Cuadro 5.1.1(1) Condiciones Naturales en las 4 Micro-Cuencas Modelos

	Xeatzan Bajo	Panyebar	Pachum	Palestina
Number of Families	325	360	160	297
Total Area of Micro-Basin (ha)	930	580	1,050	320
Location: Latitude and Longitude	14° 41' North latitude; 91° 10' West longitude.	14° 35' North latitude; 91° 22' West longitude.	14° 56' North latitude; 91° 25' West longitude.	14° 54' North latitude; 91° 36' West longitude.
Elevation (m.a.s.l)	2,150 to 2,500	1,600 to 2,600	2,300 to 2,600	2,600 to 2,800
Relief	Moderately Undulated to Undulated	Strongly Undulated; Steep	Strongly Undulated; Steep	Undulated
Land Slope (°)	Eastern part (45 to 50) ; Center (5 to 20); Western part (25 to 35).	Eastern part (50 to 60) ; Center (10 to 20); Western part (30 to 45).	Eastern part (45 to 50) ; Center (10 to 25); Western part (25 to 40).	15 to 35 all arround
Soils Classification (Simmons, 1955)	Group I, Volcanic Mountain soils; Camancha series (Cm)	Group II, soils of "Altiplano Central"; Toliman series (Tn)	Group I, Volcanic Mountain soils; Totonicapan series (Tp)	Group I, Volcanic Mountain soils; Ostuncalcos series (Os)
Soil Texture and Depth	Loam to Clay oam; Up to 1.5 m depth.	Sandy loam; Up to 1.10 m depth	Loam with high content of Organic matter, and Clay loam. Up to 1.3 m depth	Loamy Sand;
Average Annual Rainfall (mm/year)	1,000	1,500	1,000	1,300
Rainy Season	6 months; May-October	6 months; May-October	6 months; May-October	6 months; May-October
% of annual rainfall that fall during Rainy Season	90	92	90	91
Rainy Days/Year	100 to 140	140 to 160	140	140
Relative Humid.(%)	80	80; Frequently Fogs	75	80
Average Annual Temperature (°C)	20	20	15	15
Occurrence of Frost	Not every year; about 1 in 3 years	Not every year	Every year	Every year

Cuadro 5.1.1(2) Lista de Fuentes de Agua en Xeatzán Bajo en Chimaltenango .

Name: Composition: Discharge: Present Usage : Owner: Potentiality: Remarks:	1) *Pachomochai springs* 3 springs 12.5 lit/s Less than 30 % in annual average; Resource of the community portable water supply system through pumping station. Community High Only 6-8 lit/s of spring water out of 12.5 lit/s are diverted to the pump station, and the remains are discharged to the river. At pump station, water tank is always fulfilled and most of inflow water is spilled out from its tank through spillway to river. In addition, although the discharged water from the spring to stream are presently used as a source of drinking water for Patzan municipality through their pump station located about 200m away from the spring. However Patzun municipality does not have regal right for using spring water itself and depends on the surplus water from Xeatzan Bajo area.
Name: Composition: Discharge: Present Usage: Owner: Potentiality: Remarks:	2) *Chuchuka and Xeatzan Alto springs* 2 springs 0.5 lit/s 100% ; Resource of the community portable water supply system through gravity conveyance pipes. Community Low It is located outside of Xeatzan Bajo village
Name: Composition: Discharge: Present Usage: Owner: Potentiality: Remarks	3) *Chuacacquix spring* 1 spring 0.9 lit/s approx. 0 % ; No use Community Medium It is located near *Chitiyah spring*. *Chuacacquix* and *Chitiyah* were purchased by the Community from private owners in 1994 with finance of the Pump Committee in order to utilize them for irrigation in future. (according to the Community Chief)
Name: Composition: Discharge: Present Usage: Owner: Potentiality:	4) *Chitiyah spring* 1 spring 0.5 lit/s approx. 0% ; No use Community Medium
Name: Composition: Discharge: Present Usage: Owner: Potentiality: Remarks:	5) *Pachor spring* 3 Springs 0.3 lit/s 100% ; Resource of the public laundry and drinking tank. Community Low A few families depend on the drinking water at this spring water and many families use laundry facility daily.
Name: Discharge: Present Usage: Owner: Potentiality: Remarks	6) Small Streams (no name) N/A ... seasonal flow (no or few flow in dry season) Partially ; Resource of irrigation water by small-scale gravity pipelines. Private Low See the details in the Section 5.1.3 (9) Irrigation Systems.

Cuadro 5.1.2(1) Calendario de Estaciones presentado por las mujeres de Xeatzan Bajo

This seasonal calendar shows the women's perception of their seasonal environment and problems they face during the year.
This seasonal calender was made by 8 participants in Xeatzan Bajo

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain					●●●●	●●●●● ●●●●● ●●●●● ●	●●●●● ●●●●● ●●●●● ●●●●● ●●●●● ●●●●	●●●●● ●●●	●●●●● ●●●●● ●●●●● ●●●●● ●●●●● ●●	●●●●		
Ag. Work					●●●● ●●●● ●●●	●●●●● ●●●●●	●●●●● ●●●●● ●●	●●●●● ●●●●● ●	●●●●● ●●●●●	●●●●● ●●●●●	●●●●● ●●●●● ●●●	●●●●● ●●●●● ●●●●● ●●●●● ●●●
Money	●●●	●●●	●●●	●●●	●●●	●●●●● ●●●●● ●●	●●●●● ●●●●●	●●●●● ●●	●●●●● ●●●●● ●●●●●	●●●●		
Sickness	●●●●● ●●●●● ●●●●● ●●●●● ●●●●● ●●●●	●●●●● ●●●●● ●●●●● ●●●●● ●●●●● ●●●●	●●●●	●●●●●	●●●●● ●●●	●●●●● ●●	●●●●● ●	●●●●● ●●●●● ●	●●●●● ●●●	●●●●● ●●●●	●●●●● ●●●●● ●●●	●●●●● ●●●●● ●●●●● ●●●●● ●●
Food					●●●	●●●●● ●●●●● ●●	●●●●● ●●●●	●●●●● ●●	●●●●● ●●●●● ●●●●●	●●●●		

Method: The participants were given about 50 beans and put beans in the month's box for each subject. ● means 1 bean.

Notes: Rain: Water is difficult to obtain between November and April period.
Agricultural Work: Mostly women engage in vegetable harvesting from May to December.
Money: Cash income mostly depends on vegetable harvesting and paid work outside the village between January till they start seeding vegetables.
Sickness: Surprisingly the occurrence of sick in May is far more than the rest of the month. Main illness is diarrhoea.
Food Availability: The food availability coincides with the cash income and Agricultural work.

Cuadro 5.1.3(1) Practicas Actuales de Manejo de Cultivos en las Micro-Cuencas Modelos (1/2)

Xeatzan Bajo	Present/Without Project
Crop: Brocoli	All farming activities are done by hand; mechanical machinery are not used.
Variety	Green Beret, Sakata, Green Mountain, Shogun, Manrathon
Planting Density&Planting Materials	24,000 to 27,000 plants per manzana. Seedlings grown at greenhouse are used.
Fertilizer (lib/Manzana)	N=250; P=100; and K= 210
Labor (man-day/Manzana)	paid labor = 30 M-D; family labor = 150 M-D
Irrigation	Mostly raifed; few farmers irragate using aquaduct water
Insects & Diseases Control	The most important insects are at the leaves Pieris brassicae, Prodenia sp, Plutella, Trichoplusiana, Agromyza, Bemisia tabaci, Nezara; Aphids and Trips; at the roots Phyllophaga, Agroti, Diabrotica; and several Nematodes species such as Pratylenchus sp; Ditylenchus and Meloidogine sp. Integrated Pest Management practices validated by ICTA are not applied; Economic threshold criteria is not applied. Control of insects and nematodes is made applying pesticides twice a week.
Crop: Snow pea	All farming activities are done by hand; mechanical machinery are not used.
Variety	Oregon Sugar Pod, Taichung, Melting Sugar
Planting Density&Planting Materials	70,000 plants per manzana, direct seedling.
Fertilizer (lib/Manzana)	N=35; P=75; and K= 85
Labor (man-day/Manzana)	paid labor = 30 M-D; family labor = 60 M-D
Irrigation	Only rainfed production
Insects & Diseases Control	The most important insects are at the leaves Laphygma, Heliotis, Mocis, Brochus, Sitona, Agromyza, Diabrotica; Aphis, Aleurode, etc. At the roots are Melolontha, Phyllophaga, Agroti; and Nematodes; Integrated Pest Management practices validated by ICTA are not applied; Economic threshold criteria is not applied. Control of insects and nematodes is made applying pesticides twice a week.
Crop: French bean	All farming activities are done by hand; mechanical machinery are not used.
Variety	Processor, Strigless Blue Lake
Planting Density&Planting Materials	25,000 plants/manzana; about 100 pounds of seeds per manzana; direct seeding
Fertilizer (lib/Manzana)	N=30; P=70; and K= 85
Labor (man-day/Manzana)	paid labor = 75 M-D; family labor = 110 M-D
Irrigation	Only rainfed production
Insects & Diseases Control	Similar to Snow pea
Crop: Carrot	All farming activities are done by hand; mechanical machinery are not used.
Variety	Chantenay Red Cored, Tahoe, Bonanza, Spartan
Planting Density&Planting Materials	0.5 m row and 0.08 m plants; About 175,000 plants/manzana; about 5 pounds of seeds per manzana; direct seeding
Fertilizer (lib/Manzana)	N=150; P=80; and K=225
Labor (man-day/Manzana)	paid labor = 60 M-D; family labor = 90 M-D
Irrigation	Only rainfed production
Insects & Diseases Control	Most important insects are at the leaves Laphygma, Heliotis, Mocis, Brochus, Estigmena, Diacribia, Agromyza, Diabrotica, Loxa v; Aphis, etc. At the roots are Melolontha, Phyllophaga, Agrotis; and Nematodes. Integrated Pest Management practices validated by ICTA are not applied; Economic threshold criteria is not applied. Control of insects and nematodes is made applying pesticides twice a week.
Crop: Black berry	All farming activities are done by hand; mechanical machinery are not used.
Variety	
Planting Density&Planting Materials	About 3,000 plants per manzana
Fertilizer (lib/Manzana)	N=270; P=270; and K= 270
Labor (man-day/Manzana)	paid labor =70 M-D; family labor = 180 M-D
Irrigation	Irrigation using aquaduct water was done only during the first year after planting the black berries; during last 3 years irrigation is not done because lack of water.
Insects & Diseases Control	
Crop: Maize	All farming activities are done by hand; mechanical machinery are not used.
Variety	Criollo Amarillo, Criollo Blanco
Planting Density&Planting Materials	1 meter between rows and 0.7 m between plants, with 4 to 5 plants per hole, about 8,800 holes per manzana. Almost all farmers use seed material keep corn from their own previous harvest.
Fertilizer (lib/Manzana)	N=110; P=110; and K= 60
Labor (man-day/Manzana)	Only few famers pay some labor, about 20 M-D per manzana; Majority use only family labor, about 65 M-D per manzana.
Irrigation	Only rainfed production
Insects & Diseases Control	Although there are several insects and diseases affecting maize, damages are not significant and control measures are not applied.

Cuadro 5.1.3(1) Practicas Actuales de Manejo de Cultivos en las Micro-Cuencas Modelos (2/2)

Panyebar	Present/Without Project
Crop: Coffee	All farming activities are done by hand; mechanical machinery are not used.
Variety	Bourbon, Pache and Typica
Planting Density&Planting Materials	2,800 to 3,500 plants per manzana. Seedlings are grown with poor management condition.
Fertilizer (lib/Manzana)	N=250; P=100; and K= 210, and descomposed forest leves.
Labor (man-day/Manzana)	paid labor = 50 M-D, mostly for harvesting; family labor = 150 M-D
Irrigation	Only raifed.
Insects & Diseases Control	Problems of insects and diseases are not very serious in Panyebar area; Nematodes seems to be the most important problem, but farmers do not know about it. Insects are "Cochinilla" Dismicoccus cryptus, Planococcus citri; Disease present is Pellicularia kolcroga. Pesticides are not used for control of insects and diseases
Crop: Maize	All farming activities are done by hand; mechanical machinery are not used.
Variety	Toto Amarillo, Criollo Amarillo, Criollo Blanco
Planting Density&Planting Materials	1 meter between rows and 0.7 m between plants, with 4 to 5 plants per hole, about 10,000 holes per manzana. Almost all farmers use corn kept from their own previous harvest as seed material. Only about 30 % of farmers plant maize and bean in association.
Fertilizer (lib/Manzana)	N=110; P=110; and K= 60
Labor (man-day/Manzana)	Only few famers pay some labor, about 20 M-D per manzana; Majority use only family labor, about 65 M-D per manzana.
Irrigation	Only rainfed production
Insects & Diseases Control	Although there are several insects and diseases affecting maize, damages are not significant and control measures are not applied.
Palestina	
Crop: Potato	All farming activities are done by hand; mechanical machinery are not used.
Variety	Loman (3 months), Diaz (4 months);
Planting Density&Planting Materials	1 meter between rows and 0.25 m between plants, about 2 8,000 plants per manzana; 40 to 50 quintals of seeds per manzana. Almost all farmers use potato kept from their own previous harvest as seed material. Poor quality of seed used is one of the main cause of low yields.
Fertilizer (lib/Manzana)	N=180; P=180; and K=180
Labor (man-day/Manzana)	About 70 % of farmers do not paid labor; the one that pay is about 60 M-D per manzana; family labor = 105 M-D
Irrigation	Only rainfed production
Insects & Diseases Control	Main insects attacking the roots are Phyllophaga, Agrotis, Systena, Epitrix, and several Nematode species; Insects of folliage are Bemisia, Nezara, Spodoptera, Laphygma, Heliotis, Manduca, Trichoplusia, and Agromyza; Aphis and Trips. Most serious disease is Phytophtora; Laman and Diaz varieties are very suceptible to Phytophtora.
Crop: Maize	All farming activities are done by hand; mechanical machinery are not used.
Variety	Toto Amarillo, Criollo Amarillo, Criollo Blanco
Planting Density&Planting Materials	1 meter between rows and 0.7 m between plants, about 10,000 holes per manzana, with 4 to 5 plants per hole. Almost all farmers use corn kept from their own previous harvest as seed material. Only small percentage of farmers plant maize and bean in association.
Fertilizer (lib/Manzana)	N=110; P=110; and K=110
Labor (man-day/Manzana)	About 70 % of farmers do not paid labor; the one that pay labor is about 60 M-D per manzana; family labor = 105 M-D
Irrigation	Only rainfed production
Insects & Diseases Control	Although there are several insects and diseases affecting maize, damages are not significant and control measures are not applied.
Pachum	
Crop: Maize	All farming activities are done by hand; mechanical machinery are not used.
Variety	Toto Amarillo, Salpor, Criollo Amarillo, Criollo Blanco
Planting Density&Planting Materials	1 meter between rows and 0.7 m between plants, about 10,800 holes per manzana, with 4 to 5 plants per hole. Almost all farmers use corn kept from their own previous harvest as seed material. Only small percentage of farmers plant maize and bean in association.
Fertilizer (lib/Manzana)	N=65; P=65; and K=0
Labor (man-day/Manzana)	Almost all farmers do not paid labor, family labor = 160 M-D
Irrigation	Only rainfed production
Insects & Diseases Control	Although there are several insects and diseases affecting maize, damages are not significant and control measures are not applied.

Cuadro 5.1.3(2) Precios de Hortalizas en Diferentes Supermercados de la Ciudad de Guatemala

Name of Vegetables			Name of Supermarket		
English Name	Spanish Name	Variety	PAIZ	LA TORRE	MULTIMART
			4, July	14, July	30. Aug.
Amaranth	Bledo		0.75/scal		
Asparagus	Esparrago		16.75/lb	14.50/lb	
Basil	Albahaca				1.45/scale
Broccoli	Brocoli	suelto	2.00/lb 2.35/lb 3.51/lb	1.80/lb	2.35/lb
Cabbage	Repollo		1.59/lb	1.30/lb	1.50/lb
Carrot	Zanahoria	meseta minizanahoria	1.45/lb 6.27/tray	10.00/bag	4.75/bag
Cauliflower	Coliflor		2.50-2.85/lb	2.15/lb	2.30/lb
Celery	Apio	ciruelo meseta sisimit	4.2/lb	3.95/lb	 2.50/lb
Champignon	Champiñon		17.9/lb	16.50/lb	
Coriander	Cilantro				1.45/scale
Cucumber	Pepino			1.35/unit	
Eggplant	Berenjena	de 3 unidades	3.60/bunch		1.80/lb
Leek	Puerro	meseta	6.10/scale	5.5/scale	
Lettuce	Lechuga	multiagricole meseta	2.95/lb	 2.75/lb	 2.5/lb
Macoy	Macuy herb				0.90/scale
Onion	Cebolla	big blanka, small	2.15-2.85/lb 5.15/lb		2.85/lb
Parsley	Perejil	liso	1.5/bunch	2.37/bunch	1.35/scale
Pepper	Chile	chile pimento jala peno enbande jado	6.50/lb 6.45/tray 9.75/lb	 5.78/lb	 5.78/lb
Potato	Papa	loman super	1.45-1.70/lb 1.75/lb	1.50/lb 1.80/lb	1.35/lb
Pumpkin	Guicoy			2.9/each	
Snow pea	Arveja china	 pelada	5.50/lb 4.75/lb	5.0/lb	5.0/lb
Soy bean	Soya			2.50/lb	
Straw berry	Fresa			12.0/scale	9.30/scale
Sugar beet	Remolacha	 suelta urias	 1.33/lb	5.7/bag	4.5/bunch
Swiss chard	Acelga			1.50/lb	
Tomato	Tomate	manzano beluga suelto unidad 2-aj beluga prodecon	6.35/lb 7.85/tray 8.57/lb 10.00/tray 2.50/lb		
Watercress	Berro		1.35/bunch	1.00/scale	
Zuchini	Zuchini	 mini	3.75/tray 2.32/tray		
Yucca	Yuka	camelis alvaeo		9.24/bag	

Cuadro 5.1.3(3) Costo de Producción y Beneficio de Cultivos de Hortalizas en Condiciones Actuales en Xeatzan Bajo (1/4)

Snow Pea

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	quintal	180	150.0	**27,000**
B) Production Cost				**12,430**
1) Farm Inputs				
- Seeds	pound	75	100	7,500
- Fertilizers				
N	pound	2.00	35	70
P	pound	1.7	75	128
K	pound	1.6	85	136
- Compost	quintal	20	20	400
- Insecticides	lit	95	9	855
- Fungicides	pound	45	4	180
- Hanging rope				500
2) Labor (Paid)	man-day	25	30	750
Labor (Family)	**man-day**	**0**	**60**	**0**
3) Miscellaneous (10%)				1,052
4) Financial cost (21% of Direct Cost)				855
C) Net Income	(Quetzal/Manz.)			**14,570**

French Bean

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	quintal	200	108.0	**21,600**
B) Production Cost				**9,070**
1) Farm Inputs				
- Seeds	pound	**35**	100	3,500
- Fertilizers				
N	pound	2.00	30	60
P	pound	1.7	70	119
K	pound	1.6	85	136
- Compost	quintal	20	20	400
- Insecticides	lit	100	6	600
- Fungicides	pound	45	4	180
- Hanging rope				500
2) Labor (Paid)	man-day	25	75	1,875
Labor (Family)	**man-day**	**0**	**110**	**0**
3) Miscellaneous (10%)				737
4) Financial cost (21% of Direct Cost)				967
C) Net Income	(Quetzal/Manz.)			**12,530**

Cuadro 5.1.3(3) Costo de Producción y Beneficio de Cultivos de Hortalizas en Condiciones Actuales en Xeatzan Bajo (2/4)

Brocoli

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	quintal	70	190.0	**13,300**
B) Production Cost				**7,050**
1) Farm Inputs				
- Seeds	seedlings	0.13	25,000	3,250
- Fertilizers				
N	pound	2.00	250	500
P	pound	1.7	100	170
K	pound	1.6	210	336
- Compost	quintal	10	10	100
- Insecticides	lit	95	6	570
- Fungicides	pound	45	3	135
2) Labor (Paid)	man-day	25	30	750
Labor (Family)	**man-day**	**0**	**150**	**0**
3) Miscellaneous (10%)				581
4) Financial cost (21% of Direct Cost)				660
C) Net Income	(Quetzal/Manz.)			**6,250**

Cauliflower

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	quintal	80	270.0	**21,600**
B) Production Cost				**9,160**
1) Farm Inputs				
- Seeds	seedlings	0.15	27,000	4,050
- Fertilizers				
N	pound	2.00	220	440
P	pound	1.7	85	145
K	pound	1.6	260	416
- Compost	quintal	20	25	500
- Insecticides	lit	95	4	380
- Fungicides	pound	45	2	90
2) Labor (Paid)	man-day	25	60	1,500
Labor (Family)	**man-day**	**0**	**145**	**0**
3) Miscellaneous (10%)				752
4) Financial cost (21% of Direct Cost)				887
C) Net Income	(Quetzal/Manz.)			**12,440**

Cuadro 5.1.3(3) Costo de Producción y Beneficio de Cultivos de Hortalizas en Condiciones Actuales en Xeatzan Bajo (3/4)

Cabbage

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	heads	1	20,000	**20,000**
B) Production Cost				**8,470**
1) Farm Inputs				
- Seeds	seedlings	0.13	25,000	3,250
- Fertilizers				
N	pound	2.00	275	550
P	pound	1.7	100	170
K	pound	1.6	325	520
- Compost	quintal	10	10	100
- Insecticides	lit	95	9	855
- Fungicides	pound	45	4	180
2) Labor (Paid)	man-day	25	50	1,250
Labor (Family)	**man-day**	**0**	**100**	**0**
3) Miscellaneous (10%)				688
4) Financial cost (21% of Direct Cost)				906
C) Net Income	(Quetzal/Manz.)			**11,530**

Cole of Brussels

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	quintal	80	310.0	**24,800**
B) Production Cost				**8,890**
1) Farm Inputs				
- Seeds	seedlings	0.15	20,000	3,000
- Fertilizers				
N	pound	2.00	220	440
P	pound	1.7	90	153
K	pound	1.6	260	416
- Compost	quintal	20	25	500
- Insecticides	lit	95	8	760
- Fungicides	pound	45	3	135
2) Labor (Paid)	man-day	25	70	1,750
Labor (Family)	**man-day**	**0**	**150**	**0**
3) Miscellaneous (10%)				715
4) Financial cost (21% of Direct Cost)				1,022
C) Net Income	(Quetzal/Manz.)			**15,910**

Cuadro 5.1.3(3) Costo de Producción y Beneficio de Cultivos de Hortalizas en Condiciones Actuales en Xeatzan Bajo (4/4)

Carrot

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	docens	3	13,000	**32,500**
B) Production Cost				**5,370**
1) Farm Inputs				
- Seeds	pound	100	5	500
- Fertilizers				
N	pound	2.00	150	300
P	pound	1.7	80	136
K	pound	1.6	225	360
- Compost	quintal	10	25	250
- Insecticides	lit	95	8	760
- Fungicides	pound	45	4	180
2) Labor (Paid)	man-day	25	65	1,625
Labor (Family)	**man-day**	**0**	**90**	**0**
3) Miscellaneous (10%)				411
4) Financial cost (21% of Direct Cost)				845
C) Net Income	(Quetzal/Manz.)			**27,130**

Lettuce

Item	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	heads	**0.5**	50,000	**25,000**
B) Production Cost				**12,580**
1) Farm Inputs				
- Seeds	seedlings	0.1	70,000	7,000
- Fertilizers				
N	pound	2.00	85	170
P	pound	1.7	40	68
K	pound	1.6	175	280
- Compost	quintal	20	35	700
- Insecticides	lit	95	2	190
- Fungicides	pound	75	2	150
2) Labor (Paid)	man-day	25	80	2,000
Labor (Family)	**man-day**	**0**	**120**	**0**
3) Miscellaneous (10%)				1,056
4) Financial cost (21% of Direct Cost)				969
C) Net Income	(Quetzal/Manz.)			**12,420**

Cuadro 5.1.6(1) Resultados del Diagnóstico de Servicios Domésticos (1/2)

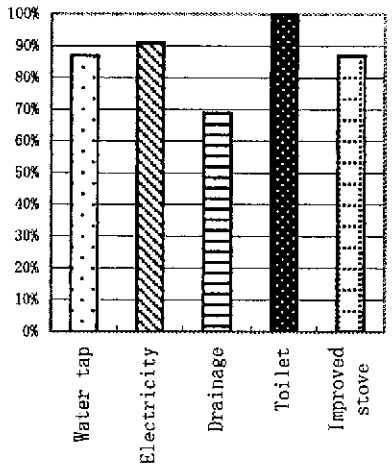
Survey Condition

- Surveyed items :
  1) Portable Water, 2) Electricity, 3) Drainage, 4) Toilet,
  5) Improved stove, 6) No. of family and 7) No. of family member
- Sampling method of house : Random sampling
- Targeting coverage of houses : More than 50% of the houses
- Survey method : Interview at each house, around 5–10 minutes at each house
- Survey period : from end of July to middle of August, 2000
- Interviewer : The member of the Study Team

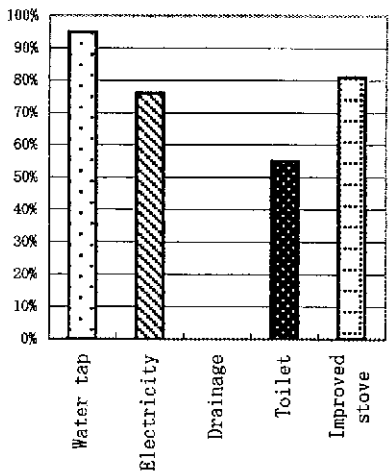
Diffusion of Facilities : Results of the adhoc survey for house facility

	Water tap	Electricity	Drainage	Toilet	Improved stove	Interviewee houses
Xeatan Bajo	87%	91%	69%	100%	87%	141
Panyevar	95%	76%	0%	55%	81%	175
Pachum	80%	28%	0%	14%	2%	75
Palestina	60%	73%	22%	73%	70%	112

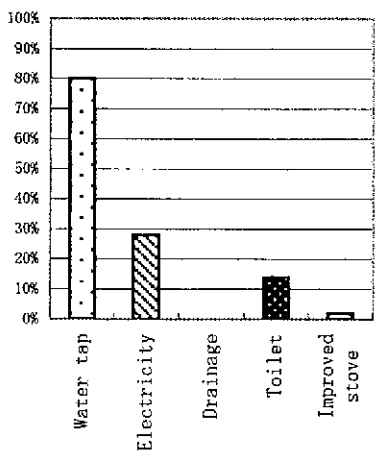
Xeatan Bajo



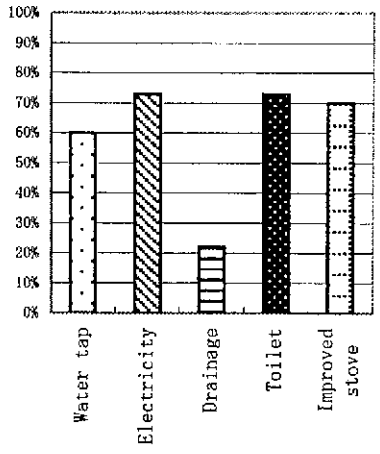
Panyevar



Pachum



Palestina



Cuadro 5.1.6(1) Resultados del Diagnóstico de Servicios Domésticos (2/2)

1) Xeatan Bajo

House	Family	Family member	Water	
			○	×
141	164	856	123	18
			87%	13%

Electric		Drinage [sumidero]			Toilet			Improved Stove		
○	×	○p	×nf	×	○p	○np	×	○p	○np	×
128	13	97	22	22	118	23	0	107	16	18
91%	9%	69%	16%	16%	84%	16%	0%	76%	11%	13%

a) 1 house has 6.07 family members in average. b) 1 house has 1.16 families in average. c) 1 family has 5.22 family members in average.

2) Panyevar

House	Family	Family member	Water *1				Electric		Drinage [sumidero]			Toilet			Improved Stove		
			○_Care	○_Fonapaz	○_C+F	×	○	×	○p	×nf	×	○p	○np	×	○p	○np	×
175	209	1208	3	58	106	9	133	42	0	0	175	2	94	78	40	103	33
			2%	33%	60%	5%	76%	24%	0%	0%	100%	1%	54%	45%	23%	59%	19%

a) 1 house has 6.90 family members in average. b) 1 house has 1.19 families in average. c) 1 family has 5.78 family members in average.

3) Pachum

House	Family	Family member	Water *2		
			○_P1	○_P2	×
75	83	426	49	16	16
			60%	20%	20%

Electric		Drinage [sumidero]			Toilet			Improved Stove		
○	×	○p	×nf	×	○p	○np	×	○p	○np	×
23	60	0	0	77	2	9	65	0	2	92
28%	72%	0%	0%	100%	3%	12%	86%	0%	2%	98%

a) 1 house has 5.68 family members in average. b) 1 house has 1.11 families in average. c) 1 family has 5.13 family members in average.

4) Palestina

House	Family	Family member	Water *3		
			○_Rural	○_Urban	×
112	152	755	47	25	48
			39%	21%	40%

Electric		Drinage [sumidero]			Toilet			Improved Stove		
○	×	○p	×nf	×	○p	○np	×	○p	○np	×
87	32	25	4	85	25	55	30	26	52	34
73%	27%	22%	4%	75%	23%	50%	27%	23%	46%	30%

a) 1 house has 6.74 family members in average. b) 1 house has 1.36 families in average. c) 1 family has 4.97 family members in average.

- Note,
*1: "○_Care" = Water system installed by CARE Guatemala, "○_FONAPAZ" = Water system installed by FONAPAZ, "○_C+F" = Both of CARE system and FONAPAZ
*2: "○_P1" = Pachum 1 Water Supply System, "○_P2" = Pachum 2 Water Supply System,
*3: "○_Rural" = Rural Portable Water System, "○_Urban" = Urban Portable Water System

○ : Yes, they have]
×: No, they don't have

○p: constructed by project
○np : constructed by money of villager, not project
×nf : constructed by project, but it is not functioning presently

Cuadro 5.1.6(2) Infraestructura Rural en Xeatzán Bajo (1/3)

1. Community Drinking Water Supply

(1) Number of beneficiaries and % of beneficiaries in the total houses	[Number of Beneficiary] -Initial stage : 212 houses -Present : 243 houses (according to the registry book of the Pump Committee) [% of Beneficiary] 87 % of the total houses in the community (based on the results of the ad hoc survey for rural infrastructure, which covers 141 houses for 164 families, conducted by the Study Team)
(2) Management organization and its regulations	The Pump Committee manages all the matters regarding the community water supply system. The committee consists of 9 members, and their activities are offered as voluntary services for the community. For daily operation, one personnel, he is not a committee member, is assigned as the operator on the payroll. The committee members will be changed every 2 years. There is no any written regulation in terms of the committee operation.
(3) Water consumption and operation	There is no reliable operation record of the pump station. However, based on the records of water charge for each household, total amount of consumed water and operational hours in a month can be calculated. [consumed water] The amount of water consumption by the system is estimated around 1,000 – 2,300m^3/month or 0.4 – 0.9 lit/s in monthly average, which varies depend on the season. Generally speaking, it observed the water consumption in dry season is much higher than that in rainy season. Provided that one family has 6 family members, the daily water consumption per person is 23-53 litters/day/person. [operational hour of pump] 0-80 hours per month
(4) Facilities	[Type of system] pumping-up system [Pump station] - Location : about 300 m downstream of the water resource, *Pachomochai springs.* - Diversion pipe : 2 pipes supply the spring water to the pump house for 24 hours. - Pump: 1 no. of 35HP, diesel engine type, its average pumping rate at the system is around 3.2 lit/s. - Collection tank capacity: 22.4 m^3 (W4.0*L3.5*H1.6m) [Conducting/distribution system] - Tank capacity: 80.2 m^3 (W9.1 *L4.1*H2.15m) - Pipe length: 2,314 m of conduction pipe and 4,117 m of distribution pipe.
(5) Rule of operation and distribution of drinking water to each family	On every morning the pump operator checks the remaining amount of water in the disributary tank. If the amount in the tank is not enough, water shall be supplied through the pumping station. There is no any limitation of usage water and each house can use water as much as they want, even for irrigation purposes. Water shortage in the system is seems to be hardly happen presently.

Cuadro 5.1.6(2) Infraestructura Rural en Xeatzán Bajo (2/3).

(6) Water charge price, how to collect water charge, outstanding status, and means against delinquent	[Water charge rate] Water charge is Q. 2.1 per 1,000 liters for every beneficiary. There is no any monthly basic charge but minimum monthly charge at Q 2.1 which grants up to 1,000 litters, thus amount of payment is charged only based on the amount of monthly water usage. [Collection of water charge] At end of month, staffs of Pump Committee check the water counter at each beneficiaries, and claim with notes for payment. Beneficiaries pay around Q10-40 per month. If payment of water charge is suspended 3 month, the committee cut the water supply to the house. At this moment (July '00) only 1 beneficiary is suspended the water supply. The monthly revenue from water supply system is around Q. 2000-3000 and the consumption is around Q.1000-2000 per month. The Pump Committee saves around Q.500-600 per month. This finance will be used only for the maintenance cost of the system, which is anticipated in future.

2. Sanitary System

(1) Number, diffusion % of the total household	[Toilet] 100 % of diffusion. : Most of these sanitary facilities were installed by a project of CARE Guatemala in 1995. According to the ad hoc survey, 84 % of the houses have such facilities made by the CARE project, and the others (mostly these were constructed after the CARE project) made it by their own money. [Drainage] The drainage system with dug pit, so called *sumidero,* had been installed by CARE at the same time of toilet system introduction. 212 houses were given the drainage system but, at present, a quarter of such facilities are not functioning because of getting full in a pit. Present beneficiary is estimated around 70 %.
(2) Features	[Toilet] Toilet is furnished with a concrete seat on the top of a dug hole, about 5-8m in depth, and covered with cloth or plastic screen. [Drainage] Dug pit, 10m in depth, and concrete top cover [1m*1m] Dug pit collects sewerage water from house and water infiltrates ground.
(3) Remarks	[Toilet] As mentioned above, the toilet system is spread among the community and contributes improvement of house sanitary condition. The fact that they install it with their finance shows its necessity, effectiveness and sustainability in the community. [Necessity of improvement for drainage system] Low; The villagers said that they scarcely install such drainage pit in their newly constructed house and also do not repair the stuck pit. In the ad hoc survey, even one facility made by their money could not be found. In the technical point of view, sewage water will not stagnate in the house because of its geographical feature, so serious problems caused by sewage water might not be occurred and effectiveness of the sumidero is not so high in this area.

Cuadro 5.1.6(2) Infraestructura Rural en Xeatzán Bajo (3/3)

3. Electricity Supply

(1) Number of beneficiaries for power supply and diffusion % of the total houses in the community	It was recognized that 13 houses did not have the community electric supply system in the ad hoc survey covering 141 houses. In this context, it is estimated about 90 % of the houses have electric. Main purpose of the electricity is for lights, radio and TV. They paid about Q.15-25/month at the rate of Q.0.99/kW
(2) Construction / installation cost	The electric system was installed on a commercial basis to each house. Newly installation cost is around Q.450-500/house. (registration: Q60, counter box: Q257, cable: Q2/m, booth: Q3.5/nos, wire: Q1.3/m)

4. Roads and Bridges

(1) Road in the community	[Pavement] gravel pavement [Present conditions of road] Good [Maintenance] By the community, but no special committee for the road maintenance exists. [Remarks] Many tracks of vegetable traders enter the community easily.
(2) Bridge	No bridge in the community

5. Improved Stove

(1) Number, diffusion % of the total houses in community.	Around 87 % of the houses in the community have the improved stove, and 10 % of the houses made new stove after the project without any financial assistance. (by the ad hoc survey) Construction cost of the improved stove is about Q300-500/nos.
(2) Remarks	Effects of improved stove are : a) to prevent accidents by children around cooking fire, b) to avoid diseases caused by its smoke and c) to reduce fire wood consumption. Through interviews the villagers recognized these effects and its effectiveness, and which is verified by the fact that many houses purchased it with their finance.

Cuadro 5.1.7(1) Resultados de Las Pruebas de Agua Potable en Xeatzán Bajo

Date of sampling		25/08/2000	25/08/2000	25/08/2000	25/08/2000	25/08/2000	
Item	Unit	C-1	C-2	C-3	C-4	C-5	Standards
pH	-	7.1	7.2	7.1	7.4	7.1	5.8-8.6
EC	µS/cm	191	250	179	200	181	-
Coliform group	cfu/ml	**55**	**40**	**15**	ND	**5**	ND
Bacteria	cfu/ml	15	14	17	10	3	100
COD	mg/l	5	5	5	5	**10**	10
TH	mg/l	50	50	20	50	50	300
NH_4^+	mg/l	ND	ND	ND	ND	ND	-
NH_4^+-N	mg/l	ND	ND	ND	ND	ND	-
NO_2^-	mg/l	ND	ND	ND	ND	ND	-
NO_2^--N	mg/l	ND	ND	ND	ND	ND	10
NO_3^-	mg/l	5	10	5	2	5	-
NO_3^--N	mg/l	1.15	2.3	1.15	0.46	1.15	10
Cu	mg/l	ND	ND	ND	ND	ND	1.0
Fe	mg/l	ND	ND	ND	ND	ND	0.3
Zn	mg/l	ND	ND	ND	ND	ND	1.0

Remarks: fountain:C-1,C-4
well:C-2,C-3
tap water:C-5

Cuadro 5.1.7(2) Uso del Agua en Xeatzán Bajo

	C-1	C-2	C-3	C-4	C-5
Community	Xeatzan Bajo	Xeatzan Bajo	Xeatzan Bajo	Xeatzan Bajo (outside of study area)	Xeatzan Bajo
Owner	Community	Private	Private	Private	primary school
Place	fountain	well	well	fountain	tap water
Size	through a pipe	1mX1mX22m (to water surface)	1mX1mX10m (to water surface)	through a pipe	-
When to use the water	Seven families, which have no running water, use all the time.	All the time. No affordability to have running water yet.	All the time. No affordability to have running water yet.	One family uses all the time. When water supply is cut off, 15 families use	all the time

Cuadro 5.1.8(1) Proyectos de Desarrollo Existentes en el Sector de Infraestructura en Xeatzán Bajo (1/2)

(a) Water Supply Project by CARE Guatemala

(1) Number of beneficiaries and % of beneficiaries in the total households	[Number of Beneficiary] -Initial stage : 212 households -Present : 243 households (according to the registry book of the Pump Committee) [% of Beneficiary] 87 % of the total houses in the community (based on the results of the ad hoc survey for rural infrastructure, which covers 141 houses for 164 families, conducted by the Study Team)
(2) Executed body, Construction year, total construction costs and financial sources	[Executed body] CARE Guatemala [Construction year] -Commencement : April 1994 -Completed : Feb. 1995. [Construction cost] Approximately Q500,000 (according to villager) for materials, and the plan/design of the system was financed and executed by CARE Guatemala. [Financial and physical contribution of beneficiaries] Beneficiaries shouldered the part of the construction cost in the amount of Q750 per each beneficiary and in voluntary services as labors for the construction works. Most of the structures were done by the hands of beneficiaries. (except water tank and pump).
(3) Facilities	[Type of system] pumping-up system [Pump station] Pump station is located at about 300 m downstream of the water resource, *Pachomochai springs*. Two diversion pipes supply the spring water to the pump house for 24 hours. - Pump: 1 no. of 35HP, diesel engine type, its average pumping rate at the system is around 3.2 lit/s. - Collection tank capacity: 22.4 m^3 (W4.0*L3.5*H1.6m) [Conducting/distribution system] - Tank capacity: 80.2 m^3 (W9.1 *L4.1*H2.15m) - Pipe length: 2,314 m of conduction pipe and 4,117 m of distribution pipe.

Cuadro 5.1.8(1) Proyectos de Desarrollo Existentes en el Sector de Infraestructura en Xeatzán Bajo (2/2)

(b) Sanitary Project by CARE Guatemala

(1) Number, % of beneficiary of the total houses	[Toilet] 212 houses got it. (84 % of the houses based on the ad hoc survey) [Drainage] 212 houses got it (However a quarter of such facilities are not functioning because of getting full in a pit presently. Present beneficiary is estimated around 70 %.)
(2) Executed body, Project year and its Features	[Executed Body] CARE Guatemala [Project year] 1995 [Feature : Toilet] Each house in the community has a toilet equipped with concrete toilet seat and a screen tent. [Feature : Drainage] The drainage system with dug pit, so called *sumidero* in Spanish [size: 1*1*10m], had installed by CARE at the same time of toilet system.

(c) Improved Stove Project by CONSUDER

(1) Installation / construction	The improved stoves are installed and used in many houses presently. Most of these improved stoves were installed under a project of CONSUDER. The project offered the stove at Q15 each and totally 175 stoves were installed in the community.
(2) Number, % of beneficiary in the total household in village.	[Beneficiary %] Around 76 % of the present houses in the community

Cuadro 5.2.1(1) Lista de Fuentes de Agua en Panyebar en Sololá.

Name:	1) *Panan springs*
Composition:	5 springs
Discharge:	2.7 lit/s
Present Usage:	92 % ; Water resource of the portable water system in the area
Owner:	Community
Potentiality:	Low
Remarks:	Water is utilized by both the supply systems, which are made by (1) CARE and (2) FONAPAZ
Name:	2) *Silberio spring*
Composition:	1 spring
Discharge:	2.4 lit/s
Present Usage:	0% ; No use
Owner:	Private
Location:	About 150-200 m down from the main road at east side valley
Potentiality:	High
Name:	3) *Juan springs*
Composition:	2 springs
Discharge:	less than 0.1 lit/s approx. and seasonally varied
Present Usage:	Partially ; Main water resource for drinking and laundry during the water system is out of order.
Owner:	Private
Location:	About 150-200 m down from the main road at west side valley
Potentiality:	Low

Note ; If spring does not have name, the name of the owner is substituted for it.

Cuadro 5.2.3(1) Precio de Café (1975 – 1998)

unit: Q./ton

Year	Price of Cerry	Price of Parchment
1975	147	691
1976	201	1,159
1977	477	2,167
1978	437	1,633
1979	347	1,549
1980	314	1,509
1981	255	1,317
1982	240	1,235
1983	293	1,475
1984	320	1,703
1985	409	2,118
1986	724	4,119
1987	781	4,520

unit: Q./ton

Year	Price of Cherry	Price of Parchment
1988	865	4,419
1989	1,033	4,417
1990	1,278	5,884
1991	1,278	5,884
1992	992	5,380
1993	992	5,380
1994	2,646	13,018
1995	2,977	14,675
1996	2,425	11,958
1997	2,425	11,958
1998	2,205	11,076
1999		
2000		

Source : Cuantitativo de la Agricultura Guatemalateca (1950-1999)

Cuadro 5.2.6(1) Infraestructura Rural en Panyebar (1/3)

1. Community Drinking Water Supply

There are 2 potable water systems in the project area. One is made by CARE Guatemala (hereinafter called as "CARE system") and the another is made by FONAPAZ (hereinafter called as "FONAPAZ system").

(1) Number of beneficiaries and % of beneficiaries in the total houses	[No. of Beneficiary] (1) CARE system : 250 houses (2) FONAPAZ system : 360 houses (according to the committee, but no certain records) Note : Beneficiaries of the 2 system are overlapped. Thus majority of the houses have 2 taps (CARE and FONAPAZ) [% of Beneficiary] 95 % (according to the ad hoc survey by Study Team, which covered 175 houses and 209 families)
(2) Management organization and its regulations	[Water committee] Maintenance committee "*Comite de Promejoramiento*" play a role of water committee in the area [Committee member] The committee consists of 9 members, and their activities are offered as voluntary services for the community. [Regulation of committee] Certain document does not exists. However the minutes of meeting certified by all the attendant stipulates all the regulations regarding the management of the water system.
(4) Water consumption and operation	[Water record made by the water committee] Not exists. [Estimated water consumption per person] 90 lit/day/person (condition: 1 house has 6.9 family members)
(5) Facilities	(1) CARE system - type of system : gravity system - water resources : Panan spring - tank capacity : 36 m^3 [4.9*4.85*1.5] - conduction pipe length & diameter : 7.2 k m & ϕ 2.5" - distribution pipe : ϕ 2.5" * 1 outlet at tank (2) FONAPAZ system - type of system : gravity system - water resources : Panan spring - tank capacity : 84 m^3 [8.8*5.3*1.8] - conduction pipe length & diameter : 7.2 k m & ϕ 4" - distribution pipe : ϕ 4" * 4 outlets at tank
(6) Rule of operation and distribution of drinking water to each family	[Limitation of water usage in volume] : No limit [Limitation of usage for irrigation] : No limit [Daily limitation of usage] Water supply service hour : 4-6 hours a day, because of water shortage

Cuadro 5.2.6(1) Infraestructura Rural en Panyebar (2/3)

(7) Water charge price, how to collect water charge, outstanding status, and means against delinquent	[Yearly water charge] : Q.6 for 1 tap [Monthly water charge] : No [Collection of water charge] Every January. Beneficiaries go to the committee and pay it. The committee does not send staff to collect the water charge to each house. Only 95 houses have paid in 1999 and the remaining water charge are suspended. [Means against delinquent] Maximum period of the moratorium for payment: 2 years After the moratorium, the committee cut the services. However this penalty measurement has not been taken. [Admission of the water system] No admission. All the cost to be paid by the new beneficiary is the actual construction cost only.

2. Sanitary System

(1) Number or diffusion % of the total household	[Toilet] 55 % (the ad hoc survey, which covered 175 houses and 209 families) [Drainage system "sumidero"] 0 % (the ad hoc survey, which covered 175 houses and 209 families)
(2) Features	[Toilet] Toilet is furnished with a concrete seat on the top of a dug hole which is about 5-8m in depth, and covered with cloth or plastic screen.
(3) Remarks	A few houses has the sanitary facilities made by the project. [construction year] 1980 [executed body] Direccion General de Salud [High percentage of self-contained for toilet facility] Most of the houses which has the toilet made it by his own finance, and the villagers have high interest in the toilet facility. However almost half of all the houses in the area do not have toilet. [Necessity of improvement for drainage system] Low; All the houses have surface drainage ditch. And, through the ditch, sewage water can be drained without being stagnate in a house because of its geographical condition. It seems to be no any problem caused by the present poor drainage condition.

Cuadro 5.2.6(1) Infraestructura Rural en Panyebar (3/3)

3. Electricity Supply

(1) Number of beneficiaries for power supply or diffusion % of the total household in village	[Diffusion (%) of the total house] 76 % (the ad hoc survey, which covered 175 houses and 209 families)
(2) Construction / installation cost	[Construction year] : 1998 [Total construction cost] : Q. 650,000 [Finance shouldered by the beneficiary] Q. 750 / house and the voluntary contribution to the construction works

4. Roads and Bridges

(1) Road in/near the community	[Length] 12 km for under the administration of Panyebar road committee including 4.4 km of road located inside the community [Pavement] gravel pavement [Present conditions of road] Not good [Maintenance] By the community
(2) Bridge	There are several bridges in the area constructed by several projects. The condition of bridges are quite good and no any problems.

5. Improved Stove

(1) Number, diffusion % of the total household in village.	[Diffusion (%) of the total house] 81 % (the ad hoc survey, which covered 175 houses and 209 families)
(2) Remarks	Some houses have the improved stove installed by FIS. They said that the FIS's stove consume less firewood than normal improved stove. [Possibility of self-contained for toilet facility] High. Around 70% of the houses which has the stove made it by his own finance, and the villagers have high interest in the improved stove.

Cuadro 5.2.7(1) Resultados de Las Pruebas de Agua Potable en Panyebar

Date of sampling		25/08/2000	25/08/2000	25/08/2000	25/08/2000	25/08/2000	30/08/2000	22/09/2000	
Item	Unit	S-1	S-2	S-3	S-4	S-5	S-6	S-7	Standards
pH	-	6.8	6.6	7.5	6.5	**9.5**	7.4	7.6	5.8-8.6
EC	µS/cm	14	157	109	105	118	108	117	-
Coliform group	cfu/ml	1	ND	**4**	**3**	**70**	**5**	-	ND
Bacteria	cfu/ml	18	28	15	18	30	20	-	100
COD	mg/l	10	10	5	5	5	10	10	10
TH	mg/l	20	20	20	20	20	20	20	300
NH_4^+	mg/l	ND	ND	ND	ND	ND	ND	ND	-
NH_4^+-N	mg/l	ND	ND	ND	ND	ND	ND	ND	-
NO_2^-	mg/l	ND	ND	ND	ND	ND	ND	ND	-
NO_2^--N	mg/l	ND	ND	ND	ND	ND	ND	ND	10
NO_3^-	mg/l	5	5	2	2	ND	1	1	-
NO_3^--N	mg/l	1.15	1.15	0.46	0.46	ND	0.23	0.23	10
Cu	mg/l	ND	ND	ND	ND	ND	ND	ND	1.0
Fe	mg/l	ND	ND	ND	ND	ND	ND	ND	0.3
Zn	mg/l	ND	ND	ND	ND	ND	ND	ND	1.0

Remarks: fountain:S-1,S-2,S-3,S-4,S-6
tank:S-5
river:S-7

Cuadro 5.2.7(2) Uso del Agua en Panyebar

	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Community	Panyevar	Panyevar	Panyevar	Panyevar	Panyevar	Panyevar	Panyevar
Owner	Private	Private	Private	Community	Private	Community	-
Place	fountain	fountain	fountain	fountain	water tank	fountain	East river of two ones
Size	1.2mX1.0mXdepth0.15m	1.8mX1.0mXdepth0.3m	2.5mX0.5mXdepth0.1m	0.75mX0.75mXdepth0.2m	-	0.7mX0.7mXdepth0.3m	width 2m, depth 0.3m
When to use the water	When water supply is cut.	When water supply is cut.	When water supply is cut.	When water supply is cut.	When water supply is cut.	Source of S-5	When water supply is cut.

Cuadro 5.2.8(1) Proyectos de Desarrollo Existentes en el Sector de Infraestructura en Panyebar (1/2)

1. Water Supply Project by CARE Guatemala

(1) Number of beneficiaries and % of beneficiaries in the total households	[No. of Beneficiary] 250 houses (Target houses at initial stage 160 house)
(2) Construction year, executing body and beneficiaries' share of construction costs	[Construction year] 1978 [Executing body] CARE Guatemala & Municipality [Beneficiaries' share of cost] voluntary services only [Total construction cost] N/A
(3) Facilities	- type of system : gravity system - water resources : Panan spring - tank capacity : 36 m^3 [4.9*4.85*1.5] - conduction pipe length & diameter : 7.2 k m & ϕ 2.5" - distribution pipe : ϕ 2.5" * 1 outlet at tank

2. Water Supply Project by FONAPAZ

(1) Number of beneficiaries and % of beneficiaries in the total households	[No. of Beneficiary] : 360 houses
(2) Construction year, executing body and beneficiaries' share of construction costs	[Construction year] 1998 January [Executing body] FONAPAZ, Municipality and Community [Beneficiaries' share of cost] the voluntary contribution to the construction works (28 labor days for a person who is over 18 years old) [Construction period] around 8 month [Total construction cost] BCIE : Q. 322,742 FONAPAZ : 32,274 Community : Q. 225,000 Municipality : Q. 50,000 Total : Q. 630,016
(3) Facilities	- type of system : gravity system - water resources : Panan spring - tank capacity : 84 m^3 [8.8*5.3*1.8] - conduction pipe length & diameter : 7.2 k m & ϕ 4" - distribution pipe : ϕ 4" * 4 outlets at tank

Cuadro 5.2.8(1) Proyectos de Desarrollo Existentes en el Sector de Infraestructura en Panyebar (2/2)

3. Electricity Supply Project by CODEUR

(1) Number of beneficiaries for power supply or diffusion % of the total household in village	[Diffusion (%) of the total house] 76 % (the ad hoc survey, which covered 175 houses and 209 families)
(2) Construction / installation cost	Present electric system was constructed by the financial supports of "*Consejo de Desarrollo Urbano y Rural*"(CODEUR), the municipality and the community. [Construction year] : 1998 [Total construction cost] Consejo de Desarrollo Urbano y Rural : Q. 300,000 Municipality : Q. 252,000 Community : Q. 98,000 Total : Q. 650,000 [Finance shouldered by the beneficiary] Q. 750 / house and the voluntary contribution to the construction works

4. Improved Stove by FIS

(1) Beneficiaries in number, % of the total household in village.	[Beneficiary (%) of the total house] 23 % (the ad hoc survey, which covered 175 houses and 209 families)
(2) Installation/construction	[Construction year] 1994 Some houses have the improved stove installed by FIS. FIS offered materials and villagers made it by their hand under instruction of FIS.

5. Road Construction and Improvement Projects

(1) CAMINOS-Rural project	[Type of works] New construction with gravel pavement and side ditches [Length] 12 km : access road to Panyebar [Construction year] 1982
(2) FONAPAZ	[Type of works] Improvement of the road with gravel pavement and side ditches [Length] 4 km : from Panyebar to Aldea Pasajquim [Construction year] under construction as of Sep. 2000
(2) SEDESOL	[Type of works] Improvement of the road with gravel pavement and side ditches [Length] 7 km : from Panyebar to Santa Clara [Construction year] Under construction in Sep. 2000

Cuadro 5.3.1(1) Lista de Fuentes de Agua en Pachum en Totonicapán

Name: Composition: Discharge: Present Usage: Owner: Potentiality: Remarks:	1) *Xecandelaria springs* 7 springs 10.3 litters/sec 6% ; Water resource of Pachum 1 water system only The Pacum 1 water committee High Only about 0.6 lit/s of spring water out of 10.3 lit/s are diverted to the water supply system, and the remain flows to the river without using.
Name: Composition: Discharge: Present Usage: Owner:	2) *Pachum 2 springs* N/A N/A Water resource of Pachum 2 water system The Pacum 2 water committee
Name: Composition: Discharge: Present Usage: Owner:	3) *Pachum 3 spring* N/A N/A Water resource of Pachum 3 water system The Pacum 3 water committee
Name: Composition: Discharge: Present Usage: Potentiality:	4) *Pacum river* 1 main river and 1 branch in the area Discharge is seasonally varied No use in the Xesana municipality High

Cuadro 5.3.6(1) Infraestructura Rural en Pachum (1/3)

1. Community Drinking Water Supply

(1) Number of beneficiaries and % of beneficiaries in the total houses	[No. of Beneficiary] Pachum 1 system : 86 houses Pachum 2 system : 48 houses Pachum 3 system : N/A (data from each water committee) [% of Beneficiary] 80% in Pachum 1 & 2 (according to the ad hoc survey by Study Team, which covered 75 houses and 83 families)
(2) Management organization and its regulations	[No. of water system and water committee in Pachum] 3 systems and 3 water committees (Every water supply system has a water committee in order to execute its management and maintenance works independently.) [Regulation of committee] Minutes of the meeting which was held for the water system functions as the committee regulation.(Pachum 1)
(3) Water consumption, water charge and operation	[Water usage record] No any record exists in each committee. [Water charge] Q50/house/year (Pacum1) [Estimated water consumption per person] (in case of Pachum 1) 106 lit/day/person (0.6 lit/s for 86 houses)
(4) Facilities	[Puchum 1 distribution system] 1) type of system : Gravity system 2) tank capacity: 31.9 m^3 [W4.2 *L4.0*H1.9m] 3) pipe length: about 1.5 km of conduction pipe (3.5 inches in diameter) [Pachum 2 distribution system] 1) type of system : Gravity system 2) facilities : storage tank : 1 no. No other data available
(5) Rule of operation and distribution of drinking water to each family	[Limitation of water usage in volume] No limit (Pachum 1 & 2) [Limitation of usage for irrigation] No regulation (Pachum 1 & 2) [Daily limitation of usage] From 7:00 am to 5:00 p.m., water usage, except drinking water, is forbidden because of a shortage of water in tank. (Pachum 1)

Cuadro 5.3.6(1) Infraestructura Rural en Pachum (2/3)

(6) Water charge price, how to collect water charge, outstanding status, and means against delinquent	[Water charge] Yearly charge: Q.50 / house (Pachum 1), No (Pachum 2) Monthly charge: No. (Pachum 1 & 2) Voluntary services: Beneficiaries are obliged to attend the maintenance work of the system led by the water committee, if necessary. [Admission of the water committee] Pachum 1 : No. (New member pay only a construction cost for pipe installation to his house) Pachum 2 : Q.200 including all the installation cost [Collection of water charge] (case of Pachum 1) Every July, a committee member collects it. [Means against delinquent] (case of Pachum 1) Maximum moratorium period for payment: 2 years (After such moratorium, the committee reluctantly cut the services.)

2. Sanitary System

(1) Diffusion % of the total household in village.	[Toilet] 15 % (the ad hoc survey, which covered 75 houses and 83 families) [Drainage system "sumidero"] 0 % (the ad hoc survey)
(2) Features	[Toilet] Toilet is furnished with a concrete/wooden seat on the top of a dug hole, about 5-8m in depth, and covered with cloth or plastic screen.
(3) Remarks	[Low possibility of self-contained for toilet facility] At present condition, only 9 houses (12 %of 75 houses) made toilet by themselves and the villager's interest in the toilet is so low. [Necessity of improvement for drainage system] Low All the houses have surface drainage ditches. And, through the ditch, sewage water can be drained easily, without being stagnate, in a house because of its geographical condition. It seems to be no any problem caused by the poor drainage.

3. Electricity Supply

(1) Number of beneficiaries for power supply and diffusion % of the total household in village	[Number of beneficiaries] 38 houses [Diffusion % of the total house] 28 % (the ad hoc survey, which covered 75 houses and 83 families)
(2) Construction	Present electric system was installed by the PER III project. Financial supports were made by *Consejo de Desarrollo Urbano y Rural (CODEUR)*, the municipality, the community and FODIGUA (*Fondo de Desarrollo Indigena Guatemalateco*) [Construction year] Oct. 1999 (started the services)

Cuadro 5.3.6(1) Infraestructura Rural en Pachum (3/3)

4. Roads and Bridges

(1) Road in/near the community	[Length] 8 km for under the administration of Pachum community [Pavement] Used to be gravel pavement but now deteriorated [Present conditions of road] Bad, specially in rainy season. The road was cut by slope sliding and sometimes cannot pass it for months. [Maintenance] By the road community but not sufficient because of lack of fund and man-power.
(2) Bridge	There are several bridges in the area constructed by several projects. The conditions of bridges are quite good and no any problems.

5. Improved Stove

(1) Diffusion % of the total household in village.	2 % of the sampled houses (2 houses) - Others cook with open fire.
(2) Remarks	Diffusion of the improved stove is so low. People are obliged to keep quite big amount of firewood for cooking and bathing. Taking into consideration of the heavy duty of firewood hauling by manual, the introducing of improved stove is effective way to alleviate heavy work.

6. Steam Bath "*Tamascal*"

(1) Diffusion % in village	Almost all houses
(2) Features	All the villagers take the steam bath, so-called "*Tamascal*" twice or three times a week. They heat up the dome with wood fire and take bath. [Shape and general size] a dome shape, front width 230 cm; high = 150 to 170 cm; depth front to back = 190 cm dimension of fire box are : width =40 cm; high = 45 cm; depth = 70 cm [Materials of *Tamascal*] concrete block, clay block, clay and soil [How to use] 1) Fire woods burn in the box built in Tamascal ; Half of the back side of box is open to pass hot air to the Dome. 2) The time required varies from 30 to 60 minutes, depending on the quality of wood. 3) Number of fire woods is 15 to 20 pieces of about 50 cm long.
(3) Remarks	They say that the diffusion of *Tamascal* in the area reaches almost 100%. Compared with that of electricity (28%), toilet (14%) and improved stove (2%), it is very clear that the popularity of *Tamascal* is so high and it relates closely to their living in Pachum. According to the villagers, consumption of firewood for the Tamascal is bigger than daily cooking fire and the *Tamascal* push up the consumption of fire woods in house. Taking into consideration of the heavy duty of firewood hauling by manual, the improvement of the *Tamascal* is effective way to alleviate their heavy work. It seems there is some rooms to be improved in order to have better efficiency for heating a dome and better air ventilation with chimney. These improvements will improve not only the labor condition for collecting fire wood but the health condition of villagers.

Cuadro 5.3.7(1) Resultados de Las Pruebas de Agua Potable en Pachum

Date of sampling		16/08/2000	16/08/2000	16/08/2000	16/08/2000	16/08/2000	19/09/2000	
Item	Unit	T-1	T-2	T-3	T-4	T-5	T-6	Standards
pH	-	6.6	7.6	6	7.4	7.8	8.1	5.8-8.6
EC	µS/cm	170	73	40	108	270	57	-
Coliform group	cfu/ml	**2**	**4**	ND	ND	**1**	-	ND
Bacteria	cfu/ml	7	20	10	0	10	-	100
COD	mg/l	5	**10**	**10**	5	**10**	5	10
TH	mg/l	20	10	0	20	50	10	300
NH_4^+	mg/l	ND	ND	ND	ND	0.1	ND	-
NH_4^+-N	mg/l	ND	ND	ND	ND	0.08	ND	-
NO_2^-	mg/l	ND	ND	ND	ND	ND	ND	-
NO_2^--N	mg/l	ND	ND	ND	ND	ND	ND	10
NO_3^-	mg/l	5	ND	1	ND	ND	1	-
NO_3^--N	mg/l	1.15	ND	0.23	ND	ND	0.23	10
Cu	mg/l	ND	ND	ND	ND	ND	ND	1.0
Fe	mg/l	ND	ND	ND	ND	0.2	ND	0.3
Zn	mg/l	ND	ND	ND	ND	ND	ND	1.0

Remarks: fountain:T-1,T-3
well:T-5
tap water:T-4
river:T-2,T-6

Cuadro 5.3.7(2) Uso del Agua en Pachum

	T-1	T-2	T-3	T-4	T-5	T-6
Community	Pachum	Pachum	Pachum (outside of study area)	Pachum	Pachum	Pachum
Owner	Private	-	Private	primary school	Private	-
Place	fountain	(branch of Pachum river)	fountain	tap water	well	Pachum river
Size	1mX1mX depth0.5m	width 2m, depth 0.3m	1mX0.6mX depth0.2m	-	3mX2mX depth0.7m	width 3m, depth 0.3m
When to use the water	When water supply is cut off during Jan. and Feb.	When water supply is cut off during Jan. and Feb.	When water supply is cut off during Jan. and Feb.	All the time	When water supply is cut off during Jan. and Feb.	When water supply is cut off during Jan. and Feb.

Cuadro 5.3.8(1) Proyectos de Desarrollo Existentes en el Sector de Infraestructura en Pachum

1. Drinking Water Supply by by CODEUR

(1) Construction year, executing body and beneficiaries' share of construction costs	[Pachum 1] Construction year: 1994 Sep. Executing body: Consejo de Desarrollo Urbana y Rural (CODEUR) Beneficiaries' share of cost: voluntary services only (1 person per a house for 3 months) Construction cost : N/A [Pachum 2] Construction year: August 1997 Executing body: Municipality Beneficiaries' share of cost: voluntary services only Construction cost : Q. 35,000
(2) Facilities	[Pucum 1 distribution system] 1) type of system : Gravity system 2) tank capacity: 31.9 m^3 [W4.2 *L4.0*H1.9m] 3) pipe length: about 1.5 km of conduction pipe (3.5 inches in diameter) [Pucum 2 distribution system] 1) type of system : Gravity system No other data available

2. Sanitary Project

Toilet facility	[Number of facility] 30 houses got it. (But only 2 existing toilet were identified through the ad hoc survey) [Executing body] : unknown [Facilities] 1 no of Toilet seat made by concrete and 1 no of concrete top slab [1m*1m] [Beneficiaries' share of cost] digging holes seting up the facilities

3. Electricity Supply Project by CODEUR

(1) Number of beneficiaries for power supply	[Number of beneficiaries] 38 houses
(2) Construction year, cost and others	Present electric system was installed by the PER III project. Financial supports were made by *Consejo de Desarrollo Urbano y Rural* (CODEUR), the municipality, the community and FODIGUA (*Fondo de Desarrollo Indigena Guatemalateco*) [Total construction cost] Total Q. 258,493 Community Q. 32,453.5 Municipality Q. 22,571 CODEUR Q. 150,000 Credit by FUNDAP Q. 53,468 [Construction year] Oct. 1999 (started the services) [Beneficiary] 38 houses (125 habitants) [Finance shouldered by the beneficiary] Q. 6,000 per house and voluntary services for construction works. [Condition of credit by FUNDAP] 30% interest for 24 months

Cuadro 5.4.1(1) Lista de Fuentes de Agua en Palestina en Quetzaltenango

Name:	1) *Los Molinos springs*
Composition:	2 springs
Discharge:	25 lit/s
Present Usage:	30 % ; Water resource of the Rural Portable Water system and laundry tank.
Owner:	Municipality
Potentiality:	High
Remarks:	Located outside of the project area
Name:	2) *Monteroso spring*
Composition:	1 spring
Discharge:	less than 0.01 lit/s approx. and seasonally varied
Present Usage:	Partially ; Water resource of drinking water when tap water is not available in the area.
Owner:	Private
Potentiality:	Low
Remarks:	Spring dry up in every dry season
Name:	3) *Los Diaz public tank's spring*
Composition:	1 spring
Discharge:	less than 0.01 lit/s approx. and seasonally varied
Present Usage:	100% ; Water resource of the public water tank for laundry
Owner:	Caserio Los Diaz
Potentiality:	Low
Name:	4) *Sector I spring*
Composition:	1 spring
Discharge:	less than 0.01 lit/s approx.
Present Usage:	Main resource of drinking water in Sector I area
Owner:	-
Potentiality:	Low

Note ; If spring does not have specific name, the name of the owner is substituted for it.

Cuadro 5.4.3(1) Precio de Papa

(1) Price flow by transactions

: Loman, middle size, middle of August, 2000

Farm-gate (Pelestina)	Q 30 ~ 35 / quintal	26.1 ~ 30.4 %
CollectionCenter(La Cumbre)	Q 40 ~ 55 / quintal	34.8 ~ 47.8 %
City Terminal(Guatemala City)	Q 65 ~ 75 / quintal	47.8 ~ 65.2 %
Retails: Super-Market I	Q 125 ~145 /quintal	
Super-Market II	Q 115 ~125/quintal	100 %
Roadside shop	Q 85 ~105/quintal	

(2) Monthly Potato Price change on Potato in 1999

: Anuario Estadistico de Pricios 1999
Productos e Insumos Agropecuarios

	WHOLESALE(quintal)			CONSUMMER(lb)		
Month	Ave.	Min.	Max.	Ave.	Min.	Max
Jan.	209.58	200.00	220.00	2.54	2.50	3.00
Feb.	215.00	200.00	230.00	2.61	2.00	3.00
Mar.	160.00	100.00	200.00	2.21	2.00	2.50
Apr.	122.50	100.00	175.00	1.83	1.50	2.00
May	107.50	100.00	120.00	1.51	1.40	1.50
Jun.	98.67	85.00	110.00	1.40	1.25	1.50
Jul.	85.42	75.00	100.00	1.29	1.00	1.50
Aug	71.25	60.00	85.00	1.00	0.90	1.25
Sep.	76.67	65.00	90.00	1.05	1.00	1.25
Oct.	90.42	75.00	110.00	1.27	1.25	1.50
Nov.	100.00	80.00	115.00	1.48	1.25	1.50
Dec.	90.00	85.00	100.00	1.33	1.25	1.50
1999 ave.	118.92			1.63		

(3) Monthly Average of Margins of Middlemen Retail/Wholesale During 1999

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Loman Washed	Jan	Feb	Mar	Apr	May	Jun
	21.27	21.51	38.39	49.66	40.70	41.89
	Jul	Aug	Sep	Oct	Nov	Dec
	51.22	40.94	36.96	40.55	47.92	47.22

Cuadro 5.4.3(2) Costo de Producción y Beneficio de Papa en Condiciones Actuales en Palestinas de los Altos .

Potato

Item	Unit	Price (Quetzal	Quantity	Amount (Quetzal/Manz.)
A) Gross Income				
Unit Yield	qq.	25	240	**6,000**
B) Production Cost				**4,480**
1) Farm Inputs				
- Seeds	qq.	25	40	1,000
- Fertilizers				
N	pound	2.00	320	640
P	pound	1.7	260	442
K	pound	1.6	100	160
- Compost	quintal	20	20	400
- Insecticides				
Cursate	lit	90	5	450
Antracol	kg.	50	13	650
Bondecebe	kg.	40	6	240
Adherent	lit	20	5	100
2) Labor (Paid)	man-day	20	20	400
(Family)	**man-day**		**100**	**0**
C) Net Income	(Quetzal/Manz.)			**1,520**

Cuadro 5.4.6(1) Infraestructura Rural en Palestina (1/3)

1. Community Drinking Water Supply

(1) Number and % of beneficiaries	[No. of Beneficiary] (1) Rural system : 927 houses in the whole system, and 106 houses are located in the project area (data from the water committee as of July 2000) (2) Urban system : 400 houses in the whole system. Most of the taps of the urban system are located at out of the project area, i.e. the Palestina town area, and only Los Cabrera and Los Morares area have the water services from the Urban system. In the Los Cabrera and Los Morares, about 60 % of the houses which have a water tap receive the water through the Urban system. [% of Beneficiary] 60% of all the houses in the area (according to the ad hoc survey by Study Team, which covered 112 houses and 152 families)
(2) Management organization and its regulations	[Water committee] Rural system and central system are managed by CONSIDER - " *La Comision interinstitutcional para la Administracion del Sistema de Agua Rural* " [Water committee member] 17 person of represent of 17 communities, 4 consejales and Mayor) [Regulation of committee] Exists; " *Regamento para la administracion, operacion y mentenimiento del sistema de captacion y distribucion de agua de las comunidades rurales de Palestina de Los Altos* "
(3) Water consumption and operation	[Water record made by the water committee] Exists. [Estimated water consumption per person] 40-80 lit/day/person (condition: 1 house has 6.7 family members) [Average operation hour and discharge of the Rural system] 5-6 hours/day * 21 lit/s (pumping up for 3 hours continuously and 45 minutes interval for re-fulfilling the 1st tank) (the average from Mar-July 2000 based on the electric consumption records)
(4) Facilities	(1) Rural Portable Water system - type of system : pumping-up system - water resources : spring - tank capacity: [1st tank]50m^3 + [2nd]25 m^3 + [3rd]100m^3 - conduction pipe length (from 1st tank to 3rd tank): 2.7 k m - pump : [1st pump]75HP (21 litters/sec) + [2nd] 75HP (21 litters/sec) + [3rd] 50HP (14 litters/sec) (2) Urban Portable Water system - type of system : pumping-up system - water resources : well - pump : 30 HP

Cuadro 5.4.6(1) Infraestructura Rural en Palestina (2/3)

(5) Rule of operation and distribution of drinking water to each family	[Limitation of water usage in volume] : No limit [Limitation of usage for irrigation] Irrigation by the portable water is prohibited. [Daily limitation of usage] : No limit
(6) Water charge price, how to collect water charge, outstanding status, and means against delinquent	[Monthly water charge] (1) Rural system : Q.2 per $1m^3$, and minimum charge is Q.12 for/up to 6 m^3 (2) Urban system : Q.0.35 per $1m^3$, and Minimum charge is Q.11 for/up 30 m^3 [Collection of water charge] The water charge should be paid at the water committee in the municipality office at every end of month. [Total amount of collected water charge in a month] Q.7,000 – Q. 12,000 per month [Means against delinquent] Maximum period of the moratorium for payment: 3 months. *After such moratorium period, the committee cut the services.* *However this penalty deal is not taken frequently because of physical and administrative problems.* [Admission of the Rural Portable Water system] Q. 2,000-4,000 including installation of pipes to the house (Admission varies depending on his past voluntary contribution to the construction works of the system)

2. Sanitary system

(1) Diffusion % of the sanitary systems of the total house	[Toilet] 73 % (the ad hoc survey, which covered 112 houses and 152 families) [Drainage system "sumidero"] 22 % (the ad hoc survey)
(2) Features	[Toilet] Toilet is furnished with a concrete/wooden seat on the top of a dug hole, about 5-8m in depth, and covered with cloth, wooden or plastic screen. [Drainage] Dug pit, 10m in depth, and concrete top cover [1m*1m] Dug pit collects sewerage water from house and water infiltrates ground.
(3) Remarks	[High percentage of self-contained for toilet facility] About 70% of the houses which has the toilet made it by his own finance, and the villagers have high interest in the toilet facility. [Drainage] The drainage facilities installed in the houses were provided by a project and nobody made it by himself. All the houses have surface drainage ditch. And, through the ditch, sewage water can be drained without being stagnate in a house because of its geographical condition. It seems to be no any problem caused by the present poor drainage condition.

Cuadro 5.4.6(1) Infraestructura Rural en Palestina (3/3)

3. Electricity supply

(1) Number and diffusion % of beneficiaries	[Diffusion %] 73 % (the ad hoc survey, which covered 112 houses and 152 families)
(2) Construction / installation cost	Present electricity supply system was constructed by the financial supports of "*Consejo de Desarrollo Urbano y Rural*", the municipality and the community. [Construction year] 1997 for Los Cabrera/Morares, Los Perez and Los Diaz 1999 for Sector I [Finance shouldered by the beneficiary] Q.1000/house and the voluntary services contributing to the construction works
(3) Remarks	According to a farmer, he pays about Q.50-70/month for 3 nos of 75w light bulbs and electricity cut is happen about 4 times in a month and its duration is 3 hours to 1 day.

4. Roads and Bridges

(1) Road in/near the community	[Pavement] Gravel pavement [Present conditions of road] Partially damaged but no problem in general [Maintenance works] Led by the municipality mainly.
(2) Bridge	There are several bridges in the area. The conditions of bridges are good.

5. Improved Stove

(1) Number, diffusion % of the total household in village.	[Diffusion % of the total house] 70 % (the ad hoc survey, which covered 112 houses and 152 families)
(2) Remarks	[High percentage of self-contained for toilet facility] Around 70% of the houses which has the stove made it by his own finance, and the villagers have high interest in the improved stove.

Cuadro 5.4.7(1) Resultados de Las Pruebas de Agua Potable en Palestina

Date of sampling		17/08/2000	17/08/2000	17/08/2000	17/08/2000	18/08/2000	20/09/2000	20/09/2000	
Item	Unit	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Standards
pH	-	7.0	6.6	6.8	7.1	6.5	7.0	6.7	5.8-8.6
EC	µS/cm	116	92	128	159	108	85	99	-
Coliform group	cfu/ml	**10**	**1**	**50**	**30**	**6**	-	-	ND
Bacteria	cfu/ml	40	10	**100**	10	8	-	-	100
COD	mg/l	5	5	5	5	**10**	**50**	**50**	10
TH	mg/l	20	10	20	20	10	10	10	300
NH_4^+	mg/l	ND	ND	ND	ND	ND	0.2	0.2	-
NH_4^+-N	mg/l	ND	ND	ND	ND	ND	0.16	0.16	-
NO_2^-	mg/l	ND	ND	ND	ND	ND	ND	ND	-
NO_2^--N	mg/l	ND	ND	ND	ND	ND	ND	ND	10
NO_3^-	mg/l	5	2	5	5	5	2	2	-
NO_3^--N	mg/l	1.15	0.46	1.15	1.15	1.15	0.46	0.46	10
Cu	mg/l	ND	ND	ND	ND	ND	ND	ND	1.0
Fe	mg/l	ND	ND	ND	ND	ND	ND	ND	0.3
Zn	mg/l	ND	ND	ND	ND	ND	ND	ND	1.0

Remarks: fountain: Q-1,Q-5
well: Q-3
tank: Q-2,Q-4
river: Q-6,Q-7

Cuadro 5.4.7(2) Uso del Agua en Palestina

	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7
Community	Los Cabreras	Los Diaz	Los Perez	Los Perez	Sector 1	Las Rosas	Los Cabreras
Owner	Private	Community	Private	Community	Community	East river of three ones	West river of three ones
Place	fountain	public tank	well	public tank	fountain	river	river
Size	0.7mX0.7mX depth0.3m	-	0.8mX0.8mX 6m(to water surface)	through a pipe	1mX1mX depth2.0m	width 2m, depth 0.4m	width 2m, depth 0.3m
When to use the water	When water supply is cut off, about 10 families use this water.	About 15 families utileze it as daily drinking water.	All the time. No affordability to have running water yet.	Washing place. Possibility to use the water to drink.	Several times a day. There is no water service in this community.	Washing place. Possibility to use the water to drink.	Washing place. Possibility to use the water to drink.

Cuadro 5.4.8(1) Proyectos de Desarrollo Existentes en el Sector de Infraestructura en Palestina

1. Drinking Water Supply Project by CARE

(1) Construction year, executing body	Rural system [Construction year] 1997 [Executing body] CARE Guatemala & Municipality [Beneficiary] 927 houses [Beneficiaries' share of cost] Q 800 and voluntary services (about 5 weeks)
(2) Facilities	- type of system : pumping-up system - water resources : spring - tank capacity: [1st tank]50m^3 + [2nd]25 m^3 + [3rd]100m^3 - conduction pipe length (from 1st tank to 3rd tank): 2.7 k m - pump : [1st pump]75HP (22 litters/sec) + [2nd] 75HP (22 litters/sec) + [3rd] 50HP (14 litters/sec)

2. Sanitary System Project by CARE

(1) Number or % of beneficiary the total house	[Toilet] 23 % (the ad hoc survey, which covered 112 houses and 152 families) [Drainage system "sumidero"] 22 % (the ad hoc survey)
(2) Remarks	Some houses have the toilet and the drainage system which were installed by CARE at the same time of the portable water project. CARE granted the people all the material and the villagers made it following the instruction of CARE. CARE has also introduced a sewerage drainage pit, so called *"sumidero"*, into houses as the same manner of toilet system.

3. Electricity Supply by CODEUR

(1) Number of beneficiaries for power supply	[% of beneficiary] 73 % (the ad hoc survey, which covered 112 houses and 152 families)
(2) Construction / installation cost	Present electric system was constructed by the financial supports of *"Consejo de Desarrollo Urbano y Rural"*(CODEUR), the municipality and the community. [Construction year] 1997 for Los Cabrera/Morares, Los Perez and Los Diaz 1999 for Sector I [Finance shouldered by the beneficiary] Q.1000/house and the voluntary services contributing to the construction works

4. Improved Stove by FIS

(1) Number, % of beneficiaries of the total houses	[% of beneficiary] 73 % (the ad hoc survey, which covered 112 houses and 152 families)
(2) Installation/construction	[Provided by FIS] : Materials, such as blocks, cement and sand, etc. [Provided by the villagers] : Labor services

Cuadro 6.2(1) Procedimiento del Estudio Participativo

Steps	Activities	Contents	Output at each stage	Final Output
Explanation of Study Procedure (Opening)	1) Public Meeting-I	- Explanation of objectives, outline, procedure of the study. - Request cooperation of community members.	-	*I. Community Profile* 1) Socio-economy 2) Agriculture & Livestock 3) Infrastructure 4) Environment 5) Health & Sanitation 6) Resource Map 7) Problem Analysis 8) Objective Analysis 9) Proposed Approach *2. Activity Report* 1) Key-informant Interview 2) Questionnaire Survey 3) Field Inspection 4) Public Meeting (I)~(V) 5) Representative Meeting (I)~(II)
Study on Present Situation	1) Key-informant Interview 2) Questionnaire Survey	- Interview with 5~10 key-informants with semi-structured interview. - Interview with 10~20 households with using simple questionnaire.	- Brief community profile (draft) - List of problems and needs	
Identification of Problems & Needs	1) Public Meeting-II, III (by gender, by age group) 2) Public Meeting-IV (by all members)	- Identification of problems and needs - Consensus on problems and needs - Ranking of needs - Selection of representatives	- List of problems & needs with ranking - List of representatives	
Investigation of Problems, Needs & Potentials	1) Field Inspection with representatives 2) Representative Meeting-I	- Confirmation of problems and potentials through site inspection - Preparation of Resource Map - Marketing condition in/around the cuenca - Environmental impact in/around the cuenca - Problem analysis	- List of confirmed problems & needs - Resource map - Problem trees	
Investigation of Solutions	1) Representative Meeting-II 2) Public Meeting -IV (by all members)	- Alternative (Approach) analysis - Consensus on approaches - Ranking of the approaches	- Objective trees with approaches	

Cuadro 6.3(1) Participación de las personas en las actividades del Estudio

Activities	Xeatzan Bajo				Panyevar				Pachum				Palestina			
	Date	Participants			Date	Participants			Date	Participants			Date	Participants		
		Male	Female	Total		Male	Female	Total		Male	Female	Total		Male	Female	Total
Public Meeting																
1. Public Meeting I	07/18	150	90	240	07/17	80	80	160	07/19	50	20	70	-	95	95	190
2. Public Meeting II	07/31	140	80	220	07/26	94	84	178	08/02	50	30	80	-	63	132	195
3. Public Meeting III	08/01	155	135	290	07/27	101	71	172	08/08	29	10	39	-	54	99	153
4. Public Meeting IV	08/07	125	120	245	08/01	106	97	203	08/16	43	30	73	-	52	89	141
5. Public Meeting V	08/28	90	80	170	08/09	88	71	159	08/30	47	37	84	-	57	101	158
Average Participation		132	101	233.0		93.8	80.6	174.4		43.8	25.4	69.2		64.2	103.2	167.4
Number of Households				325				360				160				297
Participation Rate (%)				71.7				48.4				43.3				56.4
Other Activities																
1. Key-informant Interview	7/19~21	15	3	18	7/18~20	8	4	12	7/25~26	14	3	17	-	22	8	30
2. Questionnaire survey	7/24~28	-	-	30	7/20-23	29	2	31	7/21~8/1	47	2	49	-	108	15	123
3. Representative Meeting I	08/24	20	10	30	08/04	17	7	24	08/23	23	8	31	-	19	11	30
4. Representative Meeting II	08/25	19	6	25	08/07	20	9	29	08/23	23	8	31	-	19	11	30

Activities	Los Cabrera/Morales				Los Diaz/Sector I				Los Perez			
	Date	Participants			Date	Participants			Date	Participants		
		Male	Female	Total		Male	Female	Total		Male	Female	Total
Public Meeting												
1. Public Meeting I	07/21	30	35	65	07/21	30	40	70	07/20	35	20	55
4. Public Meeting II	08/04	14	54	68	08/03	21	50	71	08/02	28	28	56
5. Public Meeting III	08/09	17	17	34	08/10	24	43	67	08/11	13	39	52
6. Public Meeting IV	08/16	16	33	49	08/17	18	32	50	08/18	18	24	42
9. Public Meeting V	09/13	12	37	49	09/12	27	40	67	09/11	18	24	42
Average Participation		17.8	35.2	53		24	41	65		22.4	27	49.4
Number of Households				83				107				107
Participation Rate (%)				63.9				60.7				46.2
Other Activities												
2. Key-informant Interview	7/28-29	7	3	10	7/26-27	7	3	10	7/24-25	8	2	10
3. Questionnaire survey	7/31-8/1	39	3	42	8/2-3	43	11	54	8/4-7	26	1	27
7. Representative Meeting I	08/22	7	3	10	08/22	6	5	11	08/22	6	3	9
8. Representative Meeting II	08/22	7	3	10	08/22	6	5	11	08/22	6	3	9

Cuadro 7.5(1) Inidicadores para Seguimiento y Organización de la Ejecución y Manejo de los Proyectos

No.	Name of the Project	Monitoring Indicators		Organization of monitoring
		condition of before implementation of the project	condition after implementation of the project	
Environment and Conservation Plans				
a-1	Restoration plan of the collapsed lands	1. Progress of completion of construction 2. Qualitative monitoring soil erosion 3. Farmer's participation rate	1. Growth rate of trees 2. Soil amounts to be eroded	An environmental committee in the community A executing office
a-2	Soil Conservation plan for steep farm lands	1. Progress of completion of construction 2. Farmer's participation rate	1. Growth rate of crop 2. Soil amounts to be eroded	An environmental committee in the community An executing office
a-3	Forestation plan	1. Progress of completion of construction 2. Farmer's participation rate	1. Growth rate of trees 2. No. of participant for forestation and training programs	An environmental committee in the community An executing office
a-4	Agro-forestry development plan	1. Progress of completion of construction 2. Farmer's participation rate	1. Growth rate of crops and trees 2. No. of participation for tree planting and training programs	An environmental committee in the community An executing office
a-5	Management plan of water quality	-	1. Content of toxity materials in water	Municipality office
a-6	Solid wastes treatment plant	1. Progress of completion of construction	1. Quantity of solid wastes 2. Amount of produced composts 3. Financial status of a executing committee	An committee in the municipality A municipality office An executing office
Plans for Increasing Income Generation			3. Financial statement	
b-1	Plan for making composts	1. Progress of completion of construction	1. Production cost of compost per ton 2. Production of composts 3. Financial statement	A municipality office An executing office
b-2	Plan of model farm on potato production	1. Progress of completion of implementation	1. Number of farmer's visitors 2. Yield of potatoes	An executing committees in the municipality An executing office
b-3	Potato storage plan (a) farmer's level	1. Progress of completion of construction	1. Price of potatoes 2. Amount damaged during storage period and quality of potatoes	A executing committee in the community An executing office
	Potato storage plan (a) commercial level	1. Progress of completion of construction	1. Price of potatoes 2. Quality of potatoes 3. Financial statement	An executing committee in the municipality A municipality office An executing office
b-4	Potato processing plan	1. Progress of completion of construction	1. Production cost 2. Financial statement	Cooperatives in the community An executing office
b-5	Mini-irrigation plan	1. Progress of completion of construction 2. Farmer's participation rate for provision of labor force for construction	1. Net benefits 2. Collection Rate of water charge	Irrigation committee in the community An executing office
b-6	Payer-chicken Raising Plan for women's groups	1. Progress of completion of construction	1. Status for raising 2. Amount of eggs and salad eggs, and net profit of cooperatives	Women' cooperative in villages An executing office

Cuadro 7.5(1) Inidicadores para Seguimiento y Organización de la Ejecución y Manejo de los Proyectos

No.	Name of the Project	Monitoring Indicators		Organization of monitoring
		condition of before implementation of the project	condition after implementation of the project	
b-7	Project for improvement of coffee plantation	1. Progress of completion of construction	1. Growth rate of coffee seedlings 2. Areas that replanted by new seedlings 3. Number of farmers who use composts and imporved technical methods 4. Yield of coffee and other cash orchard trees 5. Financial statement of cooperative	A coffee farmer's cooperative in the community An executiong office
b-8	Coffee processing plan	1. Progress of completion of construction	1. Total amount of coffee bean to be pulped 2. Rate of milling 3. Financial statement of cooperative	Coffee processing cooperatives in the community An executiong office
b-9	Agro-processing development plan	1. Progress of completion of construction	1. Total production 2. Amount of sales of production 3. Financial statement of cooperatives	Agro-processing farmer's cooperatives in the community An executing office
b-10	Plan of direct sale of vegetables	1. Progress of completion of construction	1. Total amount of agricultural products to be dealt with 2. Price of agricultural products to be dealt with	Crop production cooperatives in the community An executing office
b-11	Improvement plan for maize threshing	1. Consumed time to be threshed for maize by traditional method	1. Consumed time to be threshed for maize by threshing equipment	A committee in the community An executing office
b-12	Institutional plan for fostering nucleus farmers	1. Progress of completion of implementation	1. Number of meetings 2. Improvement of capacity of nucleus farmers	A nucleus farmer committe in the community An executing office
b-13	Plan of Revolving fund for hand weaving thread	1. Progress of completion of implementation	1. Amount of sales and stock of thread 2. Financial status of committee 3. Reduction of production costs	Cooperatives An executing office
Improvement plan for living environments				
c-1	Rehabilitation plan of roads in the village	1. Progress of completion of construction		A road committee in the community/ an executing office
c-2	Rehabilitation plan of regional roads	1. Progress of completion of construction		Mininstry concerned
c-3	Plan of rural electricity	1. Progress of completion of construction	1. Collection rate of electric charge	A electric and energy committee in the community/an executing office
c-4	Rehabilitation plan for drinking water system	1. Progress of completion of construction	1. Collection rate of water charge 2. Frequency and duration of suspension of water supply	Water committee in the community An executing office
c-5	Water quality improvement plan for the existing drinking water supply system	1. Progress of completion of construction	1. Number of users 2. Status of water treatment system 3. Number of diarrhea patients 4. No. of colon bacillus in potable water	Water committee in the community An executing office
c-6	Plan of extension use of improved cooking stoves and of Sauna bath "Temascal"	1. Consumption of wood fuel	1. Farmer's perception 2. Consumption of wood fuel	A committee in the community
c-7	Plan of provision toilette facilities	1. Progress of completion of construction	1. Status of facilities	A committee in the community

Cuadro 7.5(1) Inidicadores para Seguimiento y Organización de la Ejecución y Manejo de los Proyectos

No.	Name of the Project	Monitoring Indicators		Organization of monitoring
		condition of before implementation of the project	condition after implementation of the project	
c-8	Plan of night time health education		1. Number of participants	Health committees in the community/an executing office
c-9	Plant medicine growing plan	1. Progress of completion of construction	1. Yield of medical crops 2. Amount of sales of production 3. Financial status	Health guards in the community An executing office
c-10	Improvement plan of service quality given to Comadronas	1. Progress of completion of implementation	1. Maternal mortality rate 2. Number of paitients	Comadronas , Health committees in the community An executing office
c-11	Plan for installation of minimal phaaarmacy unit (MPU)	1. Progress of completion of implementation	1. Kind and aomount of drug to be saled and stocked 2. Profit in MPU 3. Accounting status of MPU 4. Budget use in health committee	A health committee in the community MPU An executing office
c-12	Integrated community health activity Plan	1. Progress of compretion of implementation	1. Kind and aomount of drug to be saled and stocked 2. Profit in MPU 3. Accounting status of MPU 4. Budget use in health committee	A health committee in the community MPU A municipality office An executing office
c-13	Plan for immigrant people to the coastal areas	1. Progress of completion of implementation	1. % of farmers contaminated by agricultural chemicals 2. Number of diarrhea patients	A committee in the community An executing office
c-14	Plan for reducing work load in the mountainous area through coffee processing	1. Progress of completion of implementation	1. Income of beneficiaries 2. Processed amount of coffee and milling rate	A committee in the community An executing office