

# ***TABLES***

Table 8.3.1(1) Proposed Farming Practices for Irrigated Crops in Xeatzan Bajo Area

<b>Xeatzan Bajo</b>	<b>Prácticas Propuestas</b>
<b>Cultivo: Brócoli</b>	
Varedades	Green Beret, Sakata, Green Mountain, Shogun, Manrathon
Densidad de Siembra y Material usado	30,000 plantas por manzana. Se siembran plantitas de "pilones" desarrollados en invernaderos comerciales.
Fertilización (lib/Manzana)	N=350; P=150; y K= 380
Mano de Obra (Jornales/Manzana)	pagado = 65 jornales; familiar = 160 jornales.
Riego	La programación del riego se realizará en base a requerimientos del cultivo.
Control de Insectos & Enfermedades	Aplicar importantes y económicas prácticas de Manejo Integrado de Cultivos (MIC) que han sido validadas por el ICTA, tal como la "Solarización del Suelo" que consiste en cubrir el suelo con plástico por un período de 6 semanas; Aplicar criterios de Umbral Económico de daños para el control de plagas. Hacer aplicaciones para control de insectos y nematodos aplicando pesticidas solo cuando se compruebe su necesidad. Usar insecticidas y fungicida de baja dosis letal para humanos.
<b>Cultivo: Arvejas</b>	
Varietades	Oregon Sugar Pod, Taichung, Melting Sugar
Densidad de Siembra y Material usado	80,000 plantas por manzana, siembra directa en el campo.
Fertilización (lib/Manzana)	N=50; P=90; y K=110
Mano de Obra (Jornales/Manzana)	pagado = 85 jornales; familiar = 120 jornales
Riego	La programación del riego se realizará en base a requerimientos del cultivo.
Control de Insectos & Enfermedades	Aplicar importantes y económicas prácticas de Manejo Integrado de Cultivos (MIC) que han sido validadas por el ICTA, tal como la "Solarización del Suelo" que consiste en cubrir el suelo con plástico por un período de 6 semanas; Aplicar criterios de Umbral Económico de daños para el control de plagas. Hacer aplicaciones para control de insectos y nematodos aplicando pesticidas solo cuando se compruebe su necesidad. Usar insecticidas y fungicida de baja dosis letal para humanos.
<b>Cultivo: Ejote Francés</b>	
Varedades	Processor, Strigless Blue Lake
Densidad de Siembra y Material usado	30,000 plantas/manzana; aproximadamente 120 lib de semillas por manzana; siembra directa.
Fertilización (lib/Manzana)	N=60; P=100; y K= 100
Mano de Obra (Jornales/Manzana)	pagado = 85 jornales; familiar = 120 jornales.
Riego	La programación del riego se realizará en base a requerimientos del cultivo.
Control de Insectos & Enfermedades	Similar que Arvejas
<b>Cultivo: Zanahoria</b>	
Varedades	Chantenay Red Cored, Tahoe, Bonanza, Spartan
Densidad de Siembra y Material usado	0.5 m entre surcos y 0.08 m plantas; Aprox. 175,000 plantas/manzana; 5 lib de semillas por manzana; Siembra directa.
Fertilización (lib/Manzana)	N=150; P=80; y K=225
Mano de Obra (Jornales/Manzana)	pagado = 60 jornales; familiar = 90 jornales.
Riego	La programación del riego se realizará en base a requerimientos del cultivo.
Control de Insectos & Enfermedades	Aplicar importantes y económicas prácticas de Manejo Integrado de Cultivos (MIC) que han sido validadas por el ICTA, tal como la "Solarización del Suelo" que consiste en cubrir el suelo con plástico por un período de 6 semanas; Aplicar criterios de Umbral Económico de daños para el control de plagas. Hacer aplicaciones para control de insectos y nematodos aplicando pesticidas solo cuando se compruebe su necesidad. Usar insecticidas y fungicida de baja dosis letal para humanos.
<b>Cultivo: Black berry</b>	
Todas las actividades agrícolas son realizadas manualmente; no se usan tractores u otros equipos mecánicos	
Varedades	
Densidad de Siembra y Material usado	Aproximadamente 3,000 plantas por manzana
Fertilización (lib/Manzana)	N=300; P=350; y K= 300
Mano de Obra (Jornales/Manzana)	pagado =70 jornales; familiar = 180 jornales.
Riego	La programación del riego se realizará en base a requerimientos del cultivo.
Control de Insectos & Enfermedades	Aplicar prácticas de Manejo Integrado de Plagas (MIP) que han sido validadas por el ICTA; Aplicar criterios de Umbral Económico; Hacer aplicaciones de pesticidas solo cuando se compruebe su necesidad, usar pesticidas de baja dosis letal para humanos.

Table 8.3.1 (2) Expected Yield and Annual Production of Proposed Crops

Crop	Unit	Expected Yield (per Manzana)	Planted Area (Manzana)	Expected Annual Production
1 Broccoli	heads	25,000	2	50,000
2 Brussels	qq.	480	0.5	240
3 Cabbage	heads	25,000	0.5	12,500
4 Snow Pea	qq.	180	4	720
5 Sugar Snap	qq.	180	3	540
6 French Bean	qq.	180	3	540
7 Cauliflower	heads	25,000	3	75,000
8 Carrot	qq.	600	2	1,200
9 Lettuce	heads	57,000	2	114,000
10 Black Berry	flats	2,700	1	2,700
Total			21	

Table 8.3.1 (3) Prices of Farming Inputs

Type of Inputs	Unit	Unit Cost (Quetzals)
<b>1 Seeds</b>		
Tomato (Daniela)	1,000 seeds	850
Tomato (Alboran RZ)	1,000 seeds	500
Tomato (Santa Clara)	lib.	705
Chili pepper (agronomico 10 G)	lib.	401
Chili pepper (Natali)	1,000 seeds	450
Chili pepper	lib.	666
Carrot	lib.	85
Carrot (Cantenay Andina)	lib.	101
Snow pea (Goliath)	lib.	19
Snow pea	lib.	12
French bean (Masai)	lib.	33
Broccoli (Legacy)	1,000 seeds	40
Cauliflower (Snoval)	lib.	370
Cabbage (Indiana)	1,000 seeds	31
Lettuce	lib.	352
Guicoy	ounce	30
<b>2 Fertilizers</b>		
Urea	qq.	94
Supper phosphate	qq.	121
Potassium Chloride (KCl)	qq.	95
15-15-15	qq.	95
<b>3 Insecticides</b>		
Malathion	lit	27
Diazinon	lit	121
Thiodan	lit	66
Sevin	lib.	66
<b>4 Fungicides</b>		
Dithane M 45	kg.	44

**Table 8.3.1 (4) Proposed Irrigation Water Charge in Xeatzan Bajo**

1) Pump Condition

H = 162m CDT, Q = 7 lit/sec, 45HP  
 Required water vokume 302.1 m<sup>3</sup>/day  
 Pumping-up Capacity : 25.2 m<sup>3</sup>/hr  
 Operation duration 12.0 hrs

2) Fuel Consumption

Fuel Consumption w/ 45HP-pump 9.5 lit/hr 0.21 lit/HP-hr  
 Fuel Cost for 1 hr operation 34.0 Q/hr 55gal=208lit=Q750, 1litter=Q3.60  
 Pumping-up Capacity 25.2 m<sup>3</sup>/hr  
 Diesel cost for pumping 1m<sup>3</sup> of water **1.35 Q/m<sup>3</sup>**

3) Water Charge

		say,	
Fuel Cost	1.35 Q./m <sup>3</sup>	1.30 Q./m <sup>3</sup>	65%
O & M Cost	0.27 Q./m <sup>3</sup>	0.30 Q./m <sup>3</sup>	15%
Miscellaneous*	0.41 Q./m <sup>3</sup>	0.40 Q./m <sup>3</sup>	20%
<b>Total</b>	<b>2.03 Q./m<sup>3</sup></b>	<b>2.00 Q./m<sup>3</sup></b>	

\* Miscellaneous includes contingency cost and the curtain amount of money to be used for overall welfare programs in Xeatzan Bajo.

4) Water Consumption for Irrigation

Condition : 0.76 lit/s/ha for 1crop season (100days),  
 Avagare water comsumption : 80% of max.  
 5,253 m<sup>3</sup>/ha/1crop  
 3,677 m<sup>3</sup>/manzana/1crop  
 609 m<sup>3</sup>/0.116ha(1cuerda)/1crop

5) Total Water Charge to be Collected in dry season

Total irrigated area : 4.6ha=40cuerda, 1 crop season = 100days

5,253 m<sup>3</sup>/ha/1crop : water consumption  
 24,164 m<sup>3</sup>/4.6ha/1crop : water consumption

Fuel Cost	31,414 Q./1 crop
O & M Cost	7,249 Q./1 crop
Miscellaneous*	9,666 Q./1 crop
<b>Total</b>	<b>48,329 Q./1 crop</b>

6) Water Charge for 1 pot (1/2cuerda = 0.058ha = 580m<sup>2</sup>)

Condition : 0.76 lit/s/ha for 1crop season (100days)  
 305 m<sup>3</sup>/0.058ha(0.5cuerda)/1crop : water consumption

**617 Q./0.058ha(0.5cuerda)/1crop**

**Table 8.3.1(5) Financial Crop Budget With and Without Project Conditions for Xeatzan Bajo Area (1/4)**

**Snow Pea (Arvejas Chinas)**

Item	Unit	<b>(1) Without Project</b>			<b>(2) With Project</b>		
		Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)	Unit Price (Quetzal)	Quantity (Quetzal/Manz.)	Amount (Quetzal/Manz.)
<b>A) Gross Income</b>							
Unit Yield	quintal	180	125.0	<b>22,500</b>	200	180.0	<b>36,000</b>
<b>B) Production Cost</b>				<b>5,250</b>			<b>7,150</b>
1) Farm Inputs							
- Seeds	pound	12	100	1,200	19	110	2,090
- Fertilizers							
N	pound	2.00	35	70		50	100
P	pound	1.7	75	128		90	153
K	pound	1.6	85	136		110	176
- Compost	quintal	30	20	600	30	30	900
- Insecticides	lit	95	6	570		5	475
- Fungicides	pound	45	4	180		4	180
- Hanging rope				500			500
2) Labor (Paid)	man-day	25	30	750		45	1,125
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>60</b>	<b>0</b>		<b>65</b>	<b>0</b>
3) Miscellaneous (10%)				413			570
4) Financial cost (21% of Direct Cost)				703			878
<b>C) Net Income</b>	(Quetzal/Manz.)			<b>17,250</b>			<b>28,850</b>

**French Bean**

Item	Unit	<b>(1) Without Project</b>			<b>(2) With Project</b>		
		Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)	Unit Price (Quetzal)	Quantity (Quetzal/Manz.)	Amount (Quetzal/Manz.)
<b>A) Gross Income</b>							
Unit Yield	quintal	125	150.0	<b>18,750</b>	200	180.0	<b>36,000</b>
<b>B) Production Cost</b>				<b>7,660</b>			<b>9,690</b>
1) Farm Inputs							
- Seeds	pound	20	100	2,000	25	120	3,000
- Fertilizers							
N	pound	2.00	30	60		60	120
P	pound	1.7	70	119		100	170
K	pound	1.6	85	136		100	160
- Compost	quintal	30	20	600	30	30	900
- Insecticides	lit	100	6	600		6	600
- Fungicides	pound	45	4	180		4	180
- Hanging rope				500			500
2) Labor (Paid)	man-day	25	75	1,875		85	2,125
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>110</b>	<b>0</b>		<b>120</b>	<b>0</b>
3) Miscellaneous (10%)				607			776
4) Financial cost (21% of Direct Cost)				982			1,162
<b>C) Net Income</b>	(Quetzal/Manz.)			<b>11,090</b>			<b>26,310</b>

**Table 8.3.1(5) Financial Crop Budget With and Without Project Conditions for Xeatzan Bajo Area (2/4)**

**Brocoli**

Item	Unit	<b>(1) Without Project</b>			<b>(2) With Project</b>			
		Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
<b>A) Gross Income</b>								
Unit Yield	quintal	70	140.0	<b>9,800</b>	<b>Head</b>	1.2	25,000	<b>30,000</b>
<b>B) Production Cost</b>				<b>6,480</b>				<b>10,530</b>
1) Farm Inputs								
- Seeds	seedlings	0.1	25,000	2,500		0.12	30,000	3,600
- Fertilizers								
N	pound	2.00	250	500			350	700
P	pound	1.7	100	170			200	340
K	pound	1.6	210	336			380	608
- Compost	quintal	30	10	300		30	30	900
- Insecticides	lit	95	6	570			6	570
- Fungicides	pound	45	3	135			3	135
2) Labor (Paid)	man-day	25	30	750			65	1,625
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>150</b>	<b>0</b>			<b>160</b>	<b>0</b>
3) Miscellaneous (10%)				526				848
4) Financial cost (21% of Direct Cost)				690				1,202
<b>C) Net Income</b>				<b>3,320</b>				<b>19,470</b>

**Cauliflower**

Item	Unit	<b>(1) Without Project</b>			<b>(2) With Project</b>			
		Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
<b>A) Gross Income</b>								
Unit Yield	quintal	80	160.0	<b>12,800</b>	<b>Head</b>	1.2	25,000	<b>30,000</b>
<b>B) Production Cost</b>				<b>7,650</b>				<b>10,600</b>
1) Farm Inputs								
- Seeds	seedlings	0.1	27,000	2,700		0.12	30,000	3,600
- Fertilizers								
N	pound	2.00	220	440			350	700
P	pound	1.7	85	145			150	255
K	pound	1.6	260	416			380	608
- Compost	quintal	20	25	500		30	30	900
- Insecticides	lit	95	4	380			4	380
- Fungicides	pound	45	2	90			2	90
2) Labor (Paid)	man-day	25	60	1,500			80	2,000
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>145</b>	<b>0</b>			<b>150</b>	<b>0</b>
3) Miscellaneous (10%)				617				853
4) Financial cost (21% of Direct Cost)				858				1,215
<b>C) Net Income</b>				<b>5,150</b>				<b>19,400</b>

**Table 8.3.1(5) Financial Crop Budget With and Without Project Conditions for Xeatzan Bajo Area (3/4)**

**Cabbage**

Item	Unit	Unit Price (Quetzal)	<b>(1) Without Project</b>		<b>(2) With Project</b>			
			Quantity	Amount (Quetzal/Manz.)	Unit	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
<b>A) Gross Income</b>								
Unit Yield	qq.	25	650	<b>16,250</b>	Head	<b>1.0</b>	25,000	<b>25,000</b>
<b>B) Production Cost</b>				<b>7,630</b>				<b>11,140</b>
1) Farm Inputs								
- Seeds	seedlings	0.1	25,000	2,500	0.12		30,000	3,600
- Fertilizers								
N	pound	2.00	275	550			400	800
P	pound	1.7	100	170			200	340
K	pound	1.6	325	520			400	640
- Compost	quintal	10	10	100	30		30	900
- Insecticides	lit	95	9	855			9	855
- Fungicides	pound	45	4	180			4	180
2) Labor (Paid)	man-day	25	50	1,250			65	1,625
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>100</b>	<b>0</b>			<b>110</b>	<b>0</b>
3) Miscellaneous (10%)				613				894
4) Financial cost (21% of Direct Cost)				890				1,309
<b>C) Net Income</b>	(Quetzal/Manz.)			<b>8,620</b>				<b>13,860</b>

**Cole of Brussels**

Item	Unit	Unit Price (Quetzal)	<b>(1) Without Project</b>		<b>(2) With Project</b>		
			Quantity	Amount (Quetzal/Manz.)	Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)
<b>A) Gross Income</b>							
Unit Yield	quintal	65	300.0	<b>19,500</b>	<b>65</b>	400	<b>26,000</b>
<b>B) Production Cost</b>				<b>7,770</b>			<b>11,370</b>
1) Farm Inputs							
- Seeds	seedlings	0.1	20,000	2,000	0.12		30,000
- Fertilizers							
N	pound	2.00	220	440			300
P	pound	1.7	90	153			150
K	pound	1.6	260	416			380
- Compost	quintal	20	25	500	30		30
- Insecticides	lit	95	8	760			8
- Fungicides	pound	45	3	135			3
2) Labor (Paid)	man-day	25	70	1,750			90
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>150</b>	<b>0</b>			<b>165</b>
3) Miscellaneous (10%)				615			911
4) Financial cost (21% of Direct Cost)				1,001			1,348
<b>C) Net Income</b>	(Quetzal/Manz.)			<b>11,730</b>			<b>14,630</b>

**Table 8.3.1(5) Financial Crop Budget With and Without Project Conditions for Xeatzan Bajo Area (4/4)**

**Carrot**

Item	Unit	<b>(1) Without Project</b>			<b>(2) With Project</b>		
		Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)	Unit Price (Quetzal)	Quantity (Quetzal/Manz.)	Amount
<b>A) Gross Income</b>							
Unit Yield	qq.	55	425	<b>23,380</b>	55	600	<b>33,000</b>
<b>B) Production Cost</b>				<b>6,030</b>			<b>7,600</b>
1) Farm Inputs							
- Seeds	pound	100	5	500	150	6	900
- Fertilizers							
N	pound	2.00	150	300		250	500
P	pound	1.7	80	136		150	255
K	pound	1.6	225	360		300	480
- Compost	quintal	30	25	750	30	30	900
- Insecticides	lit	95	8	760		8	760
- Fungicides	pound	45	4	180		4	180
2) Labor (Paid)	man-day	25	65	1,625		75	1,875
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>90</b>	<b>0</b>		<b>100</b>	<b>0</b>
3) Miscellaneous (10%)				461			585
4) Financial cost (21% of Direct Cost)				960			1,162
<b>C) Net Income</b>	(Quetzal/Manz.)			<b>17,350</b>			<b>25,400</b>

**Lettuce**

Item	Unit	<b>(1) Without Project</b>			<b>(2) With Project</b>		
		Unit Price (Quetzal)	Quantity	Amount (Quetzal/Manz.)	Unit Price (Quetzal)	Quantity (Quetzal/Manz.)	Amount
<b>A) Gross Income</b>							
Unit Yield	heads	<b>0.5</b>	50,000	<b>25,000</b>	<b>0.75</b>	55,000	<b>41,250</b>
<b>B) Production Cost</b>				<b>10,900</b>			<b>12,610</b>
1) Farm Inputs							
- Seeds	seedlings	0.1	55,000	5,500	0.1	60,000	6,000
- Fertilizers							
N	pound	2.00	85	170		120	240
P	pound	1.7	40	68		50	85
K	pound	1.6	175	280		220	352
- Compost	quintal	20	35	700	30	30	900
- Insecticides	lit	95	2	190		2	190
- Fungicides	pound	75	2	150		2	150
2) Labor (Paid)	man-day	25	80	2,000		100	2,500
<b>Labor (Family)</b>	<b>man-day</b>	<b>0</b>	<b>120</b>	<b>0</b>		<b>120</b>	<b>0</b>
3) Miscellaneous (10%)				906			1,042
4) Financial cost (21% of Direct Cost)				937			1,146
<b>C) Net Income</b>	(Quetzal/Manz.)			<b>14,100</b>			<b>28,640</b>

Table 8.3.1 (6) Maximum Available Water and Irrigation Water Requirement in the Mini Irrigation System in Xeatzan Bajo, Chimaltenango

(1) Maximum Available Water

**Maximum Available Water for the project : 7.0 lit/s (56% of the spring discharge)**

- Name of spring : Pachomochai Spring
- Present discharge of the spring : 12.5 lit/s
- Annual increase rate of population : 3 % per year<sup>\*1</sup>
- Number of families 325 families
- Period to be considered 15 years
- The number of family member 5.3 persons/family<sup>\*2</sup>
- Assumed water consumption per capita in 15 years later  
72 lit/person/day<sup>\*3</sup>
- Safety Factor in consideration of Dry Year 0.75
- Future Requirement for Drinking Water 3.0 lit/s for 14 hrs pumping up

(Note: \*1: National population increasing rate based on the census '73 and '94 is 2.3%, 2: Based on the household survey. \*3: 120 % of the present max consumption)

(2) Irrigation Water Requirement

The calculated irrigation water requirement : **6.6 mm/day, 0.76 liters/sec/ha.**

Irrigation water requirements for each crop are calculated by the following formula :

$$WR_g = WR_n / I_e * C_{loss}$$

$WR_n = ET_{crop} - E_{rain}$  here is,  $WR_g$  : Gross Water Requirement (mm/day)  
 $WR_n$  : Net Water Requirement (mm/day)  
 $ET_{crop}$  : Crop Evapotranspiration (mm/day)  
 $I_e$  : Irrigation Efficiency  
 $E_{rain}$  : Effective Rain (mm/day)  
 $C_{loss}$  : Conveyance Loss Factor

$ET_{crop} = E_{To} * K_c$  here is,  $E_{To}$  : Potential Evapotranspiration (mm/day)  
 $K_c$  : Crop coefficient

NOTE >  $E_{To}$  : Measured data by INSIVUMEH at San Matin Jilotepeque in Chimaltenango

**Table 8.3.1 (7) Calculation of Irrigation Water Requirement : Xeatzan Bajo**

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ETo (mm/mon.)	99	109	141	137	132	108	116	122	105	105	90	95
Ave. Kc	0.00	0.56	0.90	0.80	0.19	0.65	0.84	0.76	0.60	0.85	0.44	0.04
ETo (mm/mon.)	0.0	61.0	126.3	109.6	24.8	69.8	96.9	92.9	63.2	89.1	39.9	3.8
ETo (mm/day)	0.0	2.2	4.1	3.7	0.8	2.3	3.1	3.0	2.1	2.9	1.3	0.1
Rainfall (mm/mon.)	3.3	6.2	17.2	24.9	110.9	258.1	203.2	198	263.4	151	31.5	5
Effective rain(mm/mon)	1.98	3.72	10.32	9.96	44.36	103.24	81.28	79.20	105.36	60.40	18.90	3.00
Net Water Requirement(mm/mon)	0.0	57.3	116.0	99.6	0.0	0.0	15.6	13.7	0.0	28.7	21.0	0.8
Net Water Requirement(mm/day)	0.0	2.0	3.8	3.3	0.0	0.0	0.5	0.4	0.0	0.9	0.7	0.0
Gross Water Requirement (mm/day) *1	0.0	3.5	6.6	5.7	0.0	0.0	0.9	0.8	0.0	1.6	1.2	0.0
Gross Water Requirement (mm/day) *2	0.0	2.9	5.4	4.7	0.0	0.0	0.7	0.6	0.0	1.3	1.0	0.0
Gross Water Requirement (mm/day) max	0.0	3.5	<u>6.6</u>	5.7	0.0	0.0	0.9	0.8	0.0	1.6	1.2	0.0
Gross Water Requirement (lit/s/ha)	0.00	0.41	<u>0.76</u>	0.66	0.00	0.00	0.10	0.09	0.00	0.18	0.14	0.01

ETo : Measured data by INSIVUMEH at San Martin Jilotepeque in Chimaltenango

\*1 : Case 1 for sprinkler irrigation without green house (70% of loss)

\*2 : Case 2 for drip irrigation with green house (85% of loss)

**Calculation condition**

- 1) Cultivation :  
Case 1 : Sprinkler irrigation  
Case 2 : drip irrigation
- 2) Irrigation efficiency : 70 % for sprinkler irrigation  
85% for drip irrigation  
- Drip irrigation : more than 85-90%, say 85%  
- Sprinkler irrigation : 70-85% say, 70%  
- Surface irrigation : 50%
- 3) Conveyance loss factor : 1.2

Crops	cropping period (days)				Kc				
	Total	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Broccoli	80	20	30	20	10	0.5-0.6	0.78	0.95	0.80
Cabbage	90	25	30	25	10	0.5-0.6	0.78	0.95	0.80
Carrot	90	15	25	30	20	0.5-0.6	0.80	1.00	0.70
Guicoy	90	20	30	30	10	0.5-0.6	0.78	0.95	0.80
Brusselsa Spuraut	90	25	30	25	10	0.5-0.6	0.78	0.95	0.80
Cauliflower	80	20	30	20	10	0.5-0.6	0.78	0.95	0.80
French bean	70	10	25	25	10	0.5-0.6	0.78	0.95	0.85
Lettuce	75	20	30	15	10	0.5-0.6	0.78	0.95	0.90
Snow pea	80	15	20	30	15	0.5-0.6	0.83	1.05	0.95
Sugar Snap	90	15	25	35	15	0.5-0.6	0.83	1.05	0.95

NOTE> 1th : Initial period, 2nd : crop development period, 3 : mid-season, 4th : last season

Kc : Derived from FAO technical book, Condition: 4days interval irrigation, climate RH>70% & Wind0-5m/s

**Table 8.3.1 (8) Required Unskilled Labor of the Beneficiaries : Mini-Irrigation in Xeatzan Bajo**

1) Calculation of Man-Powers	Items	Excavation Volume [m3]	Backfilling Volume [m3]	Pipe Placement [m]	Man-power [man-day]	Man-power [men/day]	2001						2002			
							Aug	Sep	Oct	Nov	Dec	Jan	Feb			
	Construction Stage															
	Pump House and Suction Pit	40		0	34	1										
	Pump Installation and Miscellaneous Works															
	Upper Tank	100	30	0	96	2										
	Conduction Pipes	390	312	1,320	532	12										
	Distributary Pipes	1,650	1,320	12,000	2,634	20										
	Valves / Filters / Regulator Installation etc.															
	Miscellaneous Works 5%	LS			164.8											
	Total				3,461											

Number of Beneficiaries : 80

**2) Labor Productivity for Civil Works\***

Work Items	Productivity	Unit
Excavation	0.84	man-day/m3
PVC Pipe Placement	0.06	man-day/m
Backfilling	0.40	man-day/m3

\* : Derived from a Japanese Labor Productivities with modified factor Fm (=2.0) .

**3) Participation of the Beneficiaries in the Construction Period**

769.1 man-day/month in total
9.6 man-day/month/family
2.4 times/week/family

**Table 8.3.1. (9) Proposed Concept of Organization for Mini-irrigation Project (Xeatzan Bajo)**

1. Beneficiaries	<ul style="list-style-type: none"> <li>• The beneficiaries of the project will be the farmers in Caserío Xeatzan Bajo who are willing to participate in this project and satisfy the requirements stated below.               <ul style="list-style-type: none"> <li>- Engage in vegetable production at present</li> <li>- Be able to secure land area (0.058ha) in the assigned project area</li> <li>- Be able to afford initial investment for farm input (water charge, fertilizer, seeds, etc.)</li> <li>- Be able to afford initial investment for tertiary irrigation system</li> <li>- Agree with the project concepts</li> <li>- Cultivate the irrigated plot by himself. Tenant farming would not be accepted.</li> <li>- Be a member of water users' association formed by the beneficiaries. To be a member, it is required to provide hand labor in constructing irrigation system or for certain days that is decided among the association.</li> </ul> </li> </ul>
2. Water Users' Association	<ul style="list-style-type: none"> <li>• The community has already established a committee by themselves for implementation of the irrigation project. With making this committee as an executing committee, water users' association will be established by the beneficiaries of the irrigation system. After the establishment of WUA, member of the original executing committee has to be revised or re-elected.</li> <li>• The committee will be an executing body of the water users' association and be named as irrigation committee. The structure of committee would be a) President (1 person), b) Vice-president (1 person), c) Secretary (1 person), d) Treasurer (1 person), e) Vocales (5 persons).</li> <li>• Since the development committee of the community is legally registered, legal registration would not be necessary. Rather, the function of water users' association will be added to constitute of the present development committee.</li> <li>• The Water Users' Association will be in charge of 1) collection of water charge, 2) operation and maintenance of the system, and 3) decision making on use of the irrigation facility.</li> </ul>
3. Support System	
a) JICA Study Team	<ul style="list-style-type: none"> <li>• Overall supervision of the project</li> <li>• Provision of equipment and facility</li> <li>• Monitoring and evaluation of the project</li> </ul>
b) MAGA	<ul style="list-style-type: none"> <li>• Assignment of at least one personnel for the liaison officer of the Project</li> <li>• Overall supervision and data collection for monitoring.</li> <li>• Provision of technical consultancy for the case irrigation system is broken down.</li> </ul>
c) Consultant or NGO	<ul style="list-style-type: none"> <li>• Provision of technical assistance for vegetable production</li> <li>• Assistance in finding market</li> </ul>
d) Water Users' Association	<ul style="list-style-type: none"> <li>• Operation and maintenance of the irrigation system</li> <li>• Collection of water charge</li> </ul>
5. Land for Cultivation	<ul style="list-style-type: none"> <li>• Beneficiaries will provide land for cultivation. Basically, those who have the land area in the potential command area will provide their land for cultivation. For those who do not have land, rental type of land use has to be considered.</li> </ul>
6. Ownership of Irrigation Facility	<ul style="list-style-type: none"> <li>• Ownership of the irrigation system will belong to the community (the development committee since it is registered civil association).</li> <li>• Any decisions on facility use have to be made by the consensus among the association members with appropriate procedure such as general assembly. Details has to be clarified during the establishment of the association.</li> <li>• The ownership of tertiary system will belong to the beneficiaries since they have to pay for the cost of material and installation.</li> </ul>
7. Water charge	<ul style="list-style-type: none"> <li>• Beneficiaries have to pay water charge that consists of electricity fee, maintenance and repair cost, a fee to be paid to the community, and miscellaneous.</li> <li>• Irrigation committee will collect water charge and deposit collected money into the bank account through the treasurer of association.</li> <li>• Necessary payment such as operation cost of pump or repair cost will be paid from this account as the needs arise.</li> </ul>

**Table 8.3.1 (10) Project Facilities of Mini-Irrigation Project in Xeatzan Bajo**

<p>1) Pump House</p>	<p><u>Pump</u>  Design discharge of pump: 7 liters/sec = 111GPM  Driving power and energy: Diesel engine 45 HP  Suction pipe: 4 inches  Pump-up Elevation: 145m (from pump station to the top storage tank)</p> <p><u>Pump House</u>  Size : 3*4m  Made of : Concrete blocks  Fuel tank : Floor embedded type  The existing suction tank for portable system will be used for the irrigation system simultaneously.</p>
<p>2) Water Conveyance System</p>	<p><u>Conduction pipe system</u>  Closed type pipeline  Length : 1.7 km in total  Pipe type : GI pipe, PVC-250PSI and PVC-160PSI pipe  Diameter : <math>\phi</math> 4"</p> <p><u>Distributary pipe system</u>  Semi-closed type pipeline with float valve system  Length : 8 km in total approximately  Pipe type : PVC-250PSI and PVC-160PSI pipe  Diameter : <math>\phi</math> 1"-4"</p>
<p>3) Tank</p>	<p><u>Top regulating storage tank</u></p> <ul style="list-style-type: none"> <li>- Capacity : 75 m<sup>3</sup></li> <li>- Materials : reinforced concrete</li> <li>- Size : 2.1*6.0*6.0 m</li> <li>- Function : storage of pumped water before delivering to the field</li> </ul>
<p>4) The farm plot system</p>	<p>Sprinkler irrigation system for 0.058ha (1/2cuarda) will be prepared by each farmer.  Sprinkler system:</p> <ul style="list-style-type: none"> <li>- sprinkler ; 1-2 nos.</li> <li>- design discharge for a sprinkler : 0.1-0.2 lit/s</li> <li>- required water pressure : 1.8-2.2 kgf/cm<sup>2</sup> = 18-21 N/cm<sup>2</sup></li> <li>- tertiary pipe ; <math>\phi</math> 3/4" or 1", 50m approx.</li> <li>- Pressure regulator : 1 nos.</li> </ul>

**Table 8.3.1 (11) Project Cost of the Mini-irrigation Project in Xeatzan Bajo****(1) Construction Cost**

Items	Q'ty	unit	Cost (Q)	Cost (¥)
Conduction pipe (spring-pump-drainage)			13,000	201,500
PVC pipe 3" 100PSI (spring[pump])	700.00	m		
Conduction pipe (pump-tank)			84,000	1,302,000
PVC pipe 4" 160PSI	540.00	m		
PVC pipe 4" 250PSI	270.00	m		
Galvanized Iron pipe 4"	264.00	m		
Distributary pipe			107,000	1,658,500
PVC pipe 1" 160PSI	3,015.00	m		
PVC pipe 1.25" 160PSI	778.00	m		
PVC pipe 1.5" 250PSI	825.00	m		
PVC pipe 2" 160PSI	1,316.00	m		
PVC pipe 3" 160PSI	1,124.00	m		
PVC pipe 4" 160PSI	556.00	m		
Pipe Miscellaneous		LS	104,000	1,612,000
Sub-total			308,000	4,774,000
Pump & Pump House		LS	204,000	3,162,000
Pump (7 lit/s) including valve etc.				
Pump House (3*4m)				
Upper Tank (75m3)		LS	81,000	1,255,500
Sub-total			285,000	4,417,500
Consturction Supervision (incl. Control Survey)		LS	39,000	604,500
skilled labor	270.0	man-day		
Topograhic Route Survey	8.0	km		
Sub-total			39,000	604,500
Miscellaneous Works		LS	101,000	1,565,500
Total			733,000	11,361,500
Price Escalation and Contingency 20%			147,000	2,272,300
Grand-Total			880,000	13,633,800

**(2) Cost for training and initial agriculture input**

Items	Q'ty	unit	Cost (Q)	Cost (¥)
(i) Training			26,000	390,000
Personnel charge	45.00	days		
Fuel and other expenditures		LS		
Others		LS		
(ii) Initial agriculture input (for 1st crop)			92,000	1,426,000
Seeds, pesticide and fertilizer	4.60	ha		
Water charge	4.60	ha		
Total			118,000	1,829,000

Exchange Rate Q.1.0 = Yen 15.5

**Table 8.3.1 (12) Implementation Schedule : Mini-Irrigation in Xeatzan Bajo, Chimaltenango**

Items	2001			2002												2003					
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
a. Selection of Contractor for the implementation Contractor Selection and Contracting Works Contract with Contractor (Commencement of the		■	☆																		
b. Preparatory Works Plots Survey and Plots Registration Checking Survey Works Definitive Design Works		■	■																		
c. Construction Stage Preparation and Delivery of the Materials Pump House and Suction Pit Pump Installation and Miscellaneous Works Upper Tank Conduction Pipes Distributary Pipes Valves / Filters / Regulator Installation etc.			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
d. Monitoring and Evaluation Capacitation and Lecture for O&M Initial Condition Survey Interim Survey Monitoring and Evaluation Survey			■						■	■											■
e. Cultivation Ordering Seedlings Transplanting Crop Growing Management Harvesting					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
f. Agricultural Technical Assistance Decide on Marketing channel (negotiate and make agreement with company) Make arrangements for agricultural loan (BanRural or Contract growing) Make arrangements for technical transfer (INTECAP, ICTA, MAGA) Technical Transfer on Crop Management Technical Transfer on Irrigation Water Management				■	■																■

**Table 8.3.1 (13) Cost and Benefit Flow : Mini-Irrigation in Xeatzan Bajo**

(unit : Q.)

Year	Cost				Benefit	Net Cash Flow
	Capital Cost *1	O&M Cost*2	Replacement Cost*3	Total Cost		
1	1,050,520	50,572		1,101,092	148,957	-952,136
2		50,572		50,572	238,331	187,758
3		50,572		50,572	297,913	247,341
4		50,572		50,572	297,913	247,341
5		50,572	120,200	170,772	297,913	127,141
6		50,572		50,572	297,913	247,341
7		50,572		50,572	297,913	247,341
8		50,572		50,572	297,913	247,341
9		50,572		50,572	297,913	247,341
10		50,572	505,393	555,965	297,913	-258,052
11		50,572		50,572	297,913	247,341
12		50,572		50,572	297,913	247,341
13		50,572		50,572	297,913	247,341
14		50,572		50,572	297,913	247,341
15		50,572	120,200	170,772	297,913	127,141
16		50,572		50,572	297,913	247,341
17		50,572		50,572	297,913	247,341
18		50,572		50,572	297,913	247,341
19		50,572		50,572	297,913	247,341
20		50,572	505,393	555,965	297,913	-258,052
21		50,572		50,572	297,913	247,341
22		50,572		50,572	297,913	247,341
23		50,572		50,572	297,913	247,341
24		50,572		50,572	297,913	247,341
25		50,572	120,200	170,772	297,913	127,141
26		50,572		50,572	297,913	247,341
27		50,572		50,572	297,913	247,341
28		50,572		50,572	297,913	247,341
29		50,572		50,572	297,913	247,341
30		50,572		50,572	297,913	247,341

EIRR : 21.0%
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Note:

\*1 : Capital cost includes labor cost for the unskilled labors provided by the beneficiaries.

\*2 : O & M Cost consists of fuel & lubricant cost, payment for pump operators and plumber, other administrative consumption and so

\*3 : Replacement Cost :

Sprinkler system ; all the devices will be replaced in every 5 years.

Pump replacement ; every 10 years

**Table 8.3.2 (1) Estimated Cost of Threads Necessary for Making One Huipil****(1) Case Type-1, Q67 Huipil****(a) Present Cost of threads necessary for making one huipil in the case that threads are purchased at retailer in Patzun**

Kinds of threads	Quantity necessary for making one huipil (Q/lb)	Type of thread	Wholesale price (Q/lb)	Retail price (Q/lb)	Total thread cost for one huipil (Q/one)
Base warp	0.55	Segunda	-	60.0	33.0
Base woof	0.55	Mish	-	20.0	11.0
Color warp	0.30	Segunda	-	40.0	12.0
Rims	0.17	Segunda	-	60.0	10.2
<b>Total</b>					<b>66.2</b>

**(b) Expected cost of threads necessary for making one huipil at Cooperative**

Kinds of threads	Quantity necessary for making one huipil (Q/lb)	Type of thread	Wholesale price (Q/lb)	Price at Cooperative (Q/lb)*	Total thread cost for one huipil (Q/huipil)
Base warp	0.55	100% Rayon Yarn	40.0	44.4	24.4
Base woof	0.55	100% Cotton yarn	17.0	18.9	10.4
Color warp	0.30	100% Rayon Yarn	35.0	38.9	11.7
Rims	0.17	100% Rayon yarn	40.0	44.4	7.6
<b>Total</b>					<b>54.1</b>

\* Price at cooperative price is 110% of the wholesale price

**(2) Case Type-2, Q112 Huipil****(a) Present Cost of threads necessary for making one huipil in the case that threads are purchased at retailer in Patzun**

Kinds of threads	Quantity necessary for making one huipil (lb)	Type of thread	Wholesale price (Q/lb)	Retail price (Q/lb)	Total thread cost for one huipil (Q/one)
Base warp	0.55	Segunda	-	60.0	33.0
Base woof	0.55	Mish	-	20.0	11.0
Color warp	0.30	Segunda	-	192.0	57.6
Rims	0.17	Segunda	-	60.0	10.2
<b>Total</b>					<b>111.8</b>

**(b) Expected cost of threads necessary for making one huipil at Cooperative**

Kinds of threads	Quantity necessary for making one huipil (lb)	Type of thread	Wholesale price (Q/lb)	Price at Cooperative (Q/lb)*	Total thread cost for one huipil (Q/huipil)
Base warp	0.55	100% Rayon Yarn	40.0	44.4	24.4
Base woof	0.55	100% Cotton yarn	17.0	18.9	10.4
Color warp	0.30	100% Rayon Yarn	153.0	170.0	51.0
Rims	0.17	100% Rayon yarn	40.0	44.4	7.6
<b>Total</b>					<b>93.4</b>

\* Price at cooperative price is 110% of the wholesale price

Remarks : All the cost were calculated based on the prices obtained in March, 2001.

**Table 8.3.2 (2) Project Cost for Hand Weaving Project**

Item	Quantity*	Unit	Unit price (Q/lb)	Cost (Q)
<b>(1) Initial capital as revolving fund</b>				
(1) Type-1				
(i) base warp	330	lb	40	13,200
(ii) color warp	180	lb	35	6,300
(iii) woof	330	lb	17	5,610
(iv) rims	102	lb	40	4,080
(v) embroidery	LS			1,500
sub-total				30,690
(2) Type-2				
(i) base warp	330	lb	40	13,200
(ii) color warp	180	lb	153	27,540
(iii) woof	330	lb	17	5,610
(iv) rims	102	lb	40	4,080
(v) embroidery	LS			1,500
sub-total				51,930
(3) Sampel Use and adjustment purchase	LS			4,000
Total (1+2+3)				86,620
<b>(2) Office equipment and materials</b>				
(i) Storage shelves	4	no	2,000	8,000
(ii) Photocopy machine	1	no	10,000	10,000
(iii) Office materials		LS		2,000
(iv) Other costs		LS		1,500
sub-total				21,500
<b>(3) Project management</b>				
(i) Personal cost		LS		129,000
(ii) Travelling cost		LS		9,600
(iii) Training materials		LS		6,000
(iv) Others		LS		9,100
sub-total				153,700
<b>Total cost</b>				<b>261,820</b>

Remark: Initial investment as revolving funds is estimated as follows;

- (i) 200 women are to take part in cooperative purchase of thread.
- (ii) Each women weave 6 Huipils/month
- (iii) Total number of Huipil/month: 1,200 Huipils consisting of 600 (type1) and 600 (type-2)
- (iv) Total quantities is calculated by number of huipil and requiremnt of threads per huipil
- (v) requirement of threads per huipil is referred to Table 8.3.1

Table 8.3.3 (1) Project Cost for Drinking Water Quality Plan in Xeatzan Bajo

Q1.00=Yen15.5

Contenido	Especificacion	Cantidad	Unidad de Medida	Precio Unitario (Q.)	Costo (Q.)	Observacion
DOSIFICADOR	DSA 310 RE-IE	1	Unidad	4,886.60	4,886.60	* Tubo de aspiracion transparente, 1.20m
VALVULA ESFERA	PLASTICA 1"	2	Unidad	41.08	82.16	de largo equipado con lastre y crepina.
MANOMETRO	PRESION 0-100 PSI	1	Unidad	37.44	37.44	
RED.BUSHING	PVC 6" x 3"	2	Unidad	186.61	373.22	* La mano de obra no incluye trabajos de
RED.BUSHING	PVC 3" x 1"	2	Unidad	22.10	44.20	obra civil.
UNION UNIVERSAL	PVC 1"	4	Unidad	28.62	114.48	
FILTRO DE 1"	(ANILLOS) MARCA AZUD	1	Unidad	199.00	199.00	
TEE	PVC 6"	2	Unidad	588.82	1,177.64	
VALVULA MARIPOSA	HF 6" WD-3010-3	1	Unidad	1,470.56	1,470.56	
BRIDA	6" PVC	2	Unidad	324.89	649.78	
TORNILLOS 5/8 x 6" COMP		16	Unidad	11.47	183.52	9,218.60
MANO DE OBRA POR INSTALACION		1	Unidad	5,000.00	5,000.00	
ARTICULOS VARIOS Y MISCELANEOS		1	Unidad	1,100.00	1,100.00	
CASETA DE TANQUE DE DEPOSITO	0.8x0.8xH1.2m	1	Unidad			
BLOQUE DE CONCRETO	Tipo liviano de 14x19x39cms	0.096	Millar	2,546.67	244.48	
CEMENTO	Gris nacional	1	42.5kg	30.10	30.10	
ARENA	de rio	0.8	m3	74.62	59.70	
LAMINA GALVANIZADA LISA	3'x8'	1	Unidad	108.63	108.63	
PUERTA DE PLYWOOD	pino de 0.7x1.2m	1	Unidad	400.00	400.00	
TANQUE 55 GLS DE HIPOCLORITO	10%	1	55GLS	257.11	257.11	
<b>TOTAL</b>					<b>16,418.62</b>	

**Table 8.4.1(1) Projects Cost**

		unit cost	Quantity	Amount	
1) Constriction of Nursely					
a. Vinylhouse A ( Cofee )					
a) Construction	sq.m	68.00	420	28,560.00	
b) Wood frame	unit	45.00	220	9,900.00	
c) Shelf	unit	135.00	28	3,780.00	
d) sub-total				42,240.00	
b. Vinylhouse B ( Fruits )					
a) Construction	sq.m	68.00	375	25,500.00	
b) Wood frame	unit	45.00	190	8,550.00	
c) Shelf	unit	135.00	24	3,240.00	
d) sub-total				37,290.00	
c. Water Tank					
	unit	2,500.00	1	2,500.00	
d. Equipment					
a) Handcart	set	150.00	4	600.00	
b) Forks etc.	set	30.00	8	240.00	
c) Shovels, etc.	set	25.00	8	200.00	
d) Water sprayer	set	35.00	8	280.00	
e) Wood working tools	unit	100.00	2	200.00	
f) Chemical sprayer	unit	500.00	2	1,000.00	
g) Excavating machine	unit	200.00	2	400.00	
h) sub-total				2,920.00	
e. contingency				5% of construction cost	4,101.50
f. Total					<b>89,051.50</b>
2) Training					
a. Training (tech/management of sesdling)	time	1,300.00	7	9,100.00	
b. Training for graft of tree /marketing	time	1,300.00	5	6,500.00	
c. Total					<b>15,600.00</b>
3) Consuming matelial (for first cicle)					
a. Plastic Pot					
a) cofee	unit	5,500.00	0.08	412.50	
b) Fruits	unit	3,000.00	0.13	390.00	
b. Black Soil					
a) Coffee	QQ	5.00	36.18	180.92	
b) Fruits	QQ	5.00	29.61	148.03	
c. White Sand					
a) Coffee	QQ	15.00	36.18	542.76	
b) Fruits	QQ	15.00	29.61	444.08	
d. Compost					
a) Coffee	QQ	25.00	36.18	904.61	
b) Fruits	QQ	25.00	29.61	740.13	
e. Seeds					
a) Coffee	seed	5,500.00	0.15	847.00	
b) Avocado	seed	2,220.00	0.50	1,110.00	
c) Peach	seed	780.00	0.50	390.00	
f. Seedling					
a) Avocado	seedling	2,220.00	0.50	1,110.00	
b) Peach	seedling	780.00	0.50	390.00	
g. Agricultural Chemical					
h. Fertilizers	QQ	100.00	3.65	365.00	
i. Total					<b>9,175.03</b>
4) Plants					
a. Coffer	plants	2,500.00	1.50	3,750.00	
b. Avocado	plants	500.00	15.00	7,500.00	
c. Peach	plants	300.00	10.00	3,000.00	
d. Total					<b>14,250.00</b>
5) Total Cost					<b>128,076.53</b>

Table 8.4.1(2) Implementation Schedule for the Project of Improvement of Coffee Plantation

Project No		B-7																																	
Name of project		Project for Improvement of Coffee Plantation																																	
Target Site		Panjebur, San Juan Laguna, Solola																																	
Implementation Agency		Coffee Growers' Association, Panyebur																																	
Project Purpose		(1) To provide nurseries to coffee growers' association, pachum, (2) To cultivate seedlings of coffee, avocado, Peach (3) To market such cash crops by association, (4) To increase employment chace and income of members.																																	
Project Execution		2001						2002																											
		DRY SEASON			RAINY SEASON			DRY SEASON			RAINY SEASON																								
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8														
		Blooming						Plantation of Seedling						Harvesting																					
<b>1)Detail Studies</b>																																			
i) Detail studies in project sites																																			
ii)Discussion with farmers in the target sites																																			
iii)Preparation of the improvement plan																																			
<b>2)Formation of Organization</b>																																			
i ) Formation of legal association																																			
ii)Programing of training activities																																			
iii) Guidance of organizational activities																																			
<b>3)Introduction of Know-how</b>																																			
i ) Plantation management technologies																																			
ii ) Seedlings cultivation techniques																																			
iii)Grafting techniques for avocado seedling																																			
ix) Guidance for ornamental plants																																			
<b>4)Operation of nursery beds</b>																																			
i ) Construction of nursery beds																																			
ii ) Cultivation of seedlings																																			
iii) Sales of seedling																																			
5) Monitoring and evaluation																																			
i ) Setting up monitoring indicators																																			
ii ) monitoring schedule																																			
iii) Reporting																																			

Trainings : (1) Formation of legal association, (2) Technical guidance for coffee plantation renewal, (3) Cashing crops adapting to Panjebur, (4) O/M of nursery beds, (5) Technical studies on avocado, macadmiann nuts, (6) Studies on ornamental plants, (7) Training of grafting techniques, (8) training on compost preparation



**Table 8.4.1 (3) Cost Calculation for Operation of the Nursery (2/2)**

Items	Unit	Transplanta												Total
		1	2	3	4	5	6	7	8	9	10	11	12	
		Siembra de finales	Nov	Siembra de café	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
6) White Sand for Fruits							Infero de las frutales							
a. Number	plants	3,000	0	0	0	0	0	0	0	0	0	0	0	0
b. Quantity	g/pot	450	0	0	0	0	0	0	0	0	0	0	0	0
c. Amount	Q/Q	29.61	0	0	0	0	0	0	0	0	0	0	0	0
d. Unit Cost	Q/Q/Q	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
e. Cost for W. Sand for Fruits	Q	444.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	444.08
7) Compost for Coffee														
a. Number	plants	0	0	5,500	0	0	0	0	0	0	0	0	0	0
b. Quantity	g/pot	0	0	300	0	0	0	0	0	0	0	0	0	0
c. Amount	Q/Q	0	0	36.2	0	0	0	0	0	0	0	0	0	0
d. Unit Cost	Q/Q/Q	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
e. Cost for Compost for Coffee	Q	0.00	0.00	904.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	904.61
8) Compost for Fruits														
a. Number	plants	3,000	0	0	0	0	0	0	0	0	0	0	0	0
b. Quantity	g/pot	450	0	0	0	0	0	0	0	0	0	0	0	0
c. Amount	Q/Q	29.6	0	0	0	0	0	0	0	0	0	0	0	0
d. Unit Cost	Q/Q/Q	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
e. Cost for Compost for Fruits	Q	740.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	740.13
9) Seed of coffee														
a. Number	seeds	0	0	5,500	0	0	0	0	0	0	0	0	0	0
b. Unit Cost	Q/5000	770.00	770.00	770.00	770.00	770.00	770.00	770.00	770.00	770.00	770.00	770.00	770.00	770.00
c. Cost for seed of coffee	Q	0.00	0.00	847.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	847.00
10) Seed of avocado														
a. Number	seeds	2,220	0	0	0	0	0	0	0	0	0	0	0	0
b. Unit Cost	Q/seed	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
c. Cost for seed of avocado	Q	1,110.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,110.00
11) Seed of peach														
a. Number	seeds	780	0	0	0	0	0	0	0	0	0	0	0	0
b. Unit Cost	Q/seed	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
c. Cost for seed of peach	Q	390.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	390.00
12) Seedling of avocado														
a. Number	seeds	0	0	0	0	0	0	0	0	0	0	0	0	0
b. Unit Cost	Q/seed	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
c. Cost for seedling of avocado	Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13) Seedling of peach														
a. Number	seeds	0	0	0	0	0	0	0	0	0	0	0	0	0
b. Unit Cost	Q/seed	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
c. Cost for seedling of peach	Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14) Agricultural chemical														
a. Cost for Ag-chemical	Q	100	100	100	100	100	100	100	100	100	100	100	100	1,200.00
15) Fertilizers														
a. Quantity	Kg	0.16	0.16	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.16	0.16	0	3.65
d. Unit Cost	Q/Q/Q	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	0
e. Cost for Fertilizers	Q	16.00	16.00	43.00	43.00	43.00	43.00	43.00	43.00	43.00	16.00	16.00	0.00	365.00
16) Total Cost for Consuming Material	Q	3,338.24	1,160.00	3,030.79	1,430.00	1,430.00	1,643.00	1,430.00	1,430.00	1,430.00	1,116.00	1,116.00	1,116.00	9,175.03
4. Other Cost														
1) Administrative Cost	Q	596.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	596.03
2) Depreciation*1	Q	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	720.00
3) Miscellaneous*2	Q	166.91	5.80	151.54	7.15	7.15	82.15	7.15	7.15	7.15	5.80	5.80	5.80	458.75
4) Sub-total	Q	822.94	65.80	211.54	67.15	67.15	142.15	67.15	67.15	67.15	65.80	65.80	65.80	1,274.78
5. Total Cost	Q	4,759.31	339.93	4,715.36	368.28	363.18	4,943.28	368.28	352.98	368.28	334.83	339.93	318.03	17,571.67

\*1: Depreciation cost is calculated for vinal which is assumed to cost Q2,100 for 136 sq.m. of vinal house. It is assumed to be replaced after 36 months. (Q2,100/36 months = approx. Q60)

\*2: Miscellaneous cost is calculated as 5% of the total cost for consuming material.

**Table 8.4.2(1) Project Cost for Drinking Water System Improvement Plan (1/2)**

Q1.00=Yen15.5

Contenido	Especificacion	Cantidad	Unidad de Medida	Precio Unitario (Q.)	Costo (Q.)	Observacion
1. Obra de Cruse de Quebrada					<b>25,292.79</b>	
1-1 Obra de Cruse de Quebrada 20 ms.		4.00	unidad	3128.74	12,514.98	
1-2 Obra de Cruse de Quebrada 30 ms.		3.00	unidad	4259.27	12,777.81	
2. Obra de Proteccion de las Tuberias		200.00	unidad	1438.81	<b>287,761.60</b>	
3. Construccion del Tanque de Distribucion					<b>174,835.57</b>	
Preparacion de terreno		87.12	m2	15.60	1,359.07	
Marca en terreno		31.36	m2	39.00	1,223.04	
Excavacion	en terreno duro	65.34	m3	12.00	784.08	
Relleno y compactacion	suelo original	24.66	m3	20.57	507.26	
Cimiento	grava 3/4"	4.70	m3	132.50	622.75	
Concreto de base	f'c = 2,000psi	1.56	m3	1319.71	2,058.75	
Concreto	f'c = 3,000psi	26.14	m3	1384.84	36,199.72	
Hierro corrugado	Grado 40.0ksi	83.33	Hlb	507.00	42,248.31	
Parada de agua	150mm PVC	21.40	ml	117.00	2,503.80	
Escarela	Acero inoxidable 5/8"	18.00	unidad	522.60	9,406.80	
Formaletas		169.00	m2	273.00	46,137.00	
Tapa de manhole		1.00	unidad	1560.00	1,560.00	
Obra de soporte		50.00	m3	78.00	3,900.00	
Saffording		95.00	m2	156.00	14,820.00	
Sleeves		1.00	Global	585.00	585.00	
Impermeable		70.00	m2	156.00	10,920.00	

\* except labor cost (civil work, pipe installation work, transportation fee)

Table 8.4.2(1) Project Cost for Drinking Water System Improvement Plan (2/2)

Q1.00=Yen15.5

Contenido	Especificacion	Cantidad	Unidad de Medida	Precio Unitario (Q.)	Costo (Q.)	Observacion
4. Instalacion de Tuberia de Conduccion					<b>114,160.50</b>	
PVC tuberia	D3", PSI 160	500.00	20'	225.07	112,535.00	
Codo 90°	D3"	4.00	Unidad	26.21	104.84	
Codo 45°	D3"	8.00	Unidad	34.20	273.60	
Copla 3"		6.00	Unidad	65.31	391.86	
Valvula de Aire	D" 3	4.00	Unidad	13.80	55.20	
Caja de valvula	0.4x0.4x0.8 concreto	4.00	Unidad	200.00	800.00	
5. Instalacion de Tuberia de Coneccion					<b>3,130.88</b>	
PVC tuberia	D3", PSI 160	6.00	20'	225.07	1,350.42	
Codo 90°	D3"	4.00	Unidad	26.21	104.84	
Copla 3"		2.00	Unidad	65.31	130.62	
Valvula de Compuerta	D" 3	1.00	Unidad	1245.00	1,245.00	
Caja de valvula de compuerta	0.6x0.6x0.8 concreto	1.00	Unidad	300.00	300.00	
<b>Total</b>					<b>605,181.34</b>	

\* except labor cost (civil work, pipe installation work, transportation fee)

**Table 8.4.3(1) Project Cost for Drinking Water Quality Improvement Plan in Panyebar**

Q1.00=Yen15.5

Contenido	Especificacion	Cantidad	Unidad de Medida	Precio Unitario (Q.)	Costo (Q.)	Observacion
1) Instalacion de Equipo Dosificador						
DOSIFICADOR	DSA 310 RE-IE	1	Unidad	4,886.60	4,886.60	* Tubo de aspiracion transparente, 1.20m
VALVULA ESFERA	PLASTICA 1"	2	Unidad	41.08	82.16	de largo equipado con lastre y crepina.
MANOMETRO	PRESION 0-100 PSI	1	Unidad	37.44	37.44	
RED.BUSHING	PVC 6" x 3"	2	Unidad	186.61	373.22	* La mano de obra no incluye trabajos de
RED.BUSHING	PVC 3" x 1"	2	Unidad	22.10	44.20	obra civil.
UNION UNIVERSAL	PVC 1"	4	Unidad	28.62	114.48	
FILTRO DE 1"	(ANILLOS) MARCA AZUD	1	Unidad	199.00	199.00	
TEE	PVC 6"	2	Unidad	588.82	1,177.64	
VALVULA MARIPOSA	HF 6" WD-3010-3	1	Unidad	1,470.56	1,470.56	
BRIDA	6" PVC	2	Unidad	324.89	649.78	
TORNILLOS 5/8 x 6" COMP		16	Unidad	11.47	183.52	
MANO DE OBRA POR INSTALACION		1	Unidad	5,000.00	5,000.00	
ARTICULOS VARIOS Y MISCELANEOS		1	Unidad	1,100.00	1,100.00	
CASETA DE TANQUE DE DEPOSITO	0.8x0.8xH1.2m	1	Unidad			
BLOQUE DE CONCRETO	Tipo liviano de 14x19x39cms	0.096	Millar	2,546.67	244.48	
CEMENTO	Gris nacional	1	42.5kg	30.10	30.10	
ARENA	de rio	0.8	m3	74.62	59.70	
LAMINA GALVANIZADA LISA	3'x8'	1	Unidad	108.63	108.63	
PUERTA DE PLYWOOD	pino de 0.7x1.2m	1	Unidad	400.00	400.00	
TANQUE 55 GLS DE HIPOCLORITO	10%	1	55GLS	514.22	514.22	
<b>sub-total</b>					16,675.73	
Instalacion de Equipo Dosificador		2	unidad	16,675.73	33,351.45	
<b>TOTAL</b>					<b>33,351.45</b>	