330,00	220,00	450,00	288,00
Emulsionable oil	3,76	3,76	0,00	0,00	2,80	2,80	2,00	2,00	0,00	0,00	0,00	0,00	5,60	5,60	0,00	0,00
Mechanical operations	224,35	228,69	224,54	242,18	236,92	236,92	204,49	213,81	201,43	201,43	207,44	214,07	166,44	167,49	173,43	173,43
Transportation	144,63	144,63	191,47	191,47	157,50	157,50	157,35	157,35	136,00	136,00	96,00	96,00	150,00	150,00	160,00	160,00
Labor	116,28	118,16	62,31	65,40	130,66	130,66	47,52	50,76	65,07	65,07	45,53	47,38	105,41	108,09	45,39	45,39
Trade/Storage	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	39,36	39,36	0,00	0,00	0,00	0,00	0,00	0,00
Taxes	68,19	68,19	86,88	86,88	99,42	99,42	83,49	83,49	90,52	85,19	92,37	83,13	65,90	65,90	82,43	72,13
Insurance	6,59	6,82	16,20	16,78	16,28	16,28	14,99	15,34	17,37	17,37	15,53	15,74	10,36	10,42	11,40	11,40
Technical assistance	30,52	30,49	31,79	30,57	36,52	34,10	34,56	34,57	39,93	39,64	31,62	30,40	31,03	30,77	33,36	31,36
Interest over capital	131,81	131,69	113,84	109,92	136,49	128,15	156,75	156,76	149,09	148,12	103,88	100,10	134,50	133,47	109,55	103,55
CO	1763,33	1761,72	1838,30	1772,43	2114,92	1983,19	2018,04	2018,59	2332,58	2311,79	1824,17	1749,23	1793,52	1779,21	1904,87	1786,57
COT	1835,30	1832,05	2025,32	1970,33	2320,66	2188,92	2209,62	2216,71	2535,51	2514,73	2015,32	1944,22	1943,44	1929,79	2051,19	1932,89
CT	2306,07	2306,21	2644,45	2598,23	2839,97	2708,23	2779,07	2791,44	3124,37	3103,59	2562,07	2493,50	2364,61	2351,49	2560,14	2441,84

Profitability, conventional x GM corn.



First harvest.



Cost comparison, corn second harvest. Brazil, 2010/2011.

Item	RVD		MNR		CVEL		LDN		UNAI	
	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM	OGM	NOGM
Fertilizers	516,41	516,41	324,53	324,53	260,91	260,91	209,30	209,30	318,70	318,70
Chemic inputs	128,50	158,40	147,10	197,10	192,42	217,85	129,95	204,70	132,95	183,05
Herbicides	43,50	43,50	46,50	46,50	60,45	60,45	47,31	47,31	98,35	98,35
Insecticides	0,00	29,90	19,60	69,60	32,93	58,35	12,40	87,15	1,60	51,70
Fungicides	31,00	31,00	27,00	27,00	42,15	42,15	31,82	31,82	33,00	33,00
Seed treatment	54,00	54,00	54,00	54,00	56,90	56,90	38,42	38,42	0,00	0,00
Seeds	280,50	160,00	252,00	162,00	368,18	256,61	392,56	289,26	264,00	220,00
Emulsionable oil	0,00	0,00	12,00	12,00	4,65	4,65	3,76	3,76	4,00	4,00
Mechanical operations	157,11	158,08	159,73	163,54	193,71	225,26	173,21	179,54	190,04	207,19
Transportation	80,00	80,00	63,00	63,00	96,00	96,00	56,20	56,20	80,00	80,00
Labor	99,27	101,95	65,09	65,57	48,97	50,51	84,40	94,23	113,68	116,70
Trade/Storage	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Taxes	36,98	36,98	31,64	31,64	44,16	44,16	35,22	35,22	40,48	40,48
Insurance	9,61	9,61	12,05	12,20	12,85	12,85	6,05	6,50	13,06	13,88
Technical assistance	25,24	23,50	20,47	19,75	23,30	22,24	20,99	20,74	22,07	22,59
Interest over capital	161,65	150,51	125,09	120,73	121,91	116,36	124,36	122,89	115,42	118,16
CO	1495,27	1395,44	1212,70	1172,04	1367,06	1307,40	1235,99	1222,35	1294,40	1324,76
COT	1633,02	1532,38	1388,17	1349,22	1510,67	1451,01	1292,75	1287,52	1442,56	1486,47
CT	1891,55	1790,27	1655,70	1618,13	1832,36	1772,70	1611,01	1612,55	1599,04	1653,89

Profitability, conventional x GM corn.



Second harvest.



Final remarks

- Most of the GM technology in corn production in Brazil is of BT corn.
- In the first harvest the profitability of GM and conventional corn was equivalent, although differing across regions.
- In the second harvest conventional corn was more profitable in most regions.

II. Conjoint analysis

- This study is still under way.
- Field research is almost finished;
- Data bank is been filled quickly;

Estado	N Estab. População					n Amostra		
	GM	(%)	Não GM	(%)	Total	GM	Não GM	Total
Bahia (29)	1.464	48	238.934	42	240.446	25	35	60
Minas Gerais (31)	1.125	37	180.553	32	181.715	25	35	60
Santa Catarina (42)	250	8	105.336	19	105.594	10	35	45
Mato Grosso do Sul (50)	66	2	8.436	1	8.504	0	0	0
Mato Grosso (51)	64	2	11.276	2	11.342	0	0	0
Goiás (52)	102	3	21.874	4	21.979	10	35	45
Total	3.071	100	566.409	100	569.580	70	140	210