

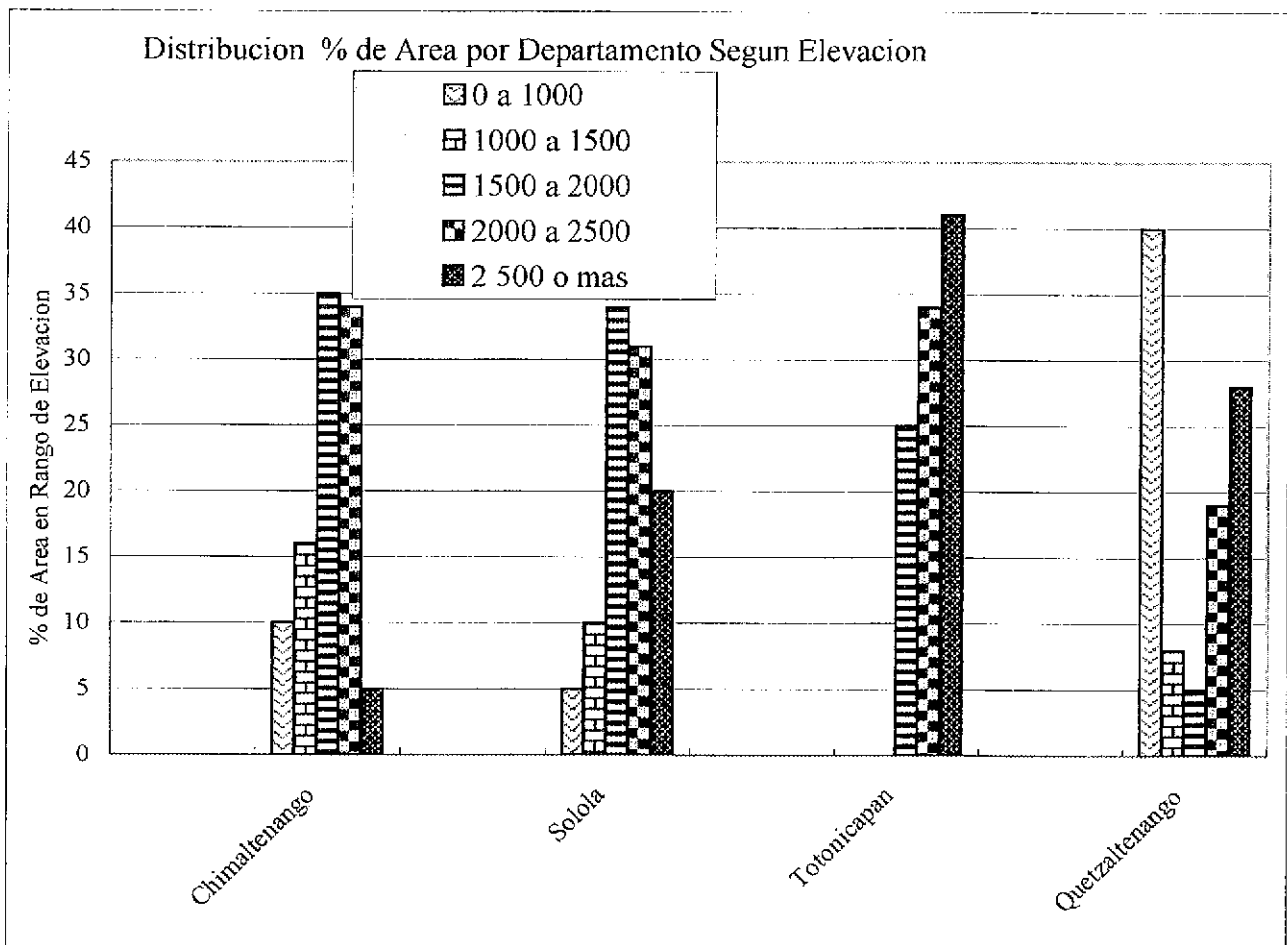
CUADROS

Cuadro 1.3.1 Lista de Contrapartes e Integrantes del Equipo de Estudios de JICA.

Name	Official Position
Counterparts	
Robert Chavez	Chief Counterpart, MAGA
Juan J. Cano	MAGA Coordinator, Chimaltenango province
Juan Gerardo Mendez G	MAGA Coordinator, Solola province
Orland Rodas de Leon	MAGA Coordinator, Totonicapan province
Jorge Guevara Santos	MAGA Coordinator, Quetzaltenango province
Oliveerio B. Portillo Mendez	MAGA , Development management Division
Oscar Cesar Lopez Maldonado	Plamar
Mario Norberto Lopez Rodriguez	Plamar
JICA experts	
Kenjiro Onaka	Team leader
Ko Watanabe	Expert for participatory development
Yuji Hatakeyama	Environmental expert
Yasuo Aonishi	Sociologist
Luis Rosad	Agronomist
Fumiaki Murakami	Infrastructure engineer
Katuya Kamisato	Infrastructure engineer
Saeko Ichikawa	Expert for health

Cuadro 3.1.4(1) Distribución de Área por Departamento Según Elevación de Terreno ..

Rango de Elevacion	Chimaltenango	Solola	Totonicapan	Quetzaltenango
0 a 1000	10	5	0	40
1000 a 1500	16	10	0	8
1500 a 2000	35	34	25	5
2000 a 2500	34	31	34	19
2 500 o mas	5	20	41	28
Total (%)	100	100	100	100



Cuadro 3.1.4(2) Variación de Temperaturas de Acuerdo con Elevación de Terreno.

Departamento Chimaltenango

Municipio Santa Cruz Balanya (2,080 m.s.n.m)												
	Enc.	Feb.	Mar.	Abr.	May	Jun.	Jul.	Ago.	Sep.	Oct.	Nov.	Dic.
Promedio Maxima Temp.	26.1	27.6	28	29.5	27.1	27.8	27.9	28.5	27.2	27	26.6	25.3
Promedio Minima Temp.	2.4	1.9	2.3	5.4	5.7	9	7.1	8.4	7.5	7.4	2.9	0

San Martin Jilotepeque (1,800 m)												
Promedio Maxima Temp.	22.3	22.8	23.4	23.6	23.3	23	23	22.9	22.6	22.5	22.5	22.6
Promedio Minima Temp.	6.7	7.9	7.5	9.4	9.5	9.6	9.3	9.8	10.1	9.8	7	9.4

Alameda (1,766 m)												
Promedio Maxima Temp.	23.1	24.2	25.3	25.8	24.5	23.8	23.2	23.3	23.1	22.9	22	21.4
Promedio Minima Temp.	7.5	8.2	8.7	10.8	11.5	13	13.4	13.1	13.9	12.7	11.5	9.6

Acatenango (1,370 m)												
Promedio Maxima Temp.	32.2	32.2	32.3	30.8	30.8	30.5	30.1	30.4	29.6	29.6	31.4	32.3
Promedio Minima Temp.	13.7	13.4	14.7	15	14.8	15	14.8	14.8	13.8	14.6	14	13.4

Departamento Solola

San Lucas Toliman (m)												
Promedio Maxima Temp.	28.4	28.9	28.4	29	27.9	28.2	28.5	28.4	28.3	27.5	28.6	28.4
Promedio Minima Temp.	6.5	6.3	7.5	10.7	12.1	12.9	11.6	10.9	10.8	9.1	8	6.3

Santiago Atitlan (1,580 m)												
Promedio Maxima Temp.	27.6	28.8	29.3	29.5	27.9	28.2	28.6	28.1	27.8	27.2	27.6	27.9
Promedio Minima Temp.	6.5	6.2	7	10.9	11.3	12.2	11.2	11.4	11.7	10.6	8.6	6.2

Departamento Quetzaltenango

El Palmar (900 m)												
Promedio Maxima Temp.	29	29.7	30	29.5	28.7	29	29.4	29.1	28.5	29	28.5	28.9
Promedio Minima Temp.	13	13.6	14.2	14.2	15.5	15.6	15.3	15	15.6	15	14.7	14.2

Colomba (1,371 m)												
Promedio Maxima Temp.	29.2	28.2	27.9	27.6	27.8	27	22.4	28	26.7	26.8	27.8	29
Promedio Minima Temp.	9.6	9.5	10.2	11.2	10.8	12.9	12.5	12.6	12	11.7	10.5	10.3

Quetzaltenango (2,380 m)												
Promedio Maxima Temp.	19.1	20.1	22.3	24.5	25.5	23.7	23	22.7	22.1	20.8	20.6	19.4
Promedio Minima Temp.	0.3	0.9	2.9	6.6	9.9	10.1	9	8.9	9.9	8.8	6.6	2.5

Olintepeque (2,380 m)												
Promedio Maxima Temp.	25.4	26.8	27.8	26.8	26.1	24.4	23.7	23.8	23.2	23.6	23.8	24.8
Promedio Minima Temp.	-6	-6.6	-5.2	0.6	3.6	4	3.1	2.9	3.6	1.9	-1.3	-6.1

Fuente: Equipo de Estudio de JICA, Usando datos de INSIVUMEH y de Informe de Clasificación de Suelo

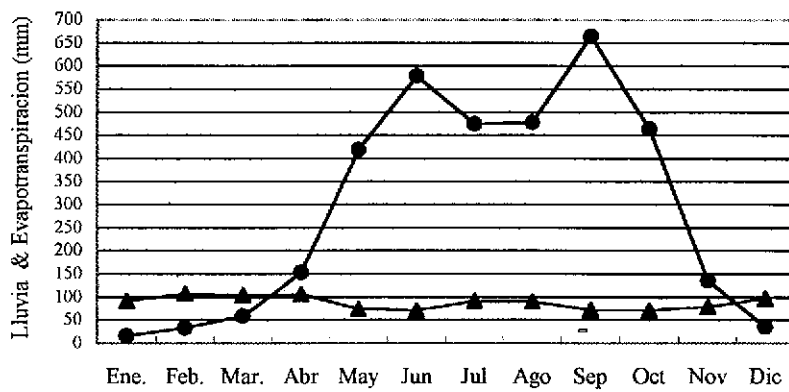
Cuadro 3.1.4(3) Promedios de lluvia en Diferentes Regiones del Departamento de Chimaltenango.

Muni. El Tejar (1,100 m.s.n.m)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	11	7	55	95	325	449	296	335	614	307	47	31	2572
Evapotranspiracion (mm)	97	116	109	110	75	72	95	95	70	71	82	102	1094

Muni. San Martin Jilotepeque	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	4	6	16	26	107	242	197	187	254	158	33	6	1236
Evapotranspiracion (mm)	99	109	141	137	132	108	116	122	105	105	90	95	1359

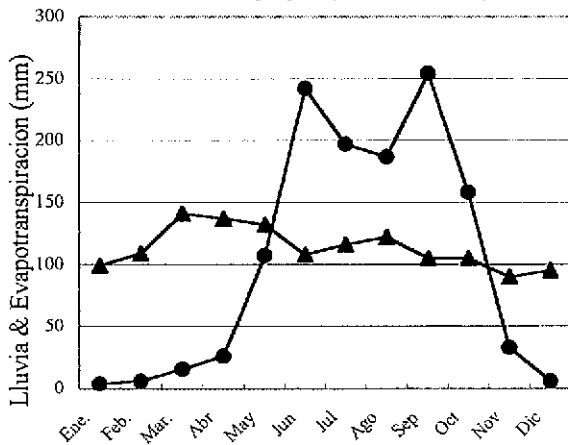
Muni. Yepocapa (620 m.s.n.m)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	16	33	58	154	419	579	474	478	665	464	136	36	3512
Evapotranspiracion (mm)	92	108	104	106	75	71	92	91	72	71	79	97	1058

Yepocapa (620 m.s.n.m.)

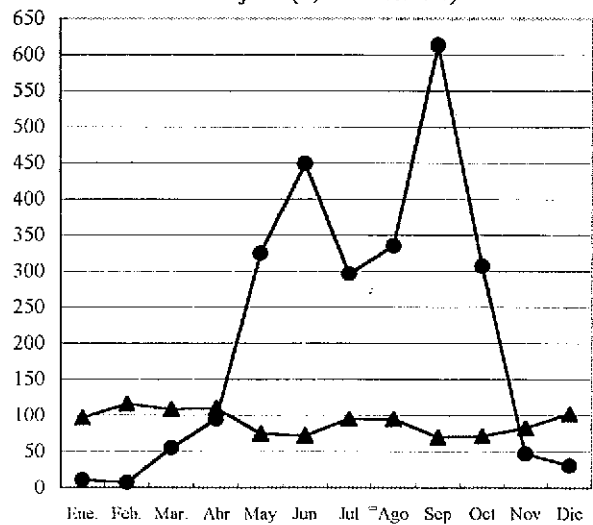


● Lluvia (mm)
▲ Evapotranspiracion (mm)

San Martin Jilotepeque (1,820 m.s.n.m)



El Tejar (1,100 m.s.n.m)



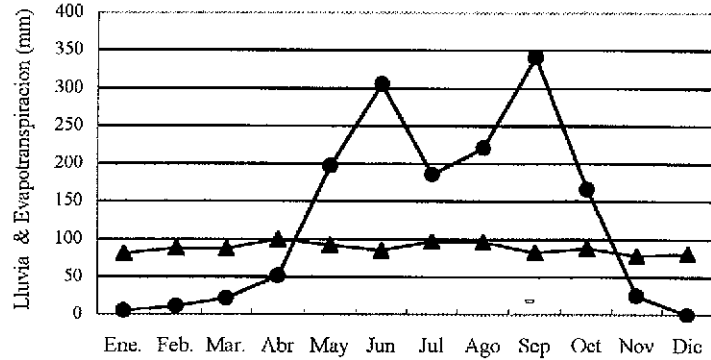
Cuadro 3.1.4(4) Promedios de lluvia en Diferentes Regiones del Departamento de Sololá.

Muni. San Lucas Toliman	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	9	24	31	72	232	520	343	322	554	334	80	15	2536
Evapotranspiracion (mm)	110	129	132	165	120	96	136	123	113	110	100	107	1441

Muni. Santa Catarina Ixtahuacan	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	4	14	16	34	139	264	149	216	311	143	24	5	1319
Evapotranspiracion (mm)	92	103	132	129	126	104	110	115	101	101	86	90	1289

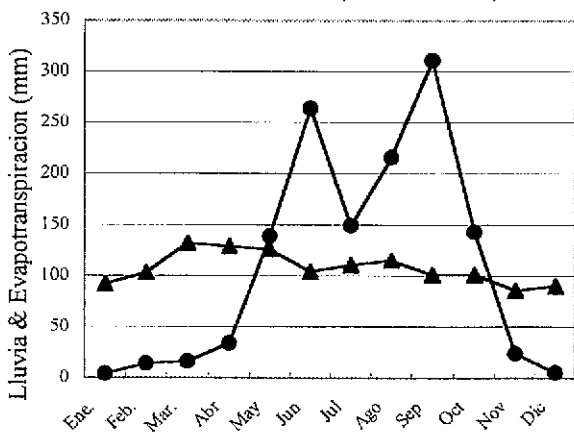
Muni. Santa Clara la Laguna	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	5	11	22	51	197	306	186	221	341	166	25	0	1531
Evapotranspiracion (mm)	81	88	87	100	92	85	97	96	82	88	78	81	1055

Santa Clara la Laguna (2,100 m.s.n.m.)

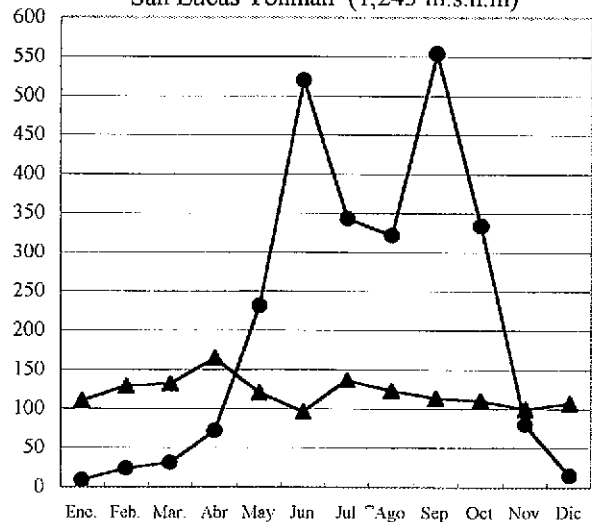


● Lluvia (mm)
▲ Evapotranspiracion (mm)

Santa Catarina Ixtahuacan (2,335 m.s.n.m)



San Lucas Toliman (1,243 m.s.n.m)

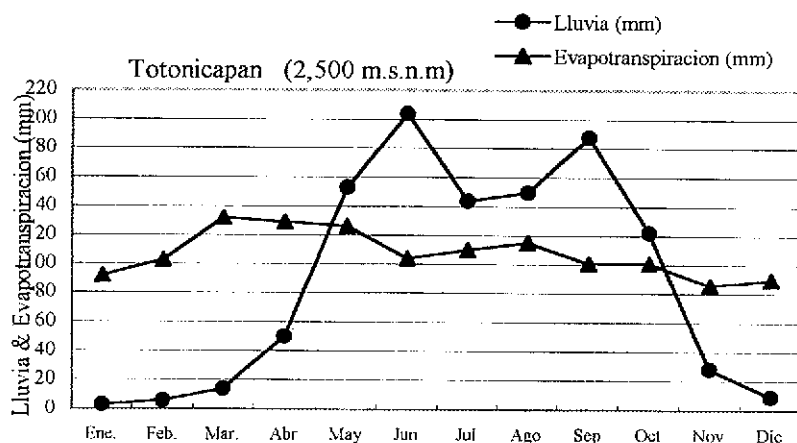
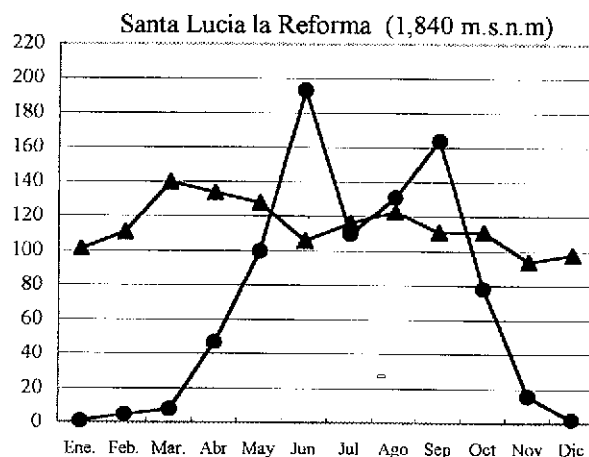
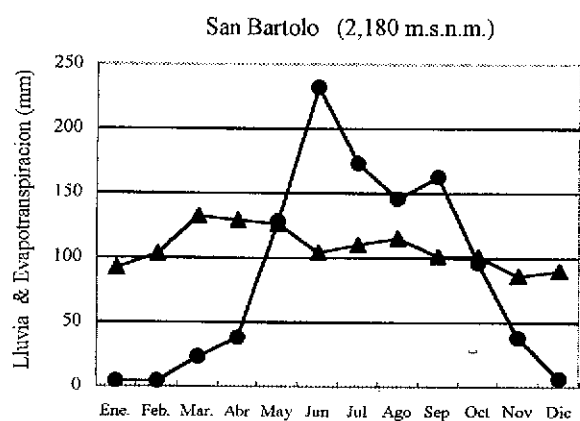


Cuadro 3.1.4(5) Promedios de lluvia en Diferentes Regiones del Departamento de Tonicapán

Muni. Santa Lucia la Reforma	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	1	5	8	47	100	193	110	131	164	78	16	2	855
Evapotranspiracion (mm)	101	111	140	134	128	106	116	123	111	111	94	98	1373

Muni. Tonicapán (2,500 m.)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	3	6	14	50	153	204	144	150	188	122	28	9	1071
Evapotranspiracion (mm)	92	103	132	129	126	104	110	115	101	101	86	90	1289

Muni. San Bartolo (2,180 m.)	Ene.	Feb.	Mar.	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Total
Lluvia (mm)	4	4	23	38	128	232	173	146	163	96	38	6	1051
Evapotranspiracion (mm)	92	103	132	129	126	104	110	115	101	101	86	90	1289



Cuadro 3.1.4(6) Promedios de lluvia en Diferentes Regiones del Departamento de Quetzaltenango

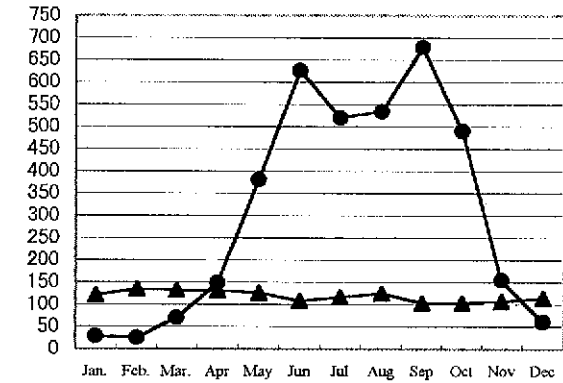
Muni. San Carlos Sija (2,760 m.)	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	2	13	16	39	145	187	145	125	212	109	23	2	1018
Evapotranspiration (mm)	89	96	120	113	109	93	100	104	92	93	77	84	1170

Muni. Olinstepeque (2,400 m.)	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	1	9	9	31	104	157	111	120	153	102	27	4	828
Evapotranspiration (mm)	81	88	87	100	92	85	97	96	82	88	78	81	1055

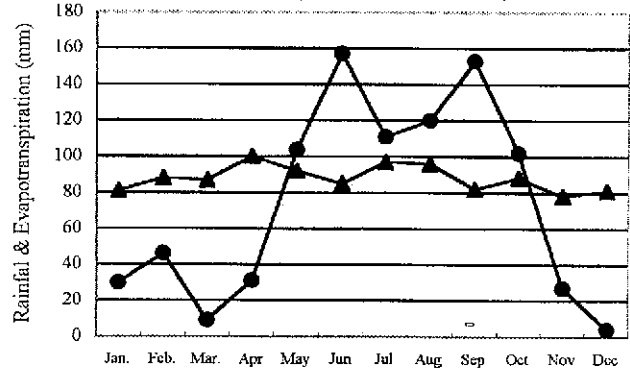
Muni. Zunil (1,500 m.)	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	30	46	9	31	104	157	111	120	153	102	27	4	894
Evapotranspiration (mm)	81	88	87	100	92	85	97	96	82	88	78	81	1055

Municip. Colomba (1,400)	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	28	25	70	149	381	626	520	534	679	490	155	61	3718
Evapotranspiration (mm)	121	134	132	131	126	108	117	125	103	103	107	114	1421

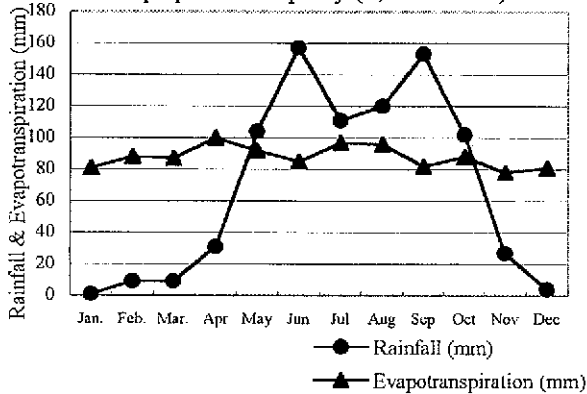
Colomba Municipality (1,400 m.a.s.l.)



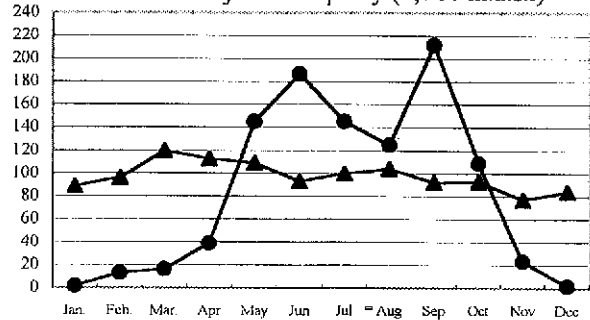
Zunil Municipality (1,500 m.a.s.l.)



Olinstepeque Municipality (2,400 m.a.s.l.)



San Carlos Sija Municipality (2,760 m.a.s.l.)



Cuadro 3.1.4(7) Areas y Características de Series de Suelos del Departamento de Chimaltenango.

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Area	Material Parental	Relieve	Pendiente Dominante (%)	Textura y Consistencia	Profundidad (cm)	Limitacion a Penetracion de Raices	Peligro de Erosion	Problema Especial de Manejo
1 Alotenango	AF	8,670	4.38								
2 Balanjuyu	Al	13,600	6.87	Ceniza volcanica mafica	Inclinado a muy inclinado	12 a 30	Franca, suelta	25 a 40	Ninguna	Alto	Erosion
3 Camanche	Ba	2,800	1.41	Ceniza volcanica mafica	Fuertemente ondulado	12 a 15	Franca, friable	25 a 40	Ninguna	Alto	Erosion, Altura
4 Cutzan	Cq	25,660	12.97	Ceniza volcanica mafica	Fuertemente ondulado	10 a 15	Franca, friable	20 a 40	Ninguna	Alto	Erosion, M.O.
5 Chinautla	Cm	17,060	8.62	Ceniza volcanica cementada	Ondulado/Fuertemente Ondul.	10	Franca, friable	50	Ninguna	Regular	Elevacion
6 Chocola	Cj	1,370	0.69	Granito, gneis	Fuertemente ondulado	10 a 25	Franco arenoso, friable	10 a 20	Ceniza cementada	Muy alto	Erosion
7 Chol	Chn	4,040	2.04		Inclinado	20 a 50	Franco, friable	10 a 20	Roca a 40 - 50 cm	Muy alto	Erosion
8 Cimas Volcanicas	Chi	6,600	3.34	Granito y cenizas volcanicas	Inclinado	50 a 60	Franco, friable	15 a 30	Roca a 40 - 50 cm	Muy alto	Erosion
9 Guatemala	Chc	2,020	1.02	Ceniza volcanica pomacea	Suavemente inclinado	3 a 6	Franco limoso, friable	30 a 50	Ninguna	Regular	Erosion
10 Guatemala, Fase pendien.	Chg	3,530	1.78	Esquistos	Inclinado	30 a 60	Franco arenoso, friable	10 a 15	Roca a 20 - 50 cm	Alto	Erosion, Fertilidad
11 Guatemala	CV	1,200	0.61	Cenizas y rocas volcanicas	Muy inclinado	0 a 6	Franco, friable	30 a 50	Ninguna	Bajo	Materia Organica
12 Guatemala	Gi	3,660	1.85	Ceniza volcanica pomacea	Casi plano	27	Franco, friable				
13 Guatemala	Gp	7,260	3.67	Ceniza volcanica pomacea	Inclinado	15 a 20	Franco arcilloso, friable	20 a 30	Ninguna	Alto	Erosion
14 Guatemala	Ou	7,230	3.65	Ceniza volcanica pomacea	Inclinado a muy inclinado	10	Franco arenoso, pedregoso	20 a 30	Ceniza cementada	Muy alto	Erosion, pedregos
15 Guatemala	Pn	930	0.47	Ceniza volcanica cementada	Inclinado	50	Franco arcilloso, friable	20 a 30	Ninguna	Muy alto	Erosion
16 Guatemala	Pz	1,800	0.91	Ceniza volcanica pomacea	Inclinado	15 a 25	Franco arenoso, friable	15 a 30	Caliza a 5 cm	Muy alto	Erosion
17 Guatemala	Pos	9,530	4.82	Ceniza volcanica pomacea	Fuertemente ondulado a Incln.	10 a 30	Franco arenoso, friable	15 a 30	Toba a 50 cm	Muy alto	Erosion, Fertilidad
18 Guatemala	Qi	19,660	9.93	Cenizas volcanicas cementada	Muy ondulado a incinado	0 a 5	Franco-arcillo-arenoso, friab.	15 a 25	Ninguna	Regular	Sequia
19 Guatemala	Sl	180	0.09	Ceniza volcanica	Casi plano a fuertemente ondu.	4 a 8	Franco limoso, friable	40 a 60	Ninguna	Regular/baja	Erosion
20 Guatemala	Sx	2,270	1.15	Ceniza volcanica	Suavemente inclinado a incln.	1 a 5	Franco arenoso, friable	30 a 50	Ninguna	Bajo	Fertilidad
21 Guatemala	Te	19,400	9.80	Ceniza volcanica	Casi plano a ondulado	15 a 30	Franco arenoso, friable	20 a 30	Ninguna	Muy alto	Erosion
22 Guatemala	Tn	4,970	2.51	Ceniza volcanica	Fuertemente ondulado, Inclinad	5 a 25	Franco turboso, friable	30 a 70	Ninguna	Alto	Altitud, Frosion
23 Guatemala	Tp	3,070	1.55	Ceniza volcanica/rocas claras	Suavemente ondulado	10 a 25	Franco gravoso, suelto	40 a 60	Ninguna	Alto	Erosion
24 Guatemala	Ye	18,530	9.36	Ceniza volc., escoria mafica	Inclinado a muy inclinado	25 a 60	Franco arenoso, suelto	5 a 20	Ninguna	Muy alto	Erosion
25 Guatemala	Zc	12,860	6.50	Ceniza volcanica	Muy inclinado, barrancos						
Total		197,900	100								

Fuente: Clasificacion de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Cuadro 3.1.4(8) Areas y Características de Series de Suelos del Departamento de Sololá.

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Area	Material Parental	Relieve	Pendiente Dominante (%)	Textura y Consistencia	Profundidad (cm)	Limitación a Penetración de Raíces	Peligro de Erosion	Problema Especial de Manejo
1 Atitlan	At	7,980	7.52	Lahar o Lodo mafico	Muy escarpado	30 a 40	Franco arenoso, suelta	40	Cementado a 75 cm	Muy Alto	Erosion, pedreg.
2 Camancha	Cm	13,460	12.69	Ceniza volcanica	Ondulado/Fuertemente Ondul.	10	Franca, friable	50	Ninguna	Regular	Elevacion
3 Camancha, Quebrada erosionado	Cme	15,110	14.24	Ceniza volcanica mafica	Fuertemente ondulado	50 a 60	Franca, friable	20 a 40		Muy alto	Erosion, M.O.
4 Chipso	Chi	4,390	4.14	Ceniza volcanica cementada	Escarpado	50 a 60	Franco, friable	15 a 30	Roca a 40 - 50 cm	Muy alto	Erosion
5 Cimas Volcanicas	CV	2,740	2.58	Granito, gneis	Escarpado	50 a 60	Franco, friable	40 a 50		Muy alto	Erosion
6 Moca	Mo	790	0.74	Ceniza volcanica	Escarpado	50 a 60	Franco, friable	40 a 50	Roca a 40 - 50 cm	Muy alto	Erosion
7 Panan	Pn	190	0.18	Ceniza volcanica cementada	Inclinado	10	Franco arenoso, suelto	40 a 50	Ceniza cementada a 50 cm	Alto	Erosion, pedregoo
8 Pazite	Pz	15,510	14.62	Ceniza volcanica pomacea	Escarpado	20 a 25	Franco arenoso, suelto	15 a 25	Ninguna	Alto	Erosion
9 Suelo Aluvial no diferenciado	SA	380	0.36								
10 Suchitepequez	Sx	4,940	4.66	Ceniza volcanica	Suavemente inclinado	4 a 10	Franco limoso, friable	40 a 60	Ninguna	Moderada	Erosion
11 Samayac	Sm	3,610	3.40	Lodo volcanico cementado	Suavemente inclinado	6 a 10	Franco limoso, friable	20 a 30	Cupa cementada a 50 cm	Alto	Erosion, pedregoo
12 Totliman	Tn	10,340	9.75	Ceniza volcanica	Fuertemente ondulado	15 a 30	Franco arenoso, friable	20 a 30	Ninguna	Alto	Erosion
13 Totonicapan	Tp	13,700	12.91	Ceniza y roca volcanica	Suavemente ondulado	5 a 25	Franco turbosa, friable	30 a 70	Ninguna	Regular	Altitud, Erosion
14 Zacualpa	Zc	460	0.43	Ceniza volcanica	Muy escarpado	50 a 60	Franco arcilloso, friable	25	Ninguna	Muy alto	Erosion
Lago Atitlan		12,500	11.78								
Total		106,100	100								

Fuente: Clasificación de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Cuadro 3.1.4(9) Areas y Características de Series de Suelos del Departamento de Totonicapán.

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Total	Material Parental	Relieve	Pendiente Dominante (%)	Textura y Consistencia	Profundidad (cm)	Limitacion a Penetracion de Raices	Peligro de Erosion	Problema Especial de Manejo
1. Camancha	Cm	9,520	8.97	Ceniza volcanica	Ondulado/Fuertemente Ondul.	10	Franca, friable	50	Ninguna	Regular	Elevacion
2. Camancha, Fase quebrada	Cmc	6,585	6.21	Lahar o Lodo mafico	Muy escapado	50				Muy Alto	Erosion, pedregos.
3. Suelo Aluvial no diferenciado	SA	580	0.55								
4. Quetzaltenango	Qe	3,085	2.91	Ceniza volcanica	Casi plano	0 a 3	Franco arenoso, firme	50 a 75	Ninguna	Ligera	Materia Organica
5. Paizite	Pz	21,500	20.26	Ceniza volcanica pomacea	Escarpado	20 a 25	Franco arenoso, suelto	15 a 25	Ninguna	Alto	Erosion
6. Quiche	Qi	24,500	23.09	Ceniza volcanica cementada	Muy ondulado/Escarpado	10 a 20	Franco arcilloso arenoso	15 a 30	Capa dura a 70 cm.	Alto	Erosion/M.O.
7. Sinache	Si	13,540	12.76	Ceniza volcanica	Fuertemente ondulado	5 a 12	Franco arcilloso, friable	30	Ninguna	Alto	Erosion
8. Totonicapán	Tp	26,790	25.25	Ceniza y roca volcanica	Suavemente ondulado	5 a 25	Franco turbosa, friable	30 a 70	Ninguna	Regular	Alitud, Erosion
Total		106,100	100.00								

Fuente: Clasificación de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Cuadro 3.1.4(10) Areas y Características de Series de Suelos del Departamento de Quetzaltenango

Nombre de la Serie	Simbolo en Mapa	Area (ha)	% del Area	Material Parental	Relieve	Pendiente (%)	Textura y Consistencia	Profundidad (cm)	Limitacion a Penetracion de Raices	Peligro de Erosion	Problema Especial de Manejo
1 Atozomango	Al	4,800	2.46	Ceniza volcanica, mafica	Inclinado a escarpado	12 a 30	Franco arenoso, suelto	25 a 40	ninguna	Alto	Manejo
2 Bucul	Bu	527	0.27	Ceniza volcanica, aluvion	Casi plano, depresional	0 a 2	Franco arcilloso, friable	40 a 60	ninguna	Leve	Erosion
3 Camancha	Cm	9,616	4.93	Ceniza volcanica	Ondulado	10	Franco, friable	50	ninguna	Regular	Elevacion
4 Camancha, Fase quebrada erosionada	Cme	8,301	4.25								Elevacion
5 Clocola	Cho	15,926	8.16	Ceniza volcanica micacea	Suavemente inclinado	3 a 6	Franco limosa, friable	30 a 50	ninguna	Regular	Erosion
6 Chuva	Chv	29,093	14.91	Ceniza volcanica suelta	Inclinado a escarpado	10 a 20	arena franca, suelta	10 a 15	ninguna	Muy alto	Erosion
7 Cirras Volcanicas	CV	2,492	1.28								Erosion
8 Intan	Ix	31,356	16.07	Ceniza volcanica, cement.	Casi plano	1 a 3	Arcilla plastica	10	ninguna	Leve	Sequia, arcilla plastica
9 Ostuncalco	Os	24,762	12.69	Ceniza volcanica	Fuertemente ondulado	10 a 20	arena franca, suelta	10	ninguna	muy alto	Erosion
10 Palin	Pl	3,763	1.93	Toba volcanica	Muy inclinado	40 a 60	Franco arenoso, friable	20 a 30	ninguna	muy alto	Erosion, pedregos
11 Patzite	Pz	3,763	1.93	Ceniza volcanica, pomasea	Inclinado	20 a 25	Franco arenoso, friable	15 a 25	ninguna	Alto	Erosion
12 Quetzaltenango	Qe	8,374	4.29	Ceniza volcanica	Casi Plano	0 a 3	Franco arenoso, firme	50 a 75	ninguna	Leve	Materia Organica
13 Quetzaltenango fase quebrada	Qeq	7,634	3.91	Ceniza volcanica						Regular	M.O. y Erosion
14 Quiche	Qi	762	0.39	Ceniza volcanica cementada	Muy ondulado/inclinado	10 a 20	Franco arenoso, firme	20 a 30	Capa dura a 70 cm	Alto	Erosion/M.O.
15 Retalhuc	Re	15,789	8.09	Ceniza Volcanica Interperiz.	Suavemente inclinado	2 a 3	Franco arcillo limoso	25	ninguna	Leve	Fertilidad
16 Sinache	Si	6,965	3.57	Ceniza volcanica	Fuertemente ondulado	5 a 12	Franco arcilloso, friable	30	ninguna	Alto	Erosion
17 Samayac	Sm	2,248	1.15	Lodo volcanico cementado	Inclinado	4 a 10	Franco limosa, friable	20 a 30	Capa Cem. a 50 cm	Regular	Pedregosidad
18 Suchitepequez	Sx	7,392	3.79	Ceniza volcanica	Suavemente inclinado	4 a 8	Franco limoso, friable	40 a 60	Ninguna	Moderada	Erosion
19 Suelo Aluvial no diferenciado	SA	992	0.51								
20 Tiquisate franco arenoso	Ti	2,254	1.16	Ceniza vole./Aluvial	Casi plano	0 a 2	Franco arenoso fina	30 a 40	ninguna	Puja	Materia Organica
21 Totonicapan	Tp	8,291	4.25	Ceniza y roca volcanica	Suavemente ondulado	5 a 25	Franco turbosa, friable	30 a 70	Ninguna	Regular	Altitud, Erosion
Total		195,100	100								

Fuente: Clasificacion de Reconocimiento de los Suelos de Guatemala, Ministerio de Agricultura, 1959

Cuadro 3.1.4(11) Definición de Clases de Capacidad de Uso Productivo.

Land capability classification	Definition of class
Class I	Class I lands can be used continuously for intensive crop production with minimum attention other than good farming practices.
Class II	Class II lands have more limitation than Class-I soils for intensive crop production, such as moderately steep slopes (2-5%).
Class III	Class III lands have severe limitations and require more special conservation practices than Class-II soils to keep them continuously productive. They have shallow soil, steep slopes of about 6-10% or shallow water tables.
Class IV	Class IV lands have severe limitations and need a greater intensity of conservation practices for cultivated crops than Class III soils. Most of the time these soils should be in "permanent" crops, such as pastures
Class V	Class V lands are not likely to erode but have other limitations, such as boulders or wetness, which are impractical to correct and thus cannot be cultivated. They should be used for pasture, range, woodland, or wildlife habitat.
Class VI	Class VI lands are suitable for the same uses as Class V lands, but they have a greater need for good management to maintain production because of such limitations as steep slopes or shallow soils.
Class VII	Class VII lands have very severe limitations and require extreme care to protect the soil, even with low intensity use for grazing, wildlife, or timber
Class VIII	Class VIII lands have such severe limitations (steep slopes, rock lands, swamps, delicate plant cover) that they can be wisely used only for wildlife, recreation, watersheds, and esthetic appreciation.

Cuadro 3.1.4(12) Definición de Clases de Capacidad de Uso Productivo.

Name	Warm Subtropic Very humid Forests	Bosque húmedo montano bajo	Bosque muy húmedo montano bajo	Bosque muy húmedo montano	Bosque húmedo submontano/emplado
Code	bmh-©	bh-MB	bmh-MB	bmh-M	bh-st(t)
Elevation	60 a 1,600m	1,500 a 2,400m	1,800 a 3,000m		650 a 1,700m
Temperature	21 a 25C	15 a 23C	13 a 19C	11C	
Rainfall	2,100 a 4,200mm	1,000 a 1,600mm	2,000 a 3,900mm	2500mm	
Zones	Coatepeque, Flores Costa Cuca, Colomba, Génova (Quetzaltenango), South of Sololá and Pochuta, Yepocapa (Chimaltenango)	Central area of Chimaltenango, lands around lake Atiplan in Sololá, northern area of Tonicapán and center orient of Quetzaltenango	Patzún and Tecpán in Chimaltenango, north of Sololá, center of Tonicapán and center- north of Quetzaltenango	Northern area of Sololá and south of Tonicapán	Norther area of San José Poauquil, south-east and northern part of San Martín Jilotepeque in Chimaltenango
Vegetation	scheelea preussii, terminalia oblonga, enterpbium cyclocarpum, trplaris melaenodendron	quercus spp., pinus pseudostrobus, pinus montezumae	pinus pseudostrobus, cuprssus lusitanica, alnus jorullensis	abies religiosa, pinus hartwegii, pinus pseudostrobus, baccharis sp., bocconia vulcania	quercus spp., pinus oocarpa, byrsonima crassifolia, curatella americana
Comments	Recent deforestation is not intense and the erosion in this zone is small	In this zone the population is growing and the agricultural lands is expanding. Erosion problem is latent	High density of the population and growing of agriculture lands. This is the most erosion risk zone. This zone is rivers recharge zone	Area with traditional forest management, deforestation is small and the risk of erosion is small	

Cuadro 3.1.5(1) Empleo de la Población Rural Según Actividad Económica

Departamento	Agricultura %	Industria %	Construccion %	Comercio %	Servicios %	Administ. Publica %	No Determido %
1 Promedio del Pais	73.9	8.0	4.7	5.0	6.1	1.6	0.7
2 Guatemala	23.2	25.1	15.9	10.4	21.5	3.4	0.5
3 Zacapa	76.3	4.8	4.0	5.3	6.4	2.7	0.5
4 Sacatepequez	44.6	21.5	11.5	6.7	13.4	1.8	0.5
5 El Progreso	72.5	9.2	4.8	4.3	6.1	2.4	0.7
6 Retalhuleu	78.6	4.9	4.4	3.9	6.0	1.3	0.9
7 Izabal	76.6	3.3	3.2	6.4	4.8	4.6	1.1
8 Santa Rosa	84.8	2.8	4.9	2.3	4.0	0.8	0.4
9 Quetzaltenango	76.1	8.2	5.2	4.4	4.6	1.0	0.5
10 Peten	93.1	0.9	0.9	1.6	2.3	0.8	0.4
11 Escuintla	69.7	10.8	5.5	4.8	7.2	1.3	0.7
12 Jutiapa	88.3	1.5	2.8	2.1	3.1	1.9	0.3
13 Baja Verapaz	85.7	2.5	3.0	2.8	3.2	2.8	0.0
14 Chiquimula	88.7	1.5	2.8	2.4	2.9	1.5	0.2
15 Jalapa	90.4	1.4	3.0	1.3	3.1	0.7	0.1
16 Suchitepequez	76.7	7.6	3.7	4.2	5.6	1.3	0.9
17 Chimaltenango	85.1	5.0	3.7	1.6	3.3	0.8	0.5
18 San Marcos	86.3	3.0	2.7	2.9	3.3	1.0	0.8
19 Huehuetenango	85.4	3.6	3.3	2.4	3.5	1.1	0.7
20 Solola	79.4	8.0	2.9	4.3	4.1	0.9	0.4
21 Totonicapan	40.8	29.5	2.9	20.8	4.9	0.5	0.6
22 Quiche	82.2	5.4	1.8	5.2	3.4	0.9	1.1
23 Alta Verapaz	89.4	1.8	1.4	2.6	2.5	1.5	0.8

Fuente: I.a Productividad y Empleo Agrícola y No Agrícola en Área Rural; Sistema de Naciones Unidas en Guatemala, 1999, basado en Censo 1994

Cuadro 3.1.5(2) Número de Agricultores y Area Sembrada de Maíz,
Según Tamaño de las Parcelas

Region y Departamento	Total	Menores de 7 ha.		De 7a 45 ha.		Mayores de 45 has.	
		Numero Parcelas	%	Num. Parcelas	%	Num. Parcelas	%
Total República.	677,449	625,414	92.32	31,528	4.65	20,507	3.03
Región I:	16,396	15,276	93.17	796	4.85	324	1.98
Guatemala.	16,396	15,276	93.17	796	4.85	324	1.98
Región II:	66,503	60,037	90.28	3,625	5.45	2,841	4.27
Alta Verapaz.	50,892	45,623	89.65	2,887	5.67	2,382	4.68
Baja Verapaz.	15,611	14,414	92.33	738	4.73	459	2.94
Región III:	44,951	38,104	84.77	3,785	8.42	3,062	6.81
El Progreso.	8,021	6,926	86.35	600	7.48	495	6.17
Izabal.	13,003	9,936	76.41	1,585	12.19	1,482	11.40
Zacapa.	6,016	4,687	77.91	814	13.53	515	8.56
Chiquimula.	17,911	16,555	92.43	786	4.39	570	3.18
Región IV:	67,682	61,028	90.17	4,160	6.15	2,494	3.68
Santa Rosa.	16,342	14,542	88.99	576	3.52	1,224	7.49
Jalapa.	24,902	22,694	91.13	1,561	6.27	647	2.60
Juliapa.	26,438	23,792	89.99	2,023	7.65	623	2.36
Región V:	72,351	68,471	94.64	3,259	4.50	621	0.86
Sacatepéquez.	12,530	10,475	83.60	2,055	16.40	0	0.00
Chimaltenango.	50,376	50,247	99.74	0	0.00	129	0.26
Excuintla.	9,445	7,749	82.04	1,204	12.75	492	5.21
Región VI:	241,025	238,841	99.09	1,955	0.81	229	0.10
Sololá.	17,347	17,340	99.96	7	0.04	0	0.00
Totonicapán.	30,574	30,574	100.00	0	0.00	0	0.00
Quetzaltenango.	74,813	74,576	99.68	229	0.31	8	0.01
Suchitepéquez.	9,184	8,373	91.17	754	8.21	57	0.62
Retalhuleu.	10,544	9,474	89.85	926	8.78	144	1.37
San Marcos.	98,563	98,504	99.94	39	0.04	20	0.02
Región VII:	144,265	135,247	93.75	8,311	5.76	707	0.49
Huehuetenango.	81,132	73,296	90.34	7,378	9.09	458	0.56
Quiché.	63,133	61,951	98.13	933	1.48	249	0.39
Región VIII:	24,276	8,410	34.64	5,637	23.22	10,229	42.14
Petén.	24,276	8,410	34.64	5,637	23.22	10,229	42.14

Fuente: MAGA, 1998 basado en Encuestas nacionales Agropecuarias, 1,995-1,996, USPADA.

**Cuadro 3.1.5(3) Tamaño Promedio del Area
Sembrada de Maíz por Departamento**

	Area Total (ha)	Numero de Parcelas	Area Promedio (ha/parcela)	Rendimiento Promedio (kg/ha)
Total del Pais	593,123	667,476	0.89	1,631
Región I:	15,797	16,396	0.96	1,667
Guatemala.	15,797	16,396	0.96	1,667
Región II:	61,026	66,503	0.92	1,152
Alta Verapaz.	47,924	50,892	0.94	1,105
Baja Verapaz.	13,102	15,611	0.84	1,324
Región III:	57,129	44,897	1.27	1,438
El Progreso.	8,663	8,021	1.08	888
Izabal.	21,440	12,949	1.66	1,667
Zacapa.	8,427	6,016	1.40	1,371
Chiquimula.	18,598	17,911	1.04	1,461
Región IV:	91,567	67,683	1.35	1,919
Santa Rosa.	28,158	16,342	1.72	2,898
Jalapa.	31,933	24,903	1.28	1,082
Jutiapa.	31,475	26,438	1.19	1,893
Región V:	46,899	72,431	0.65	1,702
Sacatepéquez.	8,480	12,510	0.68	1,255
Chimaltenango.	18,982	50,376	0.38	1,416
Excuintla.	19,436	9,545	2.04	2,176
Región VI:	136,793	241,025	0.57	1,996
Sololá.	5,559	17,347	0.32	1,254
Totonicapán.	8,825	30,574	0.29	2,072
Quetzaltenango.	50,931	74,813	0.68	2,148
Suchitepéquez.	12,565	9,184	1.37	2,464
Retalhuleu.	16,649	10,544	1.58	2,330
San Marcos.	42,263	98,563	0.43	1,624
Región VII:	87,640	134,265	0.65	1,111
Huehuetenango.	47,054	71,132	0.66	1,034
Quiché.	40,586	63,133	0.64	1,200
Región VIII:	96,275	24,276	3.97	1,689
Petén.	96,275	24,276	3.97	1,689

Fuente: MAGA, Encuestas nacionales Agropecuarias, 1995-1996, USPADA,

Cuadro 3.1.5(4) Cambio del Area Total Sembrada de Maiz, Frijol, Trigo y Café, 1985-1998

Unidades: Area (ha), Produccion (ton)

AÑO	Maiz		Frijol		Arroz		Trigo	
	Area (ha)	Produccion (ton)	Area (ha)	Produccion (ton)	Area (ha)	Produccion (ton)	Area (ha)	Produccion (ton)
1985	659,610	1,088,400	170,240	117,560	14,560	38,440	26,390	53,490
1986	677,390	1,077,340	173,390	110,610	14,350	33,920	22,680	46,060
1987	764,260	1,216,720	172,060	86,140	23,310	58,940	24,990	50,550
1988	644,210	1,323,710	140,420	93,690	26,888	69,400	22,120	50,600
1989	600,390	1,246,780	97,090	90,610	15,120	44,900	16,030	23,000
1990	634,480	1,292,570	129,990	119,600	14,280	44,960	11,270	23,000
1991	668,710	1,248,050	144,130	113,640	16,520	48,060	11,340	23,030
1992	725,620	1,382,780	140,000	115,940	15,540	40,920	12,180	24,630
1993	699,650	1,326,020	120,890	100,890	17,430	48,220	11,270	23,000
1994	535,859	957,254	93,828	51,805	6,278	11,677	12,390	26,000
1995	593,124	967,319	134,243	71,253	8,265	25,988	11,270	23,690
Diferencia entre 1985 y 1995	-66,486 -10.1%	-121,081 -11.1%	-35,997 -21.1%	-46,307 -39.4%	-6,295 -43.2%	-12,452 -32.4%	-15,120 -57.3%	-29,800 -55.7%

Fuente: MAGA, Encuesta Nacional Agropecuaria, USFADA, 1995-96.

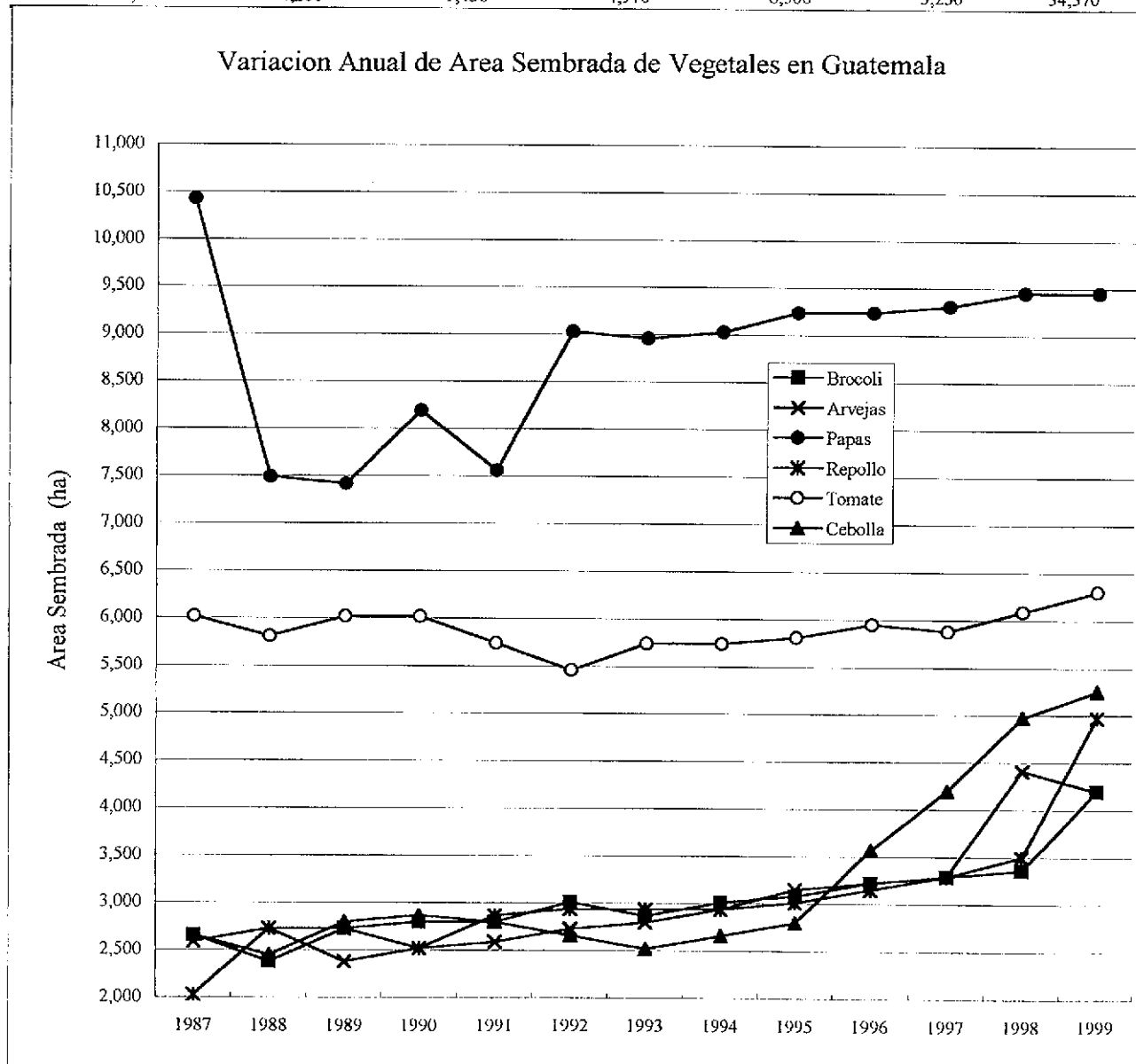
Cuadro 3.1.5(5) Área Sembrada y Producción de Maíz y Frijol en el Área de Estudio

Departamento	Maíz				Frijol Asociado con Maíz				Frijol en Monocultivo			
	Área Sembrada (ha)	Número de Parcelas	Área Promedio (ha/parcela)	Rendimiento (ton/ha)	Área Sembrada (ha)	Número de Parcelas	Área Promedio (ha/parcela)	Rendimiento (ton/ha)	Área Sembrada (ha)	Número de Parcelas	Área Promedio (ha/parcela)	Rendimiento (ton/ha)
Chimaltenango	18,980	50,380	0.38	1.42	2,464	6,300	0.39	0.123	181	1,045	0.17	0.82
Solola	5,560	17,350	0.32	1.25	1,360	5,780	0.24	0.066	0	0	0	0
Totonicapán	8,825	30,570	0.29	2.07	1,240	3,230	0.38	0.12	0	0	0	0
Quetzaltenango	50,930	74,810	0.68	2.15	1,060	1,550	0.68	0.232	0	0	0	0

Fuente: MAGA, 1998, Basado en Encuesta Nacional Agropecuaria de 1995-96, USPADAS, MAGA

Cuadro 3.1.5(6) Variación Anual del Área Sembrada de Vegetales en Guatemala.

Año	Brocoli	Arvejas	Papas	Repollo	Tomate	Cebolla	Total
	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
1987	2,660	2,590	10,430	2,030	6,020	2,660	26,390
1988	2,380	2,730	7,490	2,730	5,810	2,450	23,590
1989	2,730	2,380	7,420	2,730	6,020	2,800	24,080
1990	2,800	2,520	8,190	2,520	6,020	2,870	24,920
1991	2,800	2,590	7,560	2,870	5,740	2,800	24,360
1992	3,010	2,730	9,030	2,940	5,460	2,660	25,830
1993	2,870	2,800	8,960	2,940	5,740	2,520	25,830
1994	3,010	2,940	9,030	2,940	5,740	2,660	26,320
1995	3,080	3,150	9,240	3,010	5,810	2,800	27,090
1996	3,220	3,220	9,240	3,150	5,950	3,570	28,350
1997	3,290	3,290	9,310	3,290	5,880	4,200	29,260
1998	3,360	4,410	9,450	3,500	6,090	4,970	31,780
1999	4,200	4,200	9,450	4,970	6,300	5,250	34,370



Fuente: Asociación Gremial de Exportadores de Productos No Tradicionales (AGEXPRONI) y Banco de Guatemala

Cuadro 3.1.5(7) Area Sembrada de Vegetales por Departamentos

Unidad :Area en Manzanas

Departamento	Coliflor	Brocoli	Arvejas	Guicoy	Ejote F.	Repollo	Zanahoria	Suchimi	Tomate	Cebolla
1 Total en el Pais	2,363	19,233	13,930	2,316	1,991	3,112	3,133	1,437	6,657	759
2 Guatemala	11				55	86	7		161	55
3 Zacapa									2,857	143
4 Sacatepequez			1,197	274		286	357		200	
5 El Progreso										
6 Retalhuleu										
7 Izabal										
8 Santa Rosa										
9 Quetzaltenango										
10 Peten										
11 Escuintla										
12 Jutiapa									1,169	425
13 Baja Verapaz									466	
14 Chiquimula										
15 Jalapa										
16 Suchitepequez										
17 Chimaltenango	2,075	17,231	12,456	1,681	1,916	2,396	2,156	1,437	1,597	
18 San Marcos										
19 Huehuetenango	277	1,563	277				379		36	93
20 Solola		422		361	20	344	234			43
21 Totonicapan										
22 Quiche										
23 Alta Verapaz		17							171	

Fuente: MAGA, Encuesta Nacional Agropecuaria, 1995-96, USPADA

Cuadro 3.1.5(8) Área Sembrada de Café por Municipios del Área del Estudio.

Departamento de Chimaltenango		Departamento de Solola	
Municipios	Área de Café (ha)	Municipios	Área de Café (ha)
1 Acatenango	5,308	1 Concepción	0
2 Chimaltenango	533	2 Nahuala	3,250
3 El Tejar	0	3 Panajachel	45
4 Parramos	124	4 San Andrés Semetabaj	0
5 Patzicía	88	5 San Antonio Palopo	825
6 Patzún	63	6 San José Chacaya	0
7 San Miguel Pochuta	3,706	7 San Juan La Laguna	775
8 San Andrés Itzapa	24	8 San Lucas Tolimán	2,350
9 San José Poaquil	0	9 San Marcos La Laguna	40
10 San Juan Comalapa	0	10 San Pedro La Laguna	1,900
11 San Martín Jilotepeque	844	11 San Pablo La Laguna	225
12 San Pedro Yepocapa	3,592	12 Santa Catarina Ixtahucan	2,250
13 Santa Apolonia	0	13 Santa Catarina Palopo	0
14 Santa Cruz Balanya	0	14 Santa Cruz La Laguna	474
15 Tecpán Guatemala	0	15 Santa Clara La Laguna	185
16 Zaragoza	0	16 Santa Lucía Utatlán	0
TOTAL	14,281	17 Santa María Visitación	1,250
		18 Santiago Atitlán	2,279
		19 Solola	4
		TOTAL	15,852
Departamento de Totonicapán		Departamento de Quetzaltenango	
Municipios	Área de Café (ha)	Municipios	Área de Café (ha)
1 Momostenango	0	1 Quetzaltenango	81
2 San Andrés Xecul	0	2 Salcája	0
3 S. Bartolo Aguas Calientes	0	3 Olinstepeque	0
4 San Cristóbal Totonicapán	0	4 San Carlos Sija	0
5 San Francisco El Alto	0	5 Sibilia	0
6 Santa Lucía La Reforma	0	6 Cabricán	0
7 Santa María Chiquimulá	0	7 Almolonga	0
8 Totonicapán	0	8 Cantel	0
TOTAL	0	9 Huitán	0
		10 Zuñil	123
		11 Colomba	12,307
		12 San Francisco La Unión	0
		13 San Martín Sacatepequez	1,065
		14 Cajola	0
		15 San Miguel Sigüila	0
		16 San Juan Ostuncalco	484
		17 San Mateo	0
		18 Concepción Chiquirichapa	0
		19 El Palmar	3,459
		20 Caotepeque	2,246
		21 Genova	1,266
		22 Flores Costa Cuca	179
		23 La Esperanza	0
		24 Palestina de Los Altos	0
		TOTAL	21,209

Fuentes: 1) ANACAFE para Departamentos Chimaltenango, Totonicapán, y Quetzaltenango. 2) MAGA para Solola

Cuadro 3.1.5(9) Producción Total de Café en Guatemala y Valor de Exportaciones de Café

Año	Area cosechada (000 de ha)	Producción (000 de ton)	Rendimiento Café Oro (ton/ha)	Exportación		
				(000 de ton)	(000 US \$)	Precio Unitario (US \$/ton)
1984	232	194	1.2	126	360,700	130
1985	229	179	1.3	175	411,401	107
1986	236	194	1.2	142	522,339	167
1987	266	191	1.4	151	370,890	112
1988	266	177	1.5	141	349,569	113
1989	266	191	1.4	200	373,004	85
1990	266	194	1.4	201	323,413	73
1991	263	204	1.3	174	286,543	75
1992	263	209	1.3	195	248,955	58
1993	263	209	1.3	221	267,431	55
1994	263	211	1.2	188	317,917	77
1995	266	214	1.2	207	539,288	118
1996	269	219	1.2	238	472,433	90
1997	271	222	1.2	247	589,455	108
1998	273	228	1.2	211	586,549	127
1999	273	234	1.2	245	520,168	97

Fuente: Asociación Nacional del Café (ANACAFÉ) y Banco de Guatemala.

Cuadro 3.1.6(1) Legislación sobre Derechos de Agua

FUNDAMENTAL LAW			
ITEMS			
Name	CONSTITUTION ART. 119 LETTER C)	CONSTITUTION ART. 121 LETTER C)	CONSTITUTION ART. 128
Object	As fundamental obligations of the State, adopting the necessary measures for the conservation, development and taking advantages of the natural resources in an efficient way, with conformity to the law.	Establishes as the States rights, between others the subterranean waters, and the waters that haven't been used, according to the law.	The use of waters, lakes and rivers is at the communities service and not at any particular persons'.
Others	There is no specific law	There is no specific law	There is no specific law
ITEMS			
EXECUTION OF POLICIES FOR THE USE OF WATERS			
Name	LAW OF THE EXECUTIVE ORGANISM, DECREE NO. 114-97	MUNICIPAL CODE, DECREE NO. 58-88 HEALTH CODE, DECREE NO. 90-97	CIVIL CODE
Object	Defines the fundamental functions of the ministries and other executive organisms. MAGA is in charge of formulating and executing the policies of the sustainable use of the renewable natural resources. MEM is in charge of the study and fostering of electricity which is declared a national urgency.	Obligation to give services of drinkable water to the neighbors.	Definition of the private control. The rain water, continuous and discontinuous water that are born and flow in private properties, as well as subterranean waters obtained by artificial ways that are of private domination.
Basis	Constitution Art. 119, 128	Constitution Art. 253	Constitution Art. 39
Organism in charge of its application	Unit of Rules and Regulations, MAGA	Municipalities with the cooperation of INFOM	Judicial Power, Land Registry
Mechanism	Authorization for the use of waters	Execution and operation of projects for potable water	Land Registry or Public Deed
Others	There is no specific law for the right of the use of waters. The control and monitoring of the water quality is done by MSPAS and CONAMA.	There is not much coordination with other organisms of the State.	There is no clarity respecting the interpretation of Art. 127 of the Constitution and this Civil Code

Cuadro 3.1.6(2) Legislación sobre Medio Ambiente 1, 2 y 3 (1/3)

ITEMS	FUNDAMENTAL LAW	RELATED LAWS AND REGULATIONS, IN SPECIFIC ITEMS
NAME	Law of protection and Improvement of the environment, Decree No. 68-86	Law of protected areas, Decree No. 4-89 and its Rules Law for the Regulation of the State's territorial reserves, Decree No. 126-97 Forest Law, Decree No. 101-96 Regulations about the Study of Environmental Impact Assessment
OBJECT	Protection of the Atmosphere, Water, lithic/soil, visual, noise, diversity and biological environment.	Regulate the forest exploitation
BASIS	Constitution Art. 97	Constitution Art. 119 Environment Protection and Improvement Law, Art. 8
ORGANISM IN CHARGE OF ITS APPLICATION	CONAMA of the Presidency Republic	INAB CONAMA
MECHANISM	Application of environment impact assessment	Concession in the forests of state property. Forest management licenses. Give reforestation incentives Approval or disapproval of the studies
PUNISHMENTS	CONAMA applies	Doesn't specify, only demands the guarantee of reforestation given Fines and closing down
OTHERS	There are several specific laws of the creation of protected areas	

Cuadro 3.1.6(2) Legislación sobre Medio Ambiente 1, 2 y 3 (2/3)

FUNDAMENTAL LAW						
ITEMS	Health Code, Decree No. 90-97	Regulations for the prevention of the Atmosphere Contamination	Regulations of the Residue waters	of Regulation Municipal Solid Waste	of Regulation Hospital waste	of Regulation for the Prevention and Promotion of Health and Environment
OBJECT	Formulate policies of preventive health and the hygienic preservation of the environment					
BASIS	Constitution Art. 93, 94, 95 and 96.			Health Code, Chap. IV, Section IV		Health Code Chapter V
ORGANISM IN CHARGE OF ITS APPLICATION	IN MSPAS in coordination with CONAMA and municipalities			MSPAS, CONAMA and Municipalities		MSPAS, CONAMA and municipalities
MECHANISM	Regulations and Sanitary rules					
PUNISHMENTS						
OTHERS		In revision	In revision	In revision	In revision	In revision

Cuadro 3.1.6(2) Legislación sobre Medio Ambiente 1, 2 y 3 (3/3).

PESTICIDE CONTROL					
ITEMS	Population's health	Control of establishments	Pesticide law	Registration of home use insecticides and repellents	forbiddances
NAME					
OBJECT	The MSPAS, formulates and supervises the actions for the prevention and control of acute and chronic poisoning pesticides and chemical substances.	Control of in seams for agriculture and registration, supervision and control of establishments that import, produce, sell, according to the Health Code	Regulate the control for the use and handling of pesticides prohibits in five years DDT.		Forbid DDT, use of 2,4-D ester, Aldrin, dieldrin, endrin, canfenchloride (Toxafeno), chloride, clordimeform, etil parathion, heptachlor, BHC (hexaclorobenceno) and linden (HCH).
BASIS	Health Code. Decree 90-97, Art. 67	Law of Vegetable and Animal Sanitation, Decree 36-98	Law for the regulation of the importation, storage, transportation, selling and use of pesticides Decree 43-74		Decree 43-74, Government Agree 8.6.82, Ministerial Agree MAGA 3-88.
ORGANISM IN CHARGE OF ITS APPLICATION MECHANISM	MSPAS	MAGA, UNR	MAGA and MSPAS	MSPAP	
PUNISHMENTS			Regulation about the registration, marketing use and control of agriculture pesticides Government Agree no. 377-90		

Cuadro 4.2.1(1) Uso de Suelos y Clasificación de Pobreza basados en el Criterio del FIS en el Departamento de Chimaltenango

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty:*	Evaluation for Poverty	Land Use	Evaluation for Land Use	Limitation of Uptake of Water**	Evaluation for Uptake Water	Overall Evaluation
1	Chimaltenango	12.83	d	No	Maize, Frijol, Vegetables	Yes	No	Yes	No
2	San Jose Poaquil	12.74	d	No	Maize, Frijol, Vegetables, Coffee	Yes	No	Yes	No
3	San Martín Jitotepeque	16.74	c	Yes	Coffee, Maize, Frejol	No	No	Yes	No
4	Cornatapa	19.8	c	Yes	Maize, Frijol, Vegetables	Yes	Yes	No	No
5	Santa Apolonia	13.65	d	No	Maize, Frijol, Vegetables	Yes	No	Yes	No
6	Tecpan Guatemala	12.8	d	No	Maize, Frijol, Vegetables	Yes	Partially		No
7	Patzún	17.95	c	Yes	Maize, Frijol, Vegetables	Yes	Partially		Yes
8	Pochuta	16.91	c	Yes	Coffee, Maize, Frejol	No	No	Yes	No
9	Palzucia	29.59	b	No	Maize, Frijol, Vegetables	Yes	Yes	No	No
10	Santa Cruz de Balanya	21.75	b	No	Maize, Frijol, Vegetables	Yes	Yes	No	No
11	Acatenango	16.66	c	Yes	Coffee, Maize, Frejol	No	No	Yes	No
12	Yepocapa	14.15	d	No	Coffee, Maize, Frejol	No	No	Yes	No
13	San Andres Itzapa	20.46	b	No	Maize, Frijol, vegetables	Yes	Partially		No
14	Parramos	26.73	b	No	Maize, Frijol, Vegetables	Yes	No	Yes	No
15	Zaragoza	17.52	c	Yes	Maize, Frijol, Vegetables	Yes	Yes	No	No
16	El Tejar	10.97	d	No	Maize, Frijol, Vegetables	Yes	No	Yes	No

*: Poverty Classification

a: Extreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty, 15-19.99

d: Relative poverty, 10-14.99

e: Low poverty, below 10

** : Chimaltenango province plays an important role in the provision of drinking water to Guatemala city.

Especially water from the basin of the Pixcaya river is the most important. It is considered that adjustment and coordination of water use for drinking water in Guatemala city and agricultural water use in Chimaltenango province are very difficult and municipalities where cover the Pixcaya river basin should be excluded for selection of model microcuencia.

Cuadro 4.2.1(2) Lista de Micro-cuencas en el Municipio de Patzún

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Los Chocoyos	C-1	El Llano	4.8	Los Pinos, El Llano, Pacaman
	C-2	Los Pinos	6	Cruz de Santiago
	C-3	Xeoj	3.7	Xeoj
	C-4	Los Idolos	8.7	Patzun, Saquiya, Mocolicxot Alto, Mocolicxot Bajo
	C-5	Chuiquel	5.3	Chisal, Chuiquel, Mocolicxot Alto, Mocolicxot Bajo
	C-6	Sabalpop	1.2	Sabalpop
	C-8	Pacacquix Bajo	4	Chichoy Alto Paraíso
	C-8	Pacacquix Alto	9.3	Xepatan, Finca Patoquer, Chuchuca Alto, Chuchuca Bajo, Finca Chuiquel, Xeatzan Alto, Xeatzan Bajo
Madre Vieja	M-1	Chichoy	2.7	Chichoy, Chichoy Bajo
	M-2	Paxula	3.1	Chichoy Alto Paraíso, Chipiacul, Panimaquim
	M-3	Panibaj	1.6	Panibaj, Chipiacul, Panimaquim
	M-4	Panimaquim	5.2	Panimaquim, Chinimachicaj, Chuaquenum
	M-5	Chinimachicaj	8.1	Chinimachicaj, Chuaquenum
San Jorge	S-1	Xejolon	8.4	Xejolon, Popobaj
	S-2	La Vega	14	Finca San Rafael la Vega, Finca San Jose Panimache, Finca San Antonio Panimaquim
	S-3	Chicap	4.6	Finca Chicap
Nican	N-1	Xetzisi	8.4	Xetzisi, Xepatan
	N-2	Los Encuentros	2.1	Los Encuentros
	N-3		9.2	
Xaya	X-1	Xaya Alto	8.1	Finca San Jorge
	X-2	Villa Linda	8.3	Villa Linda, Nimaya, Pacoc, Chuchupate, Finca Las
	X-3	La Vega	3.6	La Vega
	X-4	Cojobal	2.5	Finca La Sierra, Cojobal
	X-5	Las Canoas	4.2	Las Camelias, Los Encuentritos, Finca San Lorenzo
	X-6	La Trompeta	7.2	Finca San Antonio las Odilias, La Trompeta, Trompetilla, La Cienaga, San Lorenzo, Joya de la Ramona
	X-7	Las Flores	4	El Sitio, San Isidro, Finca San Rafael el Sitio
	X-8	Zaren	3.9	El Garabato, Finca la Estancia
	X-9	Pachumulin	2.7	Pachumulin,
	X-10	La Pila	1.5	La Pila
	X-11	Pena Colorada	3.8	Pachut, La Pila

Cuadro 4.2.1(3) Evaluación de Comunidades Seleccionadas en el Departamento de Chimaltenango

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km ²)		Land Use		Access (length from main road)	Legal Use of Water Source	Overlapped by Another Projects	Social Problems		Overlap Another Municipality	Intention for Cooperation for the Survey by head of Municipality		Intention for Cooperation for the Survey by heads of Adles or Cacero	Overall Assessment	
				(no)	Assessme nt	(km2)	Assess ment	Kind of crops	Assess ment				Yes of	Assess or no ment		Yes or no ment	Assess or no ment			Assess or no ment
Patzún	1 Caserio La Trompetilla	19.35	No	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	2 Caserio La Garabato	18.95	No	62(10)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	3 Caserio Paehat	18.70	No	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	4 Caserio Popabaj	16.63	No	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	5 Caserio Chiscaman, Villa Patzún	21.00	No	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	6 Caserio Xelz'it, Xepitan	20.61	Yes	66	8.4	Yes	basic crops + vegetables	Yes	7.4	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	
	7 Aldes Nantzan Bajo	14.76	Yes	212	9.3	Yes	basic crops + vegetables	Yes	8.2	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	
	8 Caserio Pachamulih	14.47	No	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	9 Aldes Pantabaj, Pambaj	14.05	Yes	58	1.6	No	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	10 Aldes San Jose Xepitan	14.02	Yes	169	9.3	Yes	basic crops + vegetables	Yes	5.4	Yes	Yes	No	Yes	No	No	Yes	-	-	Yes	
	11 Caserio Chiquenun	13.85	No	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	12 Caserio Mecolixot Bajo	13.80	No	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
	13 Aldes Chelob	13.64	Yes	70	2.7	No	-	-	-	-	-	-	-	-	-	-	-	-	-	No

*. not identify this location

Cuadro 4.2.2(1) Uso de Suelos y Clasificación de Pobreza basados en el Criterio del FIS en el Departamento de Sololá

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty*	Evaluation for Poverty	Land Use	Evaluation for Land Use	Overall Evaluation
1	Solola	9.67	e	No	Vegetables, Potato, Maize	No	No
2	San Jose Chacaya	12.12	d	No	Potato, Vegetables, Maize	No	No
3	Santa Maria Visitacion	9.07	e	No	Coffee, Potato, Maize	Yes	No
4	Santa Lucia Utatlan	8.09	e	No	Potato, Vegetables, Maize	No	No
5	Nahuata	11.05	d	No	Coffee, Maize, Vegetables, Potato	Yes	No
6	Santa Catarina Ixtahuacan	12.01	d	No	Coffee, Banana, Maize	Yes	No
7	Santa Clara La Laguna	24.76	b	No	Coffee, Maize	Yes	No
8	Concepcion	45.74	a	No	Vegetables, Potato, Maize	No	No
9	San Andres Semetabaj	14.07	d	No	Maize, Vegetables, Flowers	No	No
10	Panajachel	11.25	d	No	Maize, Vegetables	No	No
11	Santa Catarina Palopo	29.65	b	No	Maize	No	No
12	San Antonio Palopo	31.08	a	No	Coffee, Vegetables	Yes	No
13	San Lucas Tomliman	26.75	b	No	Coffee, Maize, Frejol	Yes	No
14	Santa Cruz La Laguna	23.31	b	No	Coffee, Vegetable, Maize	Yes	No
15	San Pablo La Laguna	39.45	a	No	Coffee, Maize, Vegetables	Yes	No
16	San Marcos La Laguna	36.62	a	No	Maize, Vegetables	Yes	No
17	San Juan La Laguna	15.16	c	Yes	Coffee, Maize, Vegetables	Yes	Yes
18	San Pedro La Laguna	13.4	d	No	Coffee, Maize, Vegetables	Yes	No
19	Santiago Atitlan	41.9	a	No	Coffee, Maize, Frejol	Yes	No

*: Poverty Classification

a: Extreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty, 15-19.99

d: Relative poverty, 10- 14.99

e: Low poverty, below 10

Cuadro 4.2.2(2) Lista de Micro-cuencas en el Municipio de San Juan de la Laguna

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Quebrada Seca	Q-1	San Juan La Laguna	9.9	Pueblo San Juan La Laguna
Yatza	Y-1	Paquib/Palestina	2.8	Part of Paqub and Palestina
	Y-2	Palestina	3.2	Palestina
	Y-3	Panyevar	5.7	Aldea Panyevar
	Y-4	Pasajquim	5.8	Pasajquim
	Y-5	right of Yatza	3.2	-

Cuadro 4.2.2(3) Evaluación de Comunidades Seleccionadas en el Departamento de Sololá

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km ²)		Land Use		Access (length from main road)	Legal Title of Water Source	Overlapped by Another Projects		Social Problems		Overlapped Another Municipality		Intention for Cooperation for the Survey by head of Municipality		Intention for Cooperation for the Survey by heads of Adles or Caserio		Overall Assessment
		(no)	Assessment	(no)	Assessment	Kind of crops	Assessment	Assessment	Yes			or	Assessment	Yes	or	Assessment	Yes	or	Assessment	Yes	or	
1 San Juan La Laguna	1 Pueblo San Juan La Laguna	19.01	No	585	No	5.8	Yes			6												No
		14.03	Yes	206	Yes	5.8	Yes	Coffee (Basic crop)	Yes													

Cuadro 4.2.3(1) Uso de Suelos y Clasificación de Pobreza basados en el Criterio del FIS en el Departamento de Totonicapán

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty*	Evaluation for Poverty	Land Use (%) and Rank**	Overall Evaluation
1	Totonicapán	7.6	e	No	54% (4)	No
2	San Cristobal Totonicapán	16.15	c	Yes	27% (7)	No
3	San Francisco El Alto	14.35	d	No	28% (6)	No
4	San Andres Xecul	15.81	c	Yes	15% (8)	No
5	Momostenango	15.24	c	Yes	45% (5)	No
6	Santa Maria Chiquimula	18.02	c	Yes	61% (3)	Yes
7	Santa Lucia La Reforma	37.45	a	No	66% (2)	No
8	San Bartolo	13.11	d	No	70% (1)	No

*: Poverty Classification

a: Extreme poverty, above 30

b: Severe poverty, 20-29.99

c: Regular poverty, 15-19.99

d: Relative poverty, 10- 14.99

e: Low poverty, below 10

** : Rate of coverage by forests and ranks

Cuadro 4.2.3(2) Lista de Micro-cuencas en el Municipio de Santa María de Chiquimula (1/2)

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Alajsimier	A-1	No	7.1	No
Pacaranat*	P-1	Chiaj	9.9	Chiaj
	P-2	No	1.9	No
	P-3	Chicastro	6.9	Chicastro
	P-4	Patzam	4.2	Patzam Chipu
Tzancorral	T-1	Chuijom	5.2	Chuijom
Sajcoclaj	S-1	No	2.7	No
	S-2	Pamesabal	1.9	Pamesabal
Pachac	PC-1		7.7	No
	PC-2	Racana	7.3	Xocol Racana
	PC-3	Camaja	4.9	Camaja Xesuc Cipo
	PC-4	Chicaxul	3.9	Chicaxul Chuicabaj Chuecutinez
	PC-5	Chuiaj	8.1	Chuiaj Part of Santa Maria Chiquimula
	PC-6	El Rancho	5.9	Pamaxcolabaj Chuinatux Patzichaj Chuitacaj
	PC-7	Chuisena	4.5	Chuisena Chuisela Xeabaj
	PC-8	Xesana	9.1	Xesana Sanjuyup Chimisiya
	PC-9	Pachum	10.5	Pachum
	PC-10	Chuitacabaj	5.9	Chuibacabaj Chuanovez

Cuadro 4.2.3(2) Lista de Micro-cuencas en el Municipio de Santa María de Chiquimula (2/2)

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km ²)	Name of aldeas or caserios
Sacmequena	PC-SAC-1	Chuichipop	1.4	Chuichipop
	PC-SAC-2	Ximulul	5.7	Ximulul Xesiquel Chuichac
	PC-SAC-3	Sacxoc	5.5	Sacxoc
	PC-SAC-3	Pugertinamint	2.8	Pugertinamint
	PC-SAC-4	Chuisiguan	1.9	Chuisiguan
	PC-SAC-5	Chuijoj	1.9	Chuijoj
	PC-SAC-6	Xebe	8.5	Tzansiguan Xetulup Xebe Tuluxan Chilux Patulup
	PC-SAC-7		11.7	Chinibajuyup Xotepe Xecachelaj Carorillo Chileon Tzununux
	PC-SAC-8		10.9	No
	Sachaj	SA-1	Choacorral	13.1
SA-2		Xejuyup	0.8	Xejuyup
SA-3		Chimejia	6	Chimejia
SA-4		Paxan	7.3	Paxan
Tzununa	TZN-1	Tzununa	5.3	Tzununa Xecaquix
	TZN-2	Pacomontux	4.2	Pacomontux
	TZN-3	Casa Blanca	7.1	Xecaja Xolabix Casa Blanca
	TZN-4	Chuachituj	7	Chuachituj
	TZN-5	Chuiabaj	2.9	Chuiabaj
	TZN-6	Pachoc	7.8	Tzansibiche Pachoc
	TZN-7	Chuijox	9.1	Chuijox Panabesac Papuerta Pachiyut Las Trojadas
	TZN-8	Panimajiox	6.6	Panimajiox
	TZN-9	Chomazan	6.6	Chomazan Aprisco chuipachec

Cuadro 4.2.3(3) Evaluación de Comunidades Seleccionadas en el Departamento de Totonicapán

Name of Municipality	Name of Community	Indicators for Poverty		Number of Households in Community		Area of River Basin (km ²)		Land Use		Access (length from main road)	Legal Uplake of Water Source	Overrapped by Another Projects	Social Problems		Overrapped Another Municipality	Intention for Cooperation for the Survey by head of Municipality	Intention for Cooperation for the Survey by heads of Adles or Caserío	Overall Assessment
		(no)	Assess ment	(km ²)	Assess ment	communal forest	Assessment (km)	Assess ment	Assess ment				Yes or No	Assess or ment				
Santa María Chiquimula	1 Caserío Chuitubaj	19.69	32 No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2 Caserío Chijoj	18.69	61 Yes	1.9	No	-	-	-	-	-	-	-	-	-	-	-	-	-
	3 Caserío Chuq'op o Chijoj	18.51	57 Yes	1.4	No	-	-	-	-	-	-	-	-	-	-	-	-	-
	4 Caserío Chipu	18.00	50 Yes	4.2	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-
	5 Caserío Xejayab	17.59	83 Yes	0.8	No	-	-	-	-	-	-	-	-	-	-	-	-	-
	6 Caserío Chuisiguan	17.20	198 Yes	2.8	No	-	-	-	-	-	-	-	-	-	-	-	-	-
	7 Aldea Xecaja	16.54	39 No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	8 Caserío Paetum	16.32	68 Yes	10.5	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-
	9 Caserío Cheaxul	16.19	63 Yes	3.9	Yes	-	-	-	-	-	-	-	-	-	-	-	-	-
	10 Caserío Paxan	15.73	62(25) No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11 Caserío Pantesibal	15.63	40 No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12 Caserío Chuischoj	15.45	44 No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13 Caserío Chuitubaj	15.00	30 No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Cuadro 4.2.4(1) Uso de Suelos y Clasificación de Pobreza basados en el Criterio del FIS en el Departamento de Quetzaltenango

No.	Name of Municipality	Indicator of Poverty	Classification of Poverty*	Evaluation for Poverty	Land Use	Evaluation for Land Use	Overall Evaluation
1	Quetzaltenango	11.13	d	No	Maize, Vegetable, Potato	No	No
2	Salcaja	12.05	d	No	Maize, Fruits	No	No
3	Olimpeque	12.62	d	No	Maize	No	No
4	San Carlos Sija	7.87	c	No	Maize	No	No
5	Sibilia	4.92	c	No	Maize	No	No
6	Cabrican	9.64	c	No	Maize, Fruits	No	No
7	Cajola	42.16	a	No	Maize, Fruits	No	No
8	San Miguel Sigulia	24.57	b	No	Maize	No	No
9	Ostuncalco	14.34	d	No	Maize, Fruits, Potato	No	No
10	San Mateo	22.63	b	No	Maize, Potato, Fruits	No	No
11	Concepcion Chiquirichapa	12.5	d	No	Maize, Potato	No	No
12	San Martin Sacatepequez	14.26	d	No	Potato, Maize, vegetables	No	No
13	Almolonga	12.06	d	No	Vegetables, Maize	No	No
14	Cantel	8.75	c	No	Maize, Fruits	No	No
15	Huitan	11.02	d	No	Maize, Fruits	No	No
16	Zumil	12.81	d	No	Maize, Vegetables	No	No
17	Colomba	24.83	b	No	Coffee, Maize	No	No
18	San Francisco La Union	16.99	c	Yes	Maize	Yes	No**
19	El Palmar	22.58	b	No	Coffee, Maize	No	No
20	Coatepeque	15.66	d	No	Pasture, Sugar, Maize, Rice, Coffee, Rubber	No	No
21	Genova	30.39	a	No	Pasture, Maize, Coffee, Rice, Oil palm, Rubber	No	No
22	Flores Costa Cuca	19.66	c	Yes	Coffee, Maize	No	No
23	La Esperanza	10.49	d	No	Maize, Fruits	No	No
24	Patetina De Los Altos	15.27	c	Yes	Maize	Yes	Yes

** : An average of poverty in San Francisco La Union municipality indicates "c" and Maize in land use, however, there are no communities having "c" in poverty as shown below. Then this municipality was evaluated as no and eliminated.

Name of Community	Indicator of Poverty	Classification
Pueblo San Francisco la Union	60.99	a
Pala	9.26	c
Xeaj	8.42	c
Tz'anjuyu	7.72	c
Chuestancia	6.48	c

- *: Poverty Classification
a: Extreme poverty, above 30
b: Severe poverty, 20-29.99
c: Regular poverty, 15-19.99
d: Relative poverty, 10- 14.99
e: Low poverty, below 10

Cuadro 4.2.4(2) Lista de Micro-cuencas en el Municipio de Palestina de los Altos.

Name of River Basin	Number	Name of Microcuenca	Area of Microcuenca (km2)	Name of aldeas or caserios
Turbala	T-1	Tuimuj	2.6	Tuimuj
	T-2	El Carmen	2.3	El Carmen El Carmen-2 Altamira
	T-3	San-Ishidro	3.2	San-Ishidro Cabrera Loz Perez
	T-4	El Socorro	1.3	El Socorro Los Marroquiness Buena Vista Roble Grande
	T-5	Los Gonzalez	2.5	Los Gonzalez Pueblo Palestina de Los Alto
	T-6	El Desierto	9.3	El Desierto Los Laureles
Palana	P-1	El Eden	2.7	El Eden Sinai
	P-2	Mira Pena	3.3	Mira Pena
Patzacan	PZ-1	Las Delicias	2.1	Las Delicias Buenos Aires
Ixchol	IX-1	Toj Guabil	4.1	Toj Guabil Toj chol Asuncion

Cuadro 4.2.4(3) Evaluación de Comunidades Seleccionadas en el Departamento de Quetzaltenango

Name of Municipality	Name of Community	Indicators for Poverty	Number of Households in Community		Area of River Basin (km ²)		Land Use		Access (length from main road)		Legal Uplake of Water Source		Overrapped by Another Projects		Social Problems		Overrapped Another Municipality		Intention for Cooperation for the Survey by head of Municipality		Intention for Cooperation for the Survey by heads of Adten or Caserío		Overall Assessment
			(no)	Assessment	(km2)	Assessment	Kind of croiment	Assessment (km)	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	
1 Palestina De Los Altos	1 Caserío Tojguahil	19.90	Yes	Yes	Yes	Yes	basic crops	less 1	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	No	
	2 Caserío Los Marroquines	19.52	Yes	Yes	1.5	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	3 Caserío El Socorro	15.46	Yes	Yes	"	No	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No	
	4 Aldea El Carmen	16.58	No	No	"	Yes	basic crops	less 1	Yes	Yes	No	Yes	no	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	
	5 Caserío Los Cabrera o Molinos Los Cab	17.66	Yes	"	3.2	Yes	basic crops	less 1	Yes	Yes	No	Yes	no	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	6 Caserío Sautsídoro o Los Díaz	15.59	"	"	"	Yes	basic crops	less 1	Yes	Yes	No	Yes	no	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	7 Caserío Los Perez	18.75	"	"	"	Yes	basic crops	less 1	Yes	Yes	No	Yes	no	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Cuadro 4.3.1(1) Condición Actual de la Micro-cuenca (Chimaltenango)

Item	Present Condition
1. General Information	
(1) Province	Chimaltenango
(2) Municipality	Patzun
(3) Community (Aldea/Caserio)	Aldea Xcatzan Bajo
(4) Location	26 km to the west of Chimaltenango
(5) Area (km ²)	9.3 km ²
(6) Population*	1,100 persons
(7) Population density*	118.3 persons / km ²
(8) Number of Household*	212 households
(9) FIS Indicator**	Level C (14.76)
2. Natural Condition	
(1) Climate	Average rainfall 1,000mm, Temperature varies -3 ~ 36C°
(2) Topography (Elevation, Slope)	Elev. 2,000~2,300 m, Undulated to almost flat, Slope 1~10%
(3) Geological condition	Tv, Qp (Tertiary volcanic rocks and Pleistonic volcanic rocks)
(4) Soil	Tecpan (TC) and Comancha (Cm); deep (50 cm), Slightly Acidic pH=6.1
(5) Water Resource	River: Pacacquix (3rd tributary of River Madre Vieja) Discharge is estimated at less than 1 lit/sec. Spring: There is a spring with discharge of approx. 20 lit/sec in Xeatzan. Several springs with less than 1 lit/sec also exist in the cuenca.
3. Socio-economic Condition	
(1) Average household size*	5.2 persons / household
(2) Ethnicity	Indigena: 99.7%, Non-indigena: 0.3%
(3) Religion	Catholic
(4) Major Language	Spanish, Kaqchikel
(5) Literacy rate*	57.90%
(6) Major Occupation of residents	Farmer
4. Land & Agriculture	
(1) Land Use	Annual crop, Perennial Crop, Forest
(2) Major crops	Vegetables, Black Berry, Maize
(3) Average Farm Size	0.2 ha (to be confirmed)
(4) Cropping pattern	1) Rainfed: May~July; Aug.~Nov., 2) Irrigated: year round
(5) Irrigation condition	Sprinkler irrigation is partly applied with utilizing portable water.
5. Social Services & Infrastructure	
(1) Infrastructure	
1) Road	11.9 km of unpaved road from Patzun to Xeatzan Bajo
2) Access to portable water*	128 households
3) Electrification*	184 households
(2) Health	
1) Common diseases	To be confirmed
2) Hospital/Health care center	1 health post
3) Health Personnel	1 doctor, 1 auxiliary nurse, 2 midwives
6. Environmental situation	
(1) Forest condition	Not observed.
(2) Soil erosion	Not observed.
(3) Living Environment	Not observed.

*: Data are taken from the INE census 1994. They are subjected to the revision in the further survey.

** : FIS, 1994

Cuadro 4.3.1(2) Situación Observada en Micro-cuenca Modelo de Chimaltenango

1. Socio-economy

- ✓ Most of the residents in the community are full-time farmers and produce vegetables and basic grains.
- ✓ Although some of farmers operate irrigated vegetable production, farm size is still small (estimated at 0.2 ha) and irrigation itself is not sufficient.

2. Agriculture

- ✓ Irrigation on vegetables and black berry production was observed. However, because of limited water supply, farmers use portable water supply for the irrigation. Based on the interview with the farmers, most of them are strongly interested in the irrigated vegetable/black berry production if the water available.
- ✓ A spring with discharge of about 20lit/sec exists in the community. Out of this, about 8 lit/sec is used for portable water supply. The ownership of this spring belongs to the village and discharged water is not fully utilized at present. The spring could be a potential water source for irrigation.

3. Infrastructure

- ✓ Access road to Patzun is unpaved and in relatively poor condition. (approx. 11.9km)
- ✓ The number of households with access to the portable water has been increased to about 230 households under the project implemented by CARE.
- ✓ There is an open-air pick-up point for vegetable marketing. Farmers usually bring their produces to this pick-up point and sell to the middle-men.

4. Environment

- ✓ Forest in the micro-basin is in relatively good condition and no specific issue relating to forest is observed so far. However, since both banks of Pacacquix stream are relatively steep, attention has to be paid to avoid soil erosion.

5. Health

- ✓ There is a health post with an auxiliary nurse and a doctor. However, stock of medicine is not sufficient and there is no pharmacy in the community.
- ✓ For complicated cases that cannot be attended at the health post, patients are referred to the health center or hospital in central Patzun.

6. Willingness for Development

- ✓ Both municipality mayor and heads of the community are willing to have development programs in the community.
- ✓ Farmers are strongly interested in irrigated vegetable production.

7. Others

- ✓ Since this micro-basin is geographically located near Panajacel, which is one of the famous tourist town, it has location advantage in terms of marketing of produces. Besides, disseminating effect as a model basin would be expected.

Cuadro 4.3.2(1) Condición Actual de la Micro-cuenca (Sololá)

Item	Present Condition
1. General Information	
(1) Province	Solola
(2) Municipality	San Juan La Laguna
(3) Community (Aldea/Caserio)	Aldea Panyevvar
(4) Location	17 km to the south-west of Solola
(5) Area (km ²)	5.8 km ²
(6) Population*	1,184 persons
(7) Population density*	204 person /km ²
(8) Number of Household*	206 households
(9) FIS Indicator**	Aldea Panyevvar: level C (14.03)
2. Natural Condition	
(1) Climate	Rain fall: 1500 mm ~ 2000 mm, Temperature 18 ~ 24 C°
(2) Topography (Elevation, Slope)	Elev. 1,600~2,600 m, Steep slopes 15-60%; strongly undulated, high risk of erosion
(3) Geological condition	Tv. Terciary volcanic rocks
(4) Soil	Soil series Chiqa (chi) and suchitepequez (sx); formed from volcanic ash, loamy and silty loam texture, slightly acidic.
(5) Water Resource	River: Rio Yatza and its tributaries Discharge is roughly estimated at 1~5 lit/sec. Spring: A spring exist at the down stream of tributaries of Rio Yatza Discharge is roughly estimated at 1~5 lit/sec. Also springs exist at the skirt of Paquisis in this Aldea Panyevvar.
3. Socio-economy	
(1) Average household size*	6.3 persons/houschold
(2) Ethnicity	Indigena: 99.7%, Non-indigena: 0.3%
(3) Religion	Catholic
(4) Major Language	K'iche', Tz'utujil
(5) Literacy rate*	52.60%
(6) Major Occupation of residents	Farmer
4. Land & Agriculture	
(1) Land Use	Perennial Crop (Coffee), Annual Crop (Maize, Potato), Forest
(2) Major crops	Coffee, Maize, Potato
(3) Average Farm Size	0.1 ~ 0.15 ha (2~3 cuerda)
(4) Cropping pattern	Coffee, Maize: April ~ November
(5) Irrigation condition	Rainfed only
5. Social Service & Infrastructure	
(1) Infrastructure	
1) Road	6 km of unpaved road from the nearest town (Santa Clara La Laguna)
2) Access to portable water*	204 households
3) Electlificaion*	1 houschold
(2) Health	
1) Common diseases	ARI, Diarrheal Diseases, Malnutrition
2) Hospital/Health care center	A building for health post was constructed but not used so far.
3) Health Personnel	13 health promoters, 1 facilitator, 2 midwives
6. Environmental situation	
(1) Forest condition	Basically covered by coffee and forest trees. Partly cut for agricultural production.
(2) Soil erosion	Potential erosion area is observed in the left bank of Rio Paquiayacheu.
(3) Living Environment	Domestic waste water is drained without any treatment.

*: Data are taken from the INE census 1994. They are subjected to the revision in the further survey.

** : FIS, 1994

1. Socio-economy

- ✓ Most of the farmers plant coffee and some produce annual crops such as maize, frijol, and potatoes.
- ✓ Farm size per household is too small to cover their family expense. (0.1~0.15 ha/household)
- ✓ Because of heavy work during coffee harvesting season, young generation prefer to work outside of the community such as Guatemala City, Solola, and Quetzaltenango. Once they go out, usually they are not willing to return to the community.
- ✓ Farmers do not have sufficient capital to invest for the improvement of agricultural production.
- ✓ Those who live in highly elevated area cannot plant coffee because of climate. Therefore, income difference would be expected between those in high area and those in low area.

2. Agriculture

- ✓ Farmers have to carry 60~80kg bag of harvested coffee on the steep slope during harvesting season. Because of heavy load, people, especially younger generation, tends to avoid harvesting work.
- ✓ Facility for primary processing of coffee is not available and, therefore, selling price of coffee is low.
- ✓ Because of high elevation of coffee area (1,800~1,900 m), climate is relatively severe for coffee production.
- ✓ In coffee production, the leave disease is commonly observed and it becomes a hindrance for coffee production.
- ✓ Fungus disease is observed in potato production.

3. Infrastructure

- ✓ Access road to the nearest town (Santa Clara La Laguna) is in poor condition and it becomes difficult to access during rainy season.
- ✓ Number of house with electricity has increased compared to the situation in 1994 (census year). Actual number should be confirmed in the later survey.
- ✓ Number of house with access to the water has increased compared to the situation in 1994 (census year). Actual number should be confirmed in the later survey.
- ✓ There is a spring at the left bank of the tributaries of Rio Yatza. Its discharge amount is roughly estimated at 1~5 lit/sec. The community considers this spring as another source for portable water supply. Also there are another five springs at the skirt of Mt.Paquisis, which are expected to be available for portable water and irrigation use.

4. Environment

- ✓ Forest clearing is observed at the left bank of the tributaries of Rio Yatza. It is cleared for the production of annual crops such as maize and potatoes. Because of its strongly steep slope, high risk of soil erosion is expected.
- ✓ Domestic waste water is drained to road and stream after their use without any treatment.

Contamination of water and soil is expected.

5. Health

- ✓ Although health post is installed, it is not well-functioning. In case of emergency, patients have to be carried to the hospital in Solola. Besides, because of non-availability of ambulance, transportation cost has to be paid by the patient's family.
- ✓ Doctor is not permanently stationed. Although a health facilitator provides first-aid care, the service hour is limited (2:00~6:00pm, Monday ~ Friday).
- ✓ People have to endure heavy work load such as coffee harvesting while their nutrition condition is not sufficient.

6. Willingness for Development

- ✓ Both municipality mayor and heads of the community are willing to have development programs in the community.
- ✓ Heads of the community are especially interested in expansion of coffee production area, improvement of coffee production and marketing, because they consider that coffee is most profitable among the crops.

Cuadro 4.3.3(1) Condición Actual de la Micro-cuenca (Totonicapán).

Item	Present Condition
1. General Information	
(1) Province	Totonicapán
(2) Municipality	Santa María Chiquimula
(3) Community (Aldca/Caserio)	Caserio Pachum (in Aldea Xesana)
(4) Location	10 km to the north of Totonicapán
(5) Area (km ²)	10.5 km ²
(6) Population*	355 persons
(7) Population density*	33.8 persons / km ²
(8) Number of Household*	68 households
(9) FIS Indicator**	Level C (16.32)
2. Natural Condition	
(1) Climate	Average rainfall: 2,000 mm, Temperature 12 ~ 18 C°
(2) Topography (Elevation, Slope)	Elev. 2,400~2,900 m; Undulated to steeply dissected; slope 5~25%; High risk of erosion
(3) Geological condition	Tv, Tertiary volcanic rocks
(4) Soil	Totonicapán; formed by volcanic ash; cemented in some areas, loamy; deep
(5) Water Resource	River: Rio Pachum The discharge is roughly estimated at more than 10 lit/sec. Other: Because of dense forest, it is expected that spring and underground with sufficient discharge are available.
3. Socio-economic Condition	
(1) Average household size*	5.2 persons / households
(2) Ethnicity	Indigena: 98.5%, Non-indigena: 1.5%
(3) Religion	Catholic
(4) Major Language	Spanish, K'iche'
(5) Literacy rate*	19.70%
(6) Major Occupation of residents	Farmer
4. Land & Agriculture	
(1) Land Use	Forest, Annual Crop, Perennial Crop
(2) Major crops	Maize, Fruit trees
(3) Average Farm Size	0.1 ha
(4) Cropping pattern	Maize: April~November
(5) Irrigation condition	None; all rainfed
5. Social Services & Infrastructure	
(1) Infrastructure	
1) Road	4.6 km of unpaved road from the main road (Sn. Francisco el Alto - Sta. Maria Chiquimula). The road condition is poor and muddy.
2) Access to portable water*	54 households
3) Electrification*	0 household
(2) Health	
1) Common diseases	ARI, Intestinal Parasite, Diarrheal diseases, malnutrition, skin diseases
2) Hospital/Health care center	No health post
3) Health Personnel	3 health promoters, 2 intern health promoters
6. Environmental situation	
(1) Forest condition	The upstream basin of Rio Pachum is covered by dense forests and well-conserved. Deforestation is relatively severe at the down stream of the left bank of Rio Pachum.
(2) Soil erosion	Landslide is partly observed at the left bank of Rio Pachum.
(3) Living Environment	Not specifically observed.

*: Data are taken from the INE census 1994. They are subjected to the revision in the further survey.

** : FIS, 1994

1. Socio-economy

- ✓ Most of the community members are farmers and engaged in maize production.
- ✓ Because of limited capital, technical knowledge and small farm size (estimated at 0.1ha/household), their agricultural activity is still at subsistence level.
- ✓ For the management of forest, a committee is traditionally established and strong regulations are imposed for forest management.

2. Agriculture

- ✓ Most of the area is steeply dissected and, therefore, flat agricultural land is not available in the community. Farmers have no choice but to plant maize at steep area.
- ✓ Considering the observation that farmers use neither high yielding variety seeds nor any fertilizers, the yield of maize is expected to be low.
- ✓ Although the water is available in the river Pachum, it is not utilized yet because of no capital and no technical knowledge for irrigation.
- ✓ Since farmers do not apply any soil conservation technique at steep area, high risk of soil erosion is strongly expected.

3. Infrastructure

- ✓ Access to the main road (San Francisco El Alto - Santa Maria Chiquimula) is approximately 4.6 km with unpaved road. Access to the main road becomes muddy and difficult during rainy season.
- ✓ It is observed that the number of houses with electricity has been improved compared to the situation in 1994 (census year). It is roughly estimated that approximately 20% of households are electrified.¹

4. Environment

- ✓ Forest in the micro-basin is still well conserved because of traditional regulation among villagers. Dense forest is well kept especially in the upper stream of the Rio Pachum. However, at the down stream near Pachum, deforestation is observed at the left bank and landslide is also observed at several points.
- ✓ Because of well-conserved dense forest in the upper stream, water in Rio Pachum keeps sufficient discharge for irrigation.

5. Health

- ✓ There are no health posts in the community. When medical care is necessary, villagers have to go to the health center or the catholic church's clinic in the center of the Municipality.
- ✓ A physician visits the community every 20 days. There are 3 health promoters and 2 intern health promoters.
- ✓ ARI, intestinal parasite, diarrheal diseases, malnutrition and skin diseases are reported as common diseases.

¹ In order to have electricity in house, consumers have to extend the line by their own expense. This fact might be one of the major reasons for delaying electrification in the community.

6. *Willingness for Development*

- ✓ Both municipality mayor and heads of the community are willing to have development programs in the community.
- ✓ Community members are interested in vegetable production with using simple irrigation system, preparation of nursery beds for trees, improvement of roads.

Cuadro 4.3.4(1) Condición Actual de la Micro-cuenca (Quetzaltenango).

Item	Present Condition
1. General Information	
(1) Province	Quetzaltenango
(2) Municipality	Palestina de los Altos
(3) Community (Aldea/Cascrio)	Caserio Los Perez Caserio Los Cabrera o Molinos Los Cabrera Caserio San Isidro o Los Diaz
(4) Location	22 km to the north-west of Quetzaltenango
(5) Area (km ²)	3.2 km ²
(6) Population*	1,368 persons
(7) Population density*	427.5 persons / km ²
(8) Number of Household*	222 households
(9) FIS Indicator**	Caserio Los Perez : Level C (18.75) Caserio Los Cabrera o Molinos Los Cabrera : Level C (17.66) Caserio San Isidro o Los Diaz : Level C (15.59)
2. Natural Condition	
(1) Climate	Rainfall: 800~1,000mm, Temperature varies -9 ~ 26 C ^o
(2) Topography (Elevation, Slope)	Elev.2,600~2,900 m, Strongly undulated, Slope 10~20%, High risk of erosion
(3) Geological condition	Tv Qp, Tertiary Volcanic Rocks and Pleistocenic volcanic rocks
(4) Soil	Ostuncolco; formed by volcanic ash; Sandy loam texture; Shallow; slightly acidic pH = 6.4
(5) Water Resource	River: Branch of Naranja River Spring: There is a spring with discharge of about 23 lit/sec near Pueblo. This spring is presently utilized for portable water supply for 8 hours/day.
3. Socio-economic Condition	
(1) Average household size*	6.2 persons / household
(2) Ethnicity	Indigena: 94.5%, Non-indigena: 5.5%
(3) Religion	Catholic, Protestant
(4) Major Language	Spanish, Mam
(5) Literacy rate*	22.50%
(6) Major Occupation of residents	Farmer, Migrant farm laborers in the Lower Region
4. Land & Agriculture	
(1) Land Use	Annual crops (maize, frijol, potatoes)
(2) Major crops	Maize, Frijol, Potatoes
(3) Average Farm Size	not available
(4) Cropping pattern	Maize/ Frijol: April ~ Nov., Potato: April ~ June & July ~ Oct.
(5) Irrigation condition	Rainfed only
5. Social Services & Infrastructure	
(1) Infrastructure	
1) Road	National Road #1 runs along northern boundary of the micro-basin. The roads inside the micro-basin are all unpaved and in poor condition.
2) Access to portable water*	52 households
3) Electrification*	19 households
(2) Health	
1) Common diseases	Not confirmed
2) Hospital/Health care center	No health facility is constructed in the community.
3) Health Personnel	A few midwives in the communities
6. Environmental situation	
(1) Forest condition	Majority of forest are cleared for the agricultural land.
(2) Soil erosion	Erosion is observed in steep area because of deforestation.
(3) Living Environment	Waste water from Pueblo is drained w/o treatment into RioTurbala.

*: Data are taken from the INE census 1994. They are subjected to the revision in the further survey.

** : FIS, 1994

1. Socio-economy

- ✓ Farm size is small and located in high elevated area (2,600~2,900m). Besides, water source is very limited. Therefore, farmers have very limited choice for agricultural production (maize and frijol) and the production of these crops are not sufficient to cover the living expenses.
- ✓ To cover their living expenses, most of the people in community usually go out as migrant farm labor at lower region such as Mazatenango and Retalhuleu.
- ✓ However, landowners in this lowland region tend to refuse migrant workers because of severe soil degradation in their farm land.

2. Agriculture

- ✓ Because of limited water source, high elevation and severe climate, the choice of crops is quite limited.
- ✓ In the southern part of Municipality (Palestina de Los Altos), production of potato is expanding. Those produce are exported to other countries in Central America such as Mexico, Salvador, Honduras and Nicaragua.
- ✓ Municipality is now promoting potato production and its collective marketing through cooperative.
- ✓ There is a spring with about 23 lit/sec of discharge near Pueblo of Palestina de Los Altos. This spring belongs to the municipality and presently being utilized for portable water supply using pumps. However, it is utilized only 8 hours a day and the rest of hours are still unutilized. This spring could be a potential water source for irrigation in the selected micro-basin. In addition to these water sources, potential for groundwater is also expected.

3. Infrastructure

- ✓ Although the northern boundary of the micro-basin is connected to the national road no.1, farm roads in the basin are still unpaved and in poor condition. Hard accessibility during rainy season is expected.
- ✓ It is observed that the number of houses with access to portable water has increased to about 930 houses because of the water supply system using the above mentioned spring. However, there are still a number of households without access to portable water.
- ✓ It is observed that the number of houses with electricity increased compared with the situation in 1994 (census year). Actual number should be confirmed in the later survey.

4. Environment

- ✓ Condition of deforestation is severe. Most of the forest is cleared for agricultural land and for firewood. High risk of erosion is expected.
- ✓ Domestic waste water of the Pueblo is drained into Rio Turbala without any treatment and therefore water contamination of the river is highly expected.

5. Health

- ✓ No health service facility is built in the community.

Cuadro 4.3.4(2) Situación Observada en Micro-cuenca Modelo de Quetzaltenango (2/2)

- ✓ Only a few midwives are in the community and there are no doctors, health promoters, and facilitators.
- ✓ Because of limited agricultural production, malnutrition is also expected among the community members.

6. Willingness for Development

- ✓ Both municipality mayor and heads of the community are willing to have development programs in the community.
- ✓ The mayor is strongly interested in promoting vegetable (including potato) production for improvement of farmers' income and willing to offer the spring for irrigation use during unutilized hours.

7. Others

- ✓ Since the micro-basin is located along the National Road No.1, it has location advantage in terms of marketing. Through the National Road No.1, it is accessible to Quetzaltenango within 30 minutes to the south-east and to Mexico in 2.5 hours to the north-west. Besides, dissemination effect is highly expected because of its location.