

**Table A.1.5-9 Projected Cash Flow of C/D Centers - 3/4**

C/D Center: Mairana C/D Center	Year													Unit: US\$ 1,000										
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015		2016	2017	2018	2019	2020	2021	2022	2023 - 2035		
I. Cash Inflow	507.2	22.1																					440.8	
1. Initial Investment	507.2	22.1																					440.8	
2. Cash Reserve	36.8	48.8	73.5	85.6	103.6	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	1,500.2			
3. Users Fees	13.5	7.0																					0.0	
4. Long Term Loan	72.4	55.8	73.5	85.6	103.6	115.4	115.4	115.4	115.4	115.4	131.2	137.5	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	2,051.0			
Total	507.2	72.4	55.8	73.5	85.6	103.6	115.4	115.4	115.4	115.4	131.2	137.5	115.4	115.4	115.4	115.4	115.4	115.4	115.4	115.4	2,051.0			
II. Cash Outflow	487.1																							
1. Investment Costs	491.4																							
- C/D Development	15.8																							
- Facility/Equipment	42.2																							
- Vehicle	22.1																							
Subtotal	507.2	22.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	562.9			
2. C/D Operation Costs	0.0	50.3	55.8	72.8	78.3	86.5	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	1,258.4			
Total	507.2	72.4	55.8	72.8	78.3	86.5	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	96.8	1,821.3			
III. Cash Surplus/Deficit	229.7																							
IV. Loan Repayment Principal	13.5																							
Interest (12%)	7.0																							
Total	6.5																							
V. Cumulative Cash Reserve	20.0																							
Remarks 1: Long Term Loan --- assuming long term loan provided by municipal government to C/D at interest rate 12% for initial operation costs	0.7																							
Remarks 3: Initial Investment --- in 2035; part of replacement costs financed by FDC or other public financing sources	8.0																							
Remarks 2: C/D Operation Costs --- not including depreciation costs	5.1																							
Total	0.7	8.0	5.1	13.3	31.9	50.5	69.1	71.9	68.4	87.0	105.6	124.2	142.8	161.4	180.0	198.6	217.2					6.1		
C/D Center: Pampa Grande C/D Center																								
Unit: US\$ 1,000																								
Year																								
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 - 2035																								
I. Cash Inflow	663.1	25.2	3.2																					732.4
1. Initial Investment	663.1	25.2	3.2																					732.4
2. Cash Reserve	44.6	67.1	112.8	135.3	164.5	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	185.1	2,406.3			
3. Users Fees	21.3	9.9																					0.0	
4. Long Term Loan	663.1	91.1	77.0	116.0	135.3	164.5	185.1	185.1	185.1	185.1	206.1	210.3	185.1	188.3	185.1	185.1	185.1	185.1	185.1	185.1	3,138.7			
Total	663.1	91.1	77.0	116.0	135.3	164.5	185.1	185.1	185.1	185.1	206.1	210.3	185.1	188.3	185.1	185.1	185.1	185.1	185.1	185.1	3,138.7			
II. Cash Outflow	636.8																							
1. Investment Costs	642.1																							
- C/D Development	21.0																							
- Facility/Equipment	53.6																							
- Vehicle	25.2																							
Subtotal	663.1	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	732.4			
2. C/D Operation Costs	65.9	77.0	108.9	119.9	134.4	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	155.5	2,021.5			
Total	663.1	91.1	77.0	111.9	134.4	155.5	155.5	155.5	155.5	155.5	176.5	180.7	155.5	158.7	155.5	155.5	155.5	155.5	155.5	155.5	2,753.9			
III. Cash Surplus/Deficit	384.8																							
IV. Loan Repayment Principal	31.2																							
Interest (12%)	13.8																							
Total	45.0																							
V. Cumulative Cash Reserve	4.1																							
Remarks 1: Long Term Loan --- assuming long term loan provided by municipal government to C/D at interest rate 12% for initial operation costs	4.1																							
Remarks 2: C/D Operation Costs --- not including depreciation costs	4.6																							
Total	4.1	19.5	4.6	34.2	63.8	93.4	123.0	131.6	136.0	165.6	192.0	221.6	251.2	280.8	310.4	340.0	369.6					22.0		

Table A.1.5-9 Projected Cash Flow of C/D Centers - 4/4

C/D Center: Comarapa C/D Center	Items	Year													Unit: US\$ 1,000									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015		2016	2017	2018	2019	2020	2021	2022	2023 - 2035	
I. Cash Inflow	1. Initial Investment	421.4	25.2																				0.0	
	2. Cash Reserve											15.8	25.2										487.6	
	3. Users Fees	44.1	58.9	73.3	87.8	108.9	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	1,582.1	
	4. Long Term Loan	8.9	0.4																					0.0
	Total	421.4	78.2	59.3	73.3	87.8	108.9	121.7	121.7	121.7	121.7	137.5	146.9	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	121.7	2,069.7	
II. Cash Outflow	1. Investment Costs																						405.6	
	- C/D Development	405.6																						
	- Facility/Equipment	15.8										15.8												31.6
	- Vehicle		25.2									25.2												50.4
	Subtotal	421.4	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	487.6	
2. C/D Operation Costs		0.0	53.0	59.3	71.3	77.5	87.1	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	1,315.6	
	Total	421.4	78.2	59.3	71.3	77.5	87.1	101.2	101.2	101.2	101.2	117.0	126.4	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	101.2	1,803.2	
		0.0	0.0	0.0	2.0	10.3	21.8	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	266.5
III. Cash Surplus/Deficit																								
IV. Loan Repayment Principal																								
	Interest(12%)																							
	Total																							
V. Cumulative Cash Reserve																								
		2.0	0.2	21.5	42.0	62.5	83.0	103.5	103.5	108.2	103.5	108.2	103.5	124.0	144.5	165.0	185.5	206.0	226.5	247.0	267.5	267.5	46.4	

Remarks 1: Long Term Loan --- assuming long term loan provided by municipal government to C/D at interest rate 12% for initial operation costs      Remarks 2: C/D Operation Costs --- not including depreciation costs

Table A.1.6-1. PROPOSED INSTITUTIONAL TRAINING PROGRAMS - 1/2

Programs	Objectives/Major Subjects	Target Groups	Training Methods	Others
1. Mass Guidance	<p>To disseminate necessity of C/D centers and merits of its use and to promote effective and efficient use of it</p> <p>Main Training Subjects</p> <ul style="list-style-type: none"> <li>- Necessity of C/D center &amp; merits of its use</li> <li>- Function of C/D center &amp; operation methods</li> <li>- Relation between new wholesale market &amp; C/D center</li> <li>- Necessity of Collection Center Users Cooperative</li> </ul>	<p>Programs in Preparatory Stage(1.5 to 2 years prior to development of C/D center)</p> <p>All the vegetable and fruit producers in target areas of a C/D center</p>	<ul style="list-style-type: none"> <li>- Preparation &amp; distribution of leaflets etc.</li> <li>- Explanation meetings &amp; workshops to OTBs concerned</li> <li>- Study tour to advanced agricultural marketing area including Pilot Project in San Isidro</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation by the project office.</li> <li>- Actual operation shall be entrusted to existing farmers organizations having experiences in agriculture marketing &amp; farmers training.</li> </ul>
2. Training Programs	<p>To train advanced farmers who will become key personnel to organize &amp; develop users group(Collection Center Users Cooperative)</p> <p>Main Training Subjects</p> <ul style="list-style-type: none"> <li>- Necessity, merits &amp; functions of C/D center</li> <li>- Concept of cooperative, cooperative's law, legal procedures to establish cooperative</li> <li>- Budget &amp; accounting of cooperative</li> <li>- Right &amp; duty of cooperative members</li> <li>- concept &amp; merits of cooperative shipping &amp; selling</li> <li>- Procedures &amp; rules, accounting system</li> </ul>	<p>Advanced vegetable &amp; fruit producers nominated OTBs concerned</p>	<ul style="list-style-type: none"> <li>- Lecture &amp; practical exercises</li> <li>- Study tour to advanced agricultural marketing area including Pilot Project in San Isidro</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation by the project office.</li> <li>- Actual operation shall be entrusted to existing farmers organizations having experiences in agriculture marketing &amp; farmers training.</li> </ul>

Table A.1.6-1. PROPOSED INSTITUTIONAL TRAINING PROGRAMS - 2/2

Programs	Objectives/Major Subjects	Target Groups	Training Methods	Others
1. Mass Guidance	To disseminate necessity of C/D centers and merits of its use and to promote effective and efficient use of it  Main Training Subjects - Similar subjects to the program in the Preparatory Stage on need basis	Programs in Initial Stage (for about 5 years after development of C/D center) All the vegetable and fruit producers in target areas of a C/D center	- Explanation meetings & workshops to OTBs concerned  - Study tour to advanced agricultural marketing area including Pilot Project in San Isidro	- Implementation by the management of C/D center
2. Training Programs	To train advanced farmers who will become key personnel to organize & develop users group (Collection Center Users Cooperative)  Main Training Subjects - Similar subjects to the program in the Preparatory Stage on need basis	Advanced vegetable & fruit producers nominated by OTBs concerned	- Lecture & practical exercises  - Study tour to advanced agricultural marketing area including Pilot Project in San Isidro	- Implementation by the management of C/D center or by employing relevant experts
3. Recruiting Management Staff of Cooperative	To train management staff of Cooperative in operation & management of the organization.  Main Training Subjects - Similar subjects to the program in the Preparatory Stage on need basis	Management staff of the Cooperative or candidates for the same	- Lecture & practical exercises at C/D center  - On-the-job training at C/D center	- Training shall be implemented as practically as possible and key staff of the cooperative should engage in operation of C/D center for more than half a year before the Advance Stage
1. Training Programs	To operate & manage C/D center smoothly by Collection Center Users Cooperative and to introduce full-scale cooperative shipping & selling system as early as possible  Main Training Subjects - Operation & management of cooperative - Budget & accounting system of cooperative - Operation & management of C/D center	Programs in Advanced Stage (from about 6th year after development of C/D center) Members/staff of Collection Center Users Cooperative	- Lecture & practical exercises  - Study tour to advanced agricultural marketing area	- Implementation by the management of C/D center or by employing relevant experts

Table A.1.6-2. PROPOSED TECHNICAL EXTENSION PROGRAMS - 1/2

Experimental/Extension Programs	Objectives/Subjects/Methods	Operation by	No. of Trials/Plots & Size	Training Components Included
1. Verification Trial	To test adaptability of or to develop recommended technologies  Trial on (subjects on need basis): - Technology element (variety, fertilizer, plant protection etc.) - Crop rotation/cropping pattern - Fruit production	RRC in cooperation with extension personnel & farmers	1 - 6 plots/year/research staff (in principle)  Basic plot size: 0.1 - 0.3 ha	Farmers field days: 2 - 3 times/trial (10 - 20 farmers at a time)
2. Demonstration Plot	Demonstration of recommended technologies in fields operated by farmers  Demonstration on (subjects on needs basis): - Package echnologies - Technology element (variety, fertilizer, plant protection etc.) - Crop rotation/cropping pattern - Fruit production	Farmers under guidance of extension personnel & RRC  Farm inputs provided & products belong to farmers	2 - 6 plots/year/extension personnel (in principle)  Basic plot size: 0.1ha	Farmers field days: 2 - 3 times/plot (10 - 20 farmers at a time)
3. Field Extension Activities	Visit & provide guidance to farmers participated in training programs(TV system)	Extension personnel (& RRC staff)	Periodical(basically once/2 weeks)	Field guidance
Guidance/Trials by C/D Center		Activities		
1. Guidance	- Users or potential users	Day-today guidance on marketing aspects such as method of field selection, harvesting timing, market demand for quality & maturity, market information, assessment of products shipped to C/D		
2. Trials	Trails on: - Packing, selection & grading method - Destination market	Implementing trials for improvement of forms of packing, materials, selection & grading method in consultation with markets Sample shipment to new markets such as supermarket etc.		

File: Tab A.1.6-2

Table A.1.6-2. PROPOSED TECHNICAL EXTENSION PROGRAMS - 2/2

Technical Training Programs	Objectives/Major Subjects	Target Groups	Training Methods	Duration/Places etc.
1. Staff Training	<ul style="list-style-type: none"> <li>Induction &amp; refresher training of extension personnel</li> <li>Subjects(on need basis):                             <ul style="list-style-type: none"> <li>- Farming technologies</li> <li>- Post-harvest &amp; marketing technology</li> <li>- Group dynamics</li> <li>- Marketing system</li> <li>- Extension methods</li> <li>- Production planning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Extension personnel at C/D center &amp; candidate for the same</li> <li>Other personnel engaged in extension services in major producing areas</li> <li>Participants: 5 - 10</li> </ul>	<ul style="list-style-type: none"> <li>Lecture &amp; discussion in class</li> <li>Field training &amp; practices</li> <li>Trainers: CIAT &amp; other relevant experts</li> <li>Interval: every year for first 3 years every other year from 4th year</li> </ul>	<ul style="list-style-type: none"> <li>Duration: Induction --- 5 dyas</li> <li>Refresher --- 3 dyas</li> <li>Place: At RRC or else</li> <li>Duration: 3 days</li> <li>Place: at C/D or else</li> </ul>
2. Farmers Training	<ul style="list-style-type: none"> <li>Recruiting leading farmers in producing areas</li> <li>Subjects(on need basis):                             <ul style="list-style-type: none"> <li>- Farming technologies</li> <li>- Post-harvest &amp; marketing technology</li> <li>- Group dynamics</li> <li>- Production planning</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Candidates for leading farmers</li> <li>Participants: 10 - 20</li> </ul>	<ul style="list-style-type: none"> <li>Lecture &amp; discussion in class</li> <li>Field training &amp; practices/field visit</li> <li>Trainers: CIAT, other relevant experts &amp; extension personnel</li> </ul>	<ul style="list-style-type: none"> <li>Duration: 1 day</li> <li>Place: at C/D or else</li> </ul>
3. Short Farmer Training	<ul style="list-style-type: none"> <li>Guidance on specific or urgent matters</li> <li>Subjects(on need basis):                             <ul style="list-style-type: none"> <li>- Farming technologies</li> <li>- Post-harvest &amp; marketing technology</li> <li>- Group dynamics</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Candidates for leading farmers</li> <li>Participants: 10 - 20</li> </ul>	<ul style="list-style-type: none"> <li>Lecture &amp; discussion in class</li> <li>Field training &amp; practices/field visit</li> <li>Trainers: CIAT, other relevant experts &amp; extension personnel</li> </ul>	<ul style="list-style-type: none"> <li>Duration: 1 day</li> <li>Place: at C/D or else</li> </ul>
4. Mass Guidance	<ul style="list-style-type: none"> <li>Mass guidance on specific or urgent matters</li> <li>Subjects(on need basis):                             <ul style="list-style-type: none"> <li>- Farming technologies</li> <li>- Post-harvest &amp; marketing technology</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Farmers (users of C/D in principle)</li> <li>Participants: 30 - 50</li> </ul>	<ul style="list-style-type: none"> <li>Field guidance or guidance in class</li> <li>Trainers: CIAT, other relevant experts &amp; extension personnel</li> </ul>	<ul style="list-style-type: none"> <li>Duration: 1 day</li> <li>Place: at C/D, fields or else</li> </ul>
5. Study Tour	<ul style="list-style-type: none"> <li>Visit to advanced farmers, farmers groups as CAISY, Pilor Project(San Isidro), other major producing areas, markets etc.</li> </ul>	<ul style="list-style-type: none"> <li>Candidates for leading farmers</li> <li>Participants: 10 - 20</li> </ul>	<ul style="list-style-type: none"> <li>Visit &amp; exchange of opinions with farmers etc. at objective area</li> </ul>	<ul style="list-style-type: none"> <li>Duration: 1 day(in principle)</li> </ul>

File: Tab A.1.6-2

Table A.1.6-3.

PROPOSED IMPLEMENTATION SCHEDULES FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS - 1/2

C/D Center	Program	Year											Implementation	
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 & on		
San Isidro	<b>Inst. Training Program</b>													By Project  By C/D center  Need basis by CIAT
	1. Preparatory Stage													
	- Mass Guidance													
	- Training Program													
	2. Initial Stage													
	- Guidance/Training Program													
	3. Advanced Stage													
	- Training Program													
	<b>Extension Program</b>													
	1. Preliminary Survey													
2. Verification Trial														
3. Demonstration Plot														
4. Field Extension Activities														
5. Staff Training														
6. Farmers Training														
7. Short Farmers Training														
8. Mass Guidance														
9. Study Tour														
10. Marketing Guidance/Trials														
Samaipata	<b>Inst. Training Program</b>												By Project  By C/D center  Need basis by CIAT  Combined with Saipina & Vallegrande	
	1. Preparatory Stage													
	- Mass Guidance													
	- Training Program													
	2. Initial Stage													
	- Guidance/Training Program													
	3. Advanced Stage													
	- Training Program													
	<b>Extension Program</b>													
	1. Preliminary Survey													
2. Verification Trial														
3. Demonstration Plot														
4. Field Extension Activities														
5. Staff Training														
6. Farmers Training														
7. Short Farmers Training														
8. Mass Guidance														
9. Study Tour														
10. Marketing Guidance/Trials														
Vallegrande	<b>Inst. Training Program</b>												By Project  By C/D center  Need basis by CIAT  Combined with Saipina & Samaipata	
	1. Preparatory Stage													
	- Mass Guidance													
	- Training Program													
	2. Initial Stage													
	- Guidance/Training Program													
	3. Advanced Stage													
	- Training Program													
	<b>Extension Program</b>													
	1. Preliminary Survey													
2. Verification Trial														
3. Demonstration Plot														
4. Field Extension Activities														
5. Staff Training														
6. Farmers Training														
7. Short Farmers Training														
8. Mass Guidance														
9. Study Tour														
10. Marketing Guidance/Trials														
Saipina	<b>Inst. Training Program</b>												By Project  By C/D center  On need basis by CIAT  Combined with Samaipata/Vallegrande	
	1. Preparatory Stage													
	- Mass Guidance													
	- Training Program													
	2. Initial Stage													
	- Guidance/Training Program													
	3. Advanced Stage													
	- Training Program													
	<b>Extension Program</b>													
	1. Preliminary Survey													
2. Verification Trial														
3. Demonstration Plot														
4. Field Extension Activities														
5. Staff Training														
6. Farmers Training														
7. Short Farmers Training														
8. Mass Guidance														
9. Study Tour														
10. Marketing Guidance/Trials														

Table A.1.6-3.

**PROPOSED IMPLEMENTATION SCHEDULES FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS - 2/2**

C/D Center	Program	Year											Implementation
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Mairana	<b>Inst. Training Program</b>												_____ By Project ~~~~~~ By C/D center - - - - Need basis by CIAT _____ Combined with P. Grande/Comarapa
	1. Preparatory Stage												
	- Mass Guidance												
	- Training Program												
	2. Initial Stage												
	- Guidance/Training Program												
	3. Advanced Stage												
	- Training Program												
	<b>Extension Program</b>												
	1. Preliminary Survey												
2. Verification Trial													
3. Demonstration Plot													
4. Field Extension Activities													
5. Staff Training													
6. Farmers Training													
7. Short Farmers Training													
8. Mass Guidance													
9. Study Tour													
10. Marketing Guidance/Trials													
Pampa Grande	<b>Inst. Training Program</b>											_____ By Project ~~~~~~ By C/D center - - - - Need basis by CIAT _____ Combined with Mairana & Comarapa	
	1. Preparatory Stage												
	- Mass Guidance												
	- Training Program												
	2. Initial Stage												
	- Guidance/Training Program												
	3. Advanced Stage												
	- Training Program												
	<b>Extension Program</b>												
	1. Preliminary Survey												
2. Verification Trial													
3. Demonstration Plot													
4. Field Extension Activities													
5. Staff Training													
6. Farmers Training													
7. Short Farmers Training													
8. Mass Guidance													
9. Study Tour													
10. Marketing Guidance/Trials													
Comarapa	<b>Inst. Training Program</b>											_____ By Project ~~~~~~ By C/D center - - - - Need basis by CIAT _____ Combined with Mairana/P. Grande	
	1. Preparatory Stage												
	- Mass Guidance												
	- Training Program												
	2. Initial Stage												
	- Guidance/Training Program												
	3. Advanced Stage												
	- Training Program												
	<b>Extension Program</b>												
	1. Preliminary Survey												
2. Verification Trial													
3. Demonstration Plot													
4. Field Extension Activities													
5. Staff Training													
6. Farmers Training													
7. Short Farmers Training													
8. Mass Guidance													
9. Study Tour													
10. Marketing Guidance/Trials													



**Table A.1.6-4. ESTIMATED COSTS FOR INSTITUTIONAL TRAINING PROGRAMS**

**I. Unit Costs -1/2**

Leaflets Distribution (7 Areas: 15,000 Leaflets)			Mass Guidance Program Explanation Meeting (7 Areas: 180 OTBs)				Study Tour (180 OTBs x1 x 2 times)				
Item	Qty	Unit Costs (US\$)	Amount (US\$)	Item	Qty	Unit Costs (US\$)	Amount (US\$)	Item	Qty	Unit Costs (US\$)	Amount (US\$)
Leaflets (5 pages)	15,000	5	75,000	Materials	15,000	2	30,000	Materials	180 x 2	2	720
Distribution	15,000	1	15,000	Allowances (Refreshment)	15,000	2	30,000	Allowances (Refreshment)	180 x 2	6	2,160
Miscellaneous	-	-	500	Trainer Cost	180	30	5,400	Trainer Cost	-	-	-
				Transportation	15,000	3	45,000	Transportation	180 x 2	5	1,800
				Miscellaneous	-	-	500	Miscellaneous	-	-	120
<b>Total</b>			<b>90,500</b>	<b>Total</b>			<b>110,900</b>	<b>Total</b>			<b>4,800</b>

**I. Unit Costs -2/2**

Study Tour (105(7 Areas x 15) participants; 1 days)			Training Programs Promoter's Training Fundamental Training (105 participants; 5 days)				Promoter's Training Practical Training (105 participants; 3 days)				
Item	Qty	Unit Costs (US\$)	Amount (US\$)	Item	Qty	Unit Costs (US\$)	Amount (US\$)	Item	Qty	Unit Costs (US\$)	Amount (US\$)
Materials	110	7	770	Materials	110	20	2,200	Materials	110	20	2,200
Allowances (meal/drink)	110	6	660	Allowances (meal/drink)	105 x 5	12	6,300	Allowances (meal/drink)	105 x 3	12	3,780
Trainer Costs	-	-	-	Trainer Costs	5 x 7	50	1,750	Trainer Costs	5*7	50	1,750
Transportation	110	5	550	Transportation	105 x 5	10	5,250	Transportation	105 x 3	10	3,150
Miscellaneous	-	-	120	Miscellaneous	-	-	100	Miscellaneous	-	-	120
<b>Total</b>			<b>2,100</b>	<b>Total</b>			<b>15,600</b>	<b>Total</b>			<b>11,000</b>

**II. Annual Program Costs**

C/D Center	Program	Year					Total
		1999	2000	2001	2002	2003	
San Isidro	Mass Guidance	9,000	11,400				20,400
	Training Program		4,100				4,100
	<b>Total</b>	<b>9,000</b>	<b>15,500</b>				<b>24,500</b>
Samaipata	Mass Guidance			11,750	11,750		23,500
	Training Program			2,050	2,050		4,100
	<b>Total</b>			<b>13,800</b>	<b>13,800</b>		<b>27,600</b>
Vallegrande	Mass Guidance			31,150	31,150		62,300
	Training Program			2,050	2,050		4,100
	<b>Total</b>			<b>33,200</b>	<b>33,200</b>		<b>66,400</b>
Saipina	Mass Guidance			8,200	8,200		16,400
	Training Program			2,000	2,100		4,100
	<b>Total</b>			<b>10,200</b>	<b>10,300</b>		<b>20,500</b>
Mairana	Mass Guidance				11,000	11,000	22,000
	Training Program				2,000	2,100	4,100
	<b>Total</b>				<b>13,000</b>	<b>13,100</b>	<b>26,100</b>
Pampa Grande	Mass Guidance				15,750	15,750	31,500
	Training Program				2,050	2,050	4,100
	<b>Total</b>				<b>17,800</b>	<b>17,800</b>	<b>35,600</b>
Comarapa	Mass Guidance				15,050	15,050	30,100
	Training Program				2,050	2,050	4,100
	<b>Total</b>				<b>17,100</b>	<b>17,100</b>	<b>34,200</b>
<b>Total</b>	Mass Guidance	9,000	11,400	51,100	92,900	41,800	206,200
	Training Program	0	4,100	6,100	12,300	6,200	28,700
	<b>Total</b>	<b>9,000</b>	<b>15,500</b>	<b>57,200</b>	<b>105,200</b>	<b>48,000</b>	<b>234,900</b>

File: Tab A.1.6-4

Table A.1.6-5. ESTIMATED UNIT COSTS FOR TECHNICAL EXTENSION PROGRAMS

Experimental Programs				Extension Programs				Training Programs							
Verification Trials (0.3 ha)				Demonstration Plot (0.1 ha)				Mass Guidance(50 participants;1 day)				Study Tour(20 participants; 1 day)			
Item	Qty	Unit Cost (US\$)	Amount (US\$)	Item	Qty	Unit Cost (US\$)	Amount (US\$)	Item	Qty	Unit Cost (US\$)	Amount (US\$)	Item	Qty	Unit Cost (US\$)	Amount (US\$)
Farm Inputs				Farm Inputs				Materials				Materials			
- Seed (kg)	-	100	-	- Seed (kg)	-	-	30	Materials	60	5	300	Materials	25	5	125
- Fertilizer (kg)	90	0.5	45	- Fertilizer (kg)	30	0.5	15	Allowances (meal/drink)	50	6	300	Allowances (meal/drink)	20	6	120
- Chemicals (l)	6	20	120	- Chemicals (l)	2	20	40	Trainer Costs	3	30	90	Miscellaneous	-	-	65
Land Preparation	1	25	25	Land Preparation	-	-	-	Transportation	50	5	250	Trainer Costs	3	30	90
Labour Costs (mandays)	50	6	300	Labour Costs (mandays)	-	-	-	Miscellaneous	-	-	60	Transportation	25	12	300
Material/Board	-	-	-	Material/Board	-	-	20	Total	400	70	470	Total	1,000	700	1,700
Land Rent (ha)	-	100	-	Land Rent (ha)	-	-	-								
Field Days (25 farmers)	3 times	75	225	Field Days (25 farmers)	3 times	75	225								
Miscellaneous	-	-	75	Miscellaneous	-	-	70								
Total			1,000	Total			400	Total	400	70	470	Total	1,000	700	1,700

Farmer Training(25 participants; 3 days)				Short Farmer Training(20 participants; 1 day)				Staff Training(10 participants; 5 days)				Staff Training(10 participants; 3 days)			
Item	Qty	Unit Cost (US\$)	Amount (US\$)	Item	Qty	Unit Cost (US\$)	Amount (US\$)	Item	Qty	Unit Cost (US\$)	Amount (US\$)	Item	Qty	Unit Cost (US\$)	Amount (US\$)
Materials	25	10	250	Materials	25	5	125	Materials	15	20	300	Materials	15	20	300
Allowances (meal/drink)	25x3	6	450	Allowances (meal/drink)	20	6	120	Allowances (meal/drink)	10x5	12	600	Allowances (meal/drink)	10x3	12	360
Trainer Costs	5	50	250	Trainer Costs	3	50	150	Trainer Costs	5	50	250	Trainer Costs	5	50	250
Transportation	25x3	5	375	Transportation	20	5	100	Transportation	10x5	10	500	Transportation	10x3	10	300
Miscellaneous	-	-	75	Miscellaneous	-	-	55	Miscellaneous	-	-	150	Miscellaneous	-	-	140
Total			1,400	Total			550	Total	550	1,800	2,350	Total	1,800	1,350	3,150

File: Tab A.1.6-5

Table A.1.6-6. ESTIMATED COSTS FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS - 1/4

C/D Center	Program	Unit Rate (US\$)	Year												2009 & on										
			1999		2000		2001		2002		2003		2004			2005		2006		2007		2008			
			Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)		Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)		
San Isidro	Institutional Training Programs																								
	1. Preparatory Stage			9,000																					
	- Mass Guidance			4,100																					
	- Training Programs																								
	2. Initial Stage																								
	- Verification Trial																								
	3. Advanced Stage																								
	- Field Extension Activities																								
	Total Institutional Training Program Costs			9,000	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500	15,500
	Technical Extension Programs																								
	1. Preliminary Survey	2,000																							
	2. Experiment/Extension Programs																								
	- Verification Trial	1,000																							
	- Demonstration Plot	400																							
	- Field Extension Activities	1,200																							
3. Training Programs																									
- Staff Training	1,800/1,350																								
- Farmers Training	1,400																								
- Short Farmers Training	550																								
- Mass Guidance	1,000																								
- Study Tour	700																								
Total Technical Extension Program Costs																									
Extension Personnel	6,500																								
Administration Costs of CIAT																									
1. Additional Research Staff	9,100/13,000																								
2. Administration Costs(20% of Program Costs)																									
San Isidro C/D Center Total			9,000	26,430	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	27,460	
Samaipata	Institutional Training Programs																								
	1. Preparatory Stage																								
	- Mass Guidance																								
	- Training Programs																								
	2. Initial Stage																								
	- Verification Trial																								
	3. Advanced Stage																								
	- Field Extension Activities																								
	Total Institutional Training Program Costs																								
	Technical Extension Programs																								
	1. Preliminary Survey	1,000																							
	2. Experiment/Extension Programs																								
	- Verification Trial	1,000																							
	- Demonstration Plot	400																							
	- Field Extension Activities																								
3. Training Programs																									
- Staff Training	600/450																								
- Farmers Training	1,400																								
- Short Farmers Training	550																								
- Mass Guidance	1,000																								
- Study Tour	700																								
Total Technical Extension Program Costs																									
Extension Personnel																									
Administration Costs/CIAT(20% of Program Costs)																									
Samaipata C/D Center Total																									

Remarks 1: Field extension Activities & Extension Personnel in Samaipata cover both Samaipata & Matucana

Table A.1.6-6. ESTIMATED COSTS FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS - 2/4

C/D Center	Program	Unit Rate(US\$)	Year														
			1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 & on				
			Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	
Vallegrande	Institutional Training Programs																
	1. Preparatory Stage																
	- Mass Guidance				31,150												
	- Training Programs				2,050												
	2. Initial Stage																
	3. Advanced Stage																
	Total Institutional Training Program Costs				33,200												
	Technical Extension Programs																
	1. Preliminary Survey				2,000												
	- Experiment/Extension Programs				2,600												
	- Verification Trial				2,000												
	- Demonstration Plot				4												
	- Field Extension Activities				600												
	2. Training Programs				600												
	- Staff Training				600												
- Farmers Training				1,400													
- Short Farmers Training				1,400													
- Mass Guidance				1,000													
- Study Tour				700													
Total Technical Extension Program Costs				5,200													
Extension Personnel				0.5													
Administration Costs of CIAT				1,040													
1. Additional Research Staff				1,040													
2. Administration Costs(20% of Program Costs)				1,040													
Vallegrande C/D Center Total				33,200													
Salpina	Institutional Training Programs																
	1. Preparatory Stage																
	- Mass Guidance				8,200												
	- Training Programs				2,000												
	2. Initial Stage																
	3. Advanced Stage																
	Total Institutional Training Program Costs				10,200												
	Technical Extension Programs																
	1. Preliminary Survey				2,000												
	- Experiment/Extension Programs				2,600												
	- Verification Trial				2,000												
	- Demonstration Plot				3												
	- Field Extension Activities				600												
	2. Training Programs				600												
	- Staff Training				600												
- Farmers Training				1,400													
- Short Farmers Training				1,400													
- Mass Guidance				1,000													
- Study Tour				700													
Total Technical Extension Program Costs				5,200													
Extension Personnel				1													
Administration Costs(20% of Program Costs)				1,040													
Salpina C/D Center Total				10,200													

Remarks 1. - 6,500. Program costs to be born by C/D center

Table A.1.6-6. ESTIMATED COSTS FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS - 3/4

C/D Center	Program	Unit Rate(US\$)	Year																						
			1999		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009 & on		
			Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	
Mairana	<b>Institutional Training Programs</b>																								
	1. Preparatory Stage																								
	- Mass Guidance		11,000		11,000																				
	- Training Programs		2,100		2,100																				
	2. Initial Stage																								
	3. Advanced Stage																								
	Total Institutional Training Program Costs		13,000		13,000																				
	<b>Technical Extension Programs</b>																								
	1. Preliminary Survey	500																							
	2. Experiment/Extension Programs	1,000																							
	- Verification Trial	400																							
	- Demonstration Plot																								
	- Field Extension Activities																								
	3. Training Programs	600/450																							
	- Staff Training	1,400																							
- Farmers Training	550																								
- Short Farmers Training	1,000																								
- Mass Guidance	700																								
- Study Tour																									
Total Technical Extension Program Costs																									
Extension Personnel			2,700		2,700																				
Administration Costs/CIAT(20% of Program Costs)			540		540																				
<b>Mairana C/D Center Total</b>			13,000		13,000																				
Pampa Grande	<b>Institutional Training Programs</b>																								
	1. Preparatory Stage																								
	- Mass Guidance		15,750		15,750																				
	- Training Programs		2,050		2,050																				
	2. Initial Stage																								
	3. Advanced Stage																								
	Total Institutional Training Program Costs		17,800		17,800																				
	<b>Technical Extension Programs</b>																								
	1. Preliminary Survey	2,000																							
	2. Experiment/Extension Programs	1,000																							
	- Verification Trial	400																							
	- Demonstration Plot	1,200																							
	- Field Extension Activities																								
	3. Training Programs	600/450																							
	- Staff Training	1,400																							
- Farmers Training	550																								
- Short Farmers Training	1,000																								
- Mass Guidance	700																								
- Study Tour																									
Total Technical Extension Program Costs																									
Extension Personnel			5,200		5,200																				
Administration Costs/CIAT(20% of Program Costs)			3,250		3,250																				
<b>Pampa Grande C/D Center Total</b>			17,800		17,800																				

Remarks 2: \$ 239. Program costs to be born by C/D center

Demanda 1: Field extension Activities & Extension Personnel in Mairana - cover both Samarrais & Mairana

File: Tab A.1.6-6&7

Table A.1.6-6. ESTIMATED COSTS FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS - 4/4

C/D Center	Program	Unit Rate (US\$)	Year												2009 & on										
			1999		2000		2001		2002		2003		2004			2005		2006		2007		2008		2009 & on	
			Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)		Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)
Comarapa	Institutional Training Programs																								
	1. Preparatory Stage																								
	- Mass Guidance			15,050																					
	- Training Programs			2,050																					
	2. Initial Stage																								
	-																								
	3. Advanced Stage																								
	-																								
	Total Institutional Training Program Costs			17,100		17,100																			
	Technical Extension Programs																								
	1. Preliminary Survey	2,000																							
	-																								
	2. Experiment/Extension Programs	1,000																							
	- Verification Trial	400																							
	- Demonstration Plot																								
- Field Extension Activities	1,200																								
3. Training Programs	600/450																								
- Staff Training	1,400																								
- Farmers Training	550																								
- Short Farmers Training	1,000																								
- Mass Guidance	700																								
- Study Tour																									
Total Technical Extension Program Costs	6,500																								
Extension Personnel																									
Administration Costs/CIAI (20% of Program Costs)																									
Comarapa C/D Center Total				17,100																					

File: Tab A.1.6-6&7

Remarks: 1. . . . . program costs to be born by C/D center

Table A.1.6-7. ESTIMATED OVERALL COSTS FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS

C/D Center	Program	Unit Rate(US\$)	Year												Total								
			1999		2000		2001		2002		2003		2004			2005		2006		2007		2008	
			Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)		Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)	Qty	Amount (US\$)
Overall Costs	<b>Institutional Training Programs</b>																						
	1. Preparatory Stage																						
	- Mass Guidance	9,000	11,400	51,100	92,900	41,800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	206,200	
	- Training Programs	0	4,100	6,100	12,300	6,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28,700	
	2. Initial Stage	0	0	1,000	1,000	3,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	31,000	
	3. Advanced Stage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,000	
	Total Institutional Training Program Costs	9,000	15,500	58,200	106,200	51,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	276,900	
	<b>Technical Extension Programs</b>																						
	1. Preliminary Survey	2,000	0	1	2,000	0	0	3	5,000	3	4,500	0	0	0	0	0	0	0	0	0	0	0	11,500
	2. Experiment/Extension Programs	1,000	0	2,600	4,800	24,200	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	27,400	160,400
	- Verification Trial	400	0	2,000	2,000	8,000	13	13,000	13	13,000	11	11,000	9	9,000	2	2,000	4	4,000	1	1,000	52	52,000	
	- Demonstration Plot	400	0	0	4	1,600	4	1,600	13	5,200	23	9,200	23	9,200	26	10,400	28	9,600	31	12,400	152	59,200	
	- Field Extension Activities	1,200	0	1	600	1	1,200	3	3,000	6	6,000	7	7,200	7	7,200	7	7,200	8	7,200	9	9,600	48	49,200
	3. Training Programs		0	1,800	4,400	6,050	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,550	87,100
	- Staff Training		0	1	1,800	1	1,300	4	3,100	6	3,150	7	4,000	3	1,350	3	1,350	3	1,350	0	0	0	17,400
	- Farmers Training	1,400	0	0	0	1	1,400	1	1,400	4	5,600	6	8,400	6	8,400	1	1,400	3	4,200	1	1,400	23	32,200
	- Short Farmers Training	550	0	0	0	0	0	1	550	0	0	4	2,200	3	1,650	3	1,650	3	1,650	0	0	14	7,700
	- Mass Guidance	1,000	0	0	1	1,000	1	1,000	3	3,000	3	3,000	2	2,000	3	3,000	3	3,000	3	3,000	0	0	20,000
	- Study Tour	700	0	0	0	1	700	0	0	4	2,800	3	2,100	3	2,100	3	2,100	0	0	0	0	14	9,800
	Total Technical Extension Program Costs		0	6,400	9,200	23,650	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	43,250	259,000
	Extension Personnel	6,500	0	1	3,250	1	6,500	3	16,250	6	32,500	7	39,000	7	39,000	7	39,000	8	45,500	9	52,000	48	273,000
	Administration Costs of CIAT		0	1,280	10,940	13,830	39,850	41,420	39,380	14,200	14,580	1,880	177,360										
	1. Additional Research Staff		0	0	0	1	9,100	1	9,100	3	31,200	3	31,200	1	9,100	1	9,100	0	0	0	0	13	130,000
2. Administration Costs(20% of Program Costs)		0	1,280	1,840	4,730	8,650	10,220	8,180	5,100	5,480	1,880	47,360											
<b>Overall Program Costs</b>		9,000	26,430	84,840	159,930	167,100	137,020	124,780	89,800	99,580	87,780	986,260											

File: Tab A.1.6-6&7

**Table A.1.6-8. ESTIMATED COSTS FOR INSTITUTIONAL TRAINING AND TECHNICAL EXTENSION PROGRAMS TO BE BORN BY PROJECT**

Unit: US\$ 1,000

C/D Center	Programs	Year										Total
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
San Isidro	Operation of C/D Center											
	1. Institutional Training Programs	9.0	15.5									
	2. Technical Extension Programs		10.9	26.6	26.5	36.9	37.8	36.0				
	- Experiment/Extension Programs		4.6	4.8	4.8	4.8	4.8	4.8				
	- Training Programs		1.8	4.4	4.3	2.1	2.9	1.4				
	- Administration Costs		4.5	17.4	17.4	30.0	30.1	29.8				
	<b>Total Program Costs</b>	<b>9.0</b>	<b>26.4</b>	<b>26.6</b>	<b>26.5</b>	<b>36.9</b>	<b>37.8</b>	<b>36.0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>199.2</b>
Samaipata	Operation of C/D Center											
	1. Institutional Training Programs			13.8	13.8							
	2. Technical Extension Programs				8.3	11.6	10.2	5.8	7.3	6.6		
	- Experiment/Extension Programs				3.6	3.4	2.4	1.4	1.4	1.4		
	- Training Programs				0.6	3.6	3.4	0.7	2.0	1.4		
	- Administration Costs				4.1	4.6	4.4	3.7	3.9	3.8		
	<b>Total Program Costs</b>	<b>0</b>	<b>0</b>	<b>13.8</b>	<b>22.1</b>	<b>11.6</b>	<b>10.2</b>	<b>5.8</b>	<b>7.3</b>	<b>6.6</b>	<b>0</b>	<b>77.4</b>
Vallegrande	Operation of C/D Center											
	1. Institutional Training Programs			33.2	33.2							
	2. Technical Extension Programs				9.5	25.7	25.4	23.9	21.4	23.4		
	- Experiment/Extension Programs				4.6	4.8	4.8	4.8	2.8	4.8		
	- Training Programs				0.6	3.6	3.4	2.1	2.0	1.4		
	- Administration Costs				4.3	17.3	17.2	17.0	16.6	17.2		
	<b>Total Program Costs</b>	<b>0</b>	<b>0</b>	<b>33.2</b>	<b>42.7</b>	<b>25.7</b>	<b>25.4</b>	<b>23.9</b>	<b>21.4</b>	<b>23.4</b>	<b>0</b>	<b>195.7</b>
Saipina	Operation of C/D Center											
	1. Institutional Training Programs			10.2	10.3							
	2. Technical Extension Programs				9.5	16.1	14.7	11.9	4.2	1.0		
	- Experiment/Extension Programs				4.6	4.4	3.4	2.4	1.0			
	- Training Programs				0.6	3.6	3.4	2.1	2.0			
	- Administration Costs				4.3	8.1	7.9	7.4	1.2	1.0		
	<b>Total Program Costs</b>	<b>0</b>	<b>0</b>	<b>10.2</b>	<b>19.8</b>	<b>16.1</b>	<b>14.7</b>	<b>11.9</b>	<b>4.2</b>	<b>1.0</b>	<b>0</b>	<b>77.9</b>
Mairana	Operation of C/D Center											
	1. Institutional Training Programs				13.0	13.1						
	2. Technical Extension Programs					6.5	10.4	9.0	5.8	7.3	4.9	
	- Experiment/Extension Programs					2.1	2.4	2.4	1.4	1.4	1.4	
	- Training Programs					0.6	3.6	2.4	0.7	2.0		
	- Administration Costs					3.8	4.4	4.2	3.7	3.9	3.5	
	<b>Total Program Costs</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13.0</b>	<b>19.6</b>	<b>10.4</b>	<b>9.0</b>	<b>5.8</b>	<b>7.3</b>	<b>4.9</b>	<b>70</b>
Pampa Grande	Operation of C/D Center											
	1. Institutional Training Programs				17.8	17.8						
	2. Technical Extension Programs					9.5	16.6	16.3	13.6	13.5	12.7	
	- Experiment/Extension Programs					4.6	4.8	4.8	3.8	3.8	3.8	
	- Training Programs					0.6	3.6	3.4	2.1	2.0	1.4	
	- Administration Costs					4.3	8.2	8.1	7.7	7.7	7.5	
	<b>Total Program Costs</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17.8</b>	<b>27.3</b>	<b>16.6</b>	<b>16.3</b>	<b>13.6</b>	<b>13.5</b>	<b>12.7</b>	<b>117.8</b>
Comarapa	Operation of C/D Center											
	1. Institutional Training Programs				17.1	17.1						
	2. Technical Extension Programs					9.5	16.6	16.3	10.7	15.1	9.9	
	- Experiment/Extension Programs					4.6	4.8	4.8	2.8	3.8	2.8	
	- Training Programs					0.6	3.6	3.4	0.7	3.4		
	- Administration Costs					4.3	8.2	8.1	7.2	7.9	7.1	
	<b>Total Program Costs</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17.1</b>	<b>26.6</b>	<b>16.6</b>	<b>16.3</b>	<b>10.7</b>	<b>15.1</b>	<b>9.9</b>	<b>112.3</b>
Overall	Operation of C/D Center											
	1. Institutional Training Programs	9.0	15.5	57.2	105.2	48.0	0	0	0	0	0	
	2. Technical Extension Programs	0	10.9	26.6	53.8	115.8	131.7	119.2	63	66.9	27.5	
	- Experiment/Extension Programs	0	4.6	4.8	17.6	28.7	27.4	25.4	13.2	15.2	8	
	- Training Programs	0	1.8	4.4	6.1	14.7	23.9	15.5	9.5	10.2	1.4	
	- Administration Costs	0	4.5	17.4	30.1	72.4	80.4	78.3	40.3	41.5	18.1	
	<b>Total Program Costs</b>	<b>9.0</b>	<b>26.4</b>	<b>83.8</b>	<b>159.0</b>	<b>163.8</b>	<b>131.7</b>	<b>119.2</b>	<b>63.0</b>	<b>66.9</b>	<b>27.5</b>	<b>850.3</b>
		Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008

File: Tab A.1.6-8





Table A.1.7-2 OVERALL IMPLEMENTATION PLANS FOR DEVELOPMENT AND OPERATION OF C/D CENTERS - 1/2

C/D Center/Development Stage & Activities	Agencies	Year											
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Project &amp; Sub-Project Office</b>	Prefecture	-----											
<b>San Isidro C/D Center(Pilot Project)</b>													
Development Stage													
- Preparatory Stage	-	---	---	---									
- Initial Stage	-			---	---	---	---	---	---				
- Advanced Stage	-								---	---	---	---	---
Development Activities													
- Steering Committee for Development	A	---	---										
- Trial Operation at PETHOSAM Facility	B	---	---										
- Institutional Training	C	---	---										
	D	-----											
- Technical Extension	E								---	---	---	---	---
	D	-----											
- Construction	F	---											
- Operation & Management Arrangement	A	---											
- Steering Committee for O & M	A	---											
- Operation of C/D Center	D	-----											
<b>Samalpata C/D Center</b>													
Development Stage													
- Preparatory Stage	-	---											
- Initial Stage	-					---	---	---	---	---			
- Advanced Stage	-									---	---	---	
Development Activities													
- Steering Committee for Development	A	---											
- Trial Operation at Existing Facility	B	---											
- Institutional Training	C	---											
	D	-----											
- Technical Extension	E	---											
	D	-----											
- Construction	F	---											
- Operation & Management Arrangement	A	---											
- Steering Committee for O & M	A	---											
- Operation of C/D Center	D	-----											
<b>Vallegrande &amp; Saipina C/D Center</b>													
Development Stage													
- Preparatory Stage	-	---											
- Initial Stage	-					---	---	---	---	---			
- Advanced Stage	-									---	---	---	
Development Activities													
- Steering Committee for Development	A	---											
- Institutional Training	C	---											
	D	-----											
- Technical Extension	E	---											
	D	-----											
- Construction	F	---											
- Operation & Management Arrangement	A	---											
- Steering Committee for O & M	A	---											
- Operation of C/D Center	D	-----											

Remark: Agencies --- Implementation agencies of development activities: A = Sub-project office, B = Sub-project office/ASOFRUT, C = Sub-project office, D = C/D center, E = Sub-project office/CIAT, F = Municipal Gov. File: Tab A.1.7-2

**Table A.1.7-2 OVERALL IMPLEMENTATION PLANS FOR DEVELOPMENT AND OPERATION OF C/D CENTERS - 2/2**

Collection Center/Development Activities	Agencies	Year											
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Project &amp; Sub-Project Office</b>	Prefecture												
<b>Mairana C/D Center</b>													
Development Stage													
- Preparatory Stage	-				-----	-----							
- Initial Stage	-						-----	-----	-----	-----			
- Advanced Stage	-											-----	-----
Development Activities													
- Steering Committee for Development	A				=====	=====							
- Institutional Training	C				=====	=====							
	D						=====	=====	=====	=====			
- Technical Extension	E					=====	=====	=====	=====	=====			
	D											=====	=====
- Construction	F					=====	=====						
- Operation & Management Arrangement	A					=====	=====						
- Steering Committee for O & M	A					=====	=====	=====	=====	=====			
- Operation of C/D Center	D							=====	=====	=====	=====		
<b>Pampa Grande C/D Center</b>													
Development Stage													
- Preparatory Stage	-				-----	-----							
- Initial Stage	-						-----	-----	-----	-----			
- Advanced Stage	-											-----	-----
Development Activities													
- Steering Committee for Development	A				=====	=====							
- Institutional Training	C				=====	=====							
	D						=====	=====	=====	=====			
- Technical Extension	E					=====	=====	=====	=====	=====			
	D											=====	=====
- Construction	F					=====	=====						
- Operation & Management Arrangement	A					=====	=====						
- Steering Committee for O & M	A					=====	=====	=====	=====	=====			
- Operation of C/D Center	D							=====	=====	=====	=====		
<b>Comarapa C/D Center</b>													
Development Stage													
- Preparatory Stage	-				-----	-----							
- Initial Stage	-						-----	-----	-----	-----			
- Advanced Stage	-											-----	-----
Development Activities													
- Steering Committee for Development	A				=====	=====							
- Institutional Training	C				=====	=====							
	D						=====	=====	=====	=====			
- Technical Extension	E					=====	=====	=====	=====	=====			
	D											=====	=====
- Construction	F					=====	=====						
- Operation & Management Arrangement	A					=====	=====						
- Steering Committee for O & M	A					=====	=====	=====	=====	=====			
- Operation of C/D Center	D							=====	=====	=====	=====		

Remark: Agencies --- Implementation agencies of development activities: A = Sub-project office, B = Sub-project office/ASOHFRUT, C = Sub-project office, D = C/D center, E = Sub-project office/CIAT, F = Municipal Gov.

File: Tab A.1.7-2

**Table A.1.7-3. MAJOR FUNCTIONS/ACTIVITIES TO BE PERFORMED BY INSTITUTIONS CONCERNED - 1/2**

	Major Activities/Functions To Be Performed			
	1999	2000	2001	2002
Institutions Prefecture Gov.	- Establishment of Project & Sub-Project Office	- Budget Allocation for Project	- Budget Allocation for Project	- Budget Allocation for Project
Project Office	- Coordination with St. Cruz City	- Coordination with St. Cruz City	- Coordination with St. Cruz City	- Coordination with St. Cruz City
Sub-Project Office	- Project Budget Arrangement	- Project Budget Arrangement	- Project Budget Arrangement	- Project Budget Arrangement
	- Technical/Institutional Guidance for Development of San Isidro C/D Center	- Technical/Institutional Guidance for Development of San Isidro C/D Center	- Technical/Institutional Guidance for Dev. of Samaipata, Vallegrande & Saipina C/D Centers	- Technical/Institutional Guidance for Develop. of Mairana, Pampa Grande & Comarapa C/D Center
	- Institutional Training for San Isidro C/D center	- Institutional Training for San Isidro C/D center	- Institutional Training for Samaipata, Vallegrande & Saipina C/D	- Institutional Training for Mairana, Pampa Grande & Comarapa C/D Center
San Isidro C/D Center	- Trail Operation at PETHOSAM	- Trail Operation at PETHOSAM	- Initial Stage of Operation	- Initial Stage of Operation
Municipal Gov.	- Etab. of Steering Committee for Development of C/D	- Manag. of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D
Samaipata, Vallegrande & Saipina C/D Centers	- Project Proposal to FDC	- Project Proposal to FDC	- Trail Operation at Existing Facility (Samaipata)	- Trail Operation(Samaipata)
Municipal Gov.	- Management Arrangement of C/D with ASOFRUT	- Management Arrangement of C/D with ASOFRUT	- Construction of C/D Center	- Institutional Training/Guidance
Mairana, Pampa Grande & Comarapa C/D Centers	- Etab. of Steering Committee for Development of C/D	- Etab. of Steering Committee for Development of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D
ASOFRUT	- Project Proposal to FDC	- Project Proposal to FDC	- Project Proposal to FDC	- Project Proposal to FDC
EMCA	- Management Arrangement of C/D with ASOFRUT	- Management Arrangement of C/D with ASOFRUT	- Management Arrangement of C/D with ASOFRUT	- Management Arrangement of C/D with ASOFRUT
CIAT	- Technical Extension Programs in San Isidro	- Technical Extension Programs in San Isidro Areas	- Technical Extension Programs in Samaipata, Vallegrande & Saipina Areas	- Technical Extension Programs in Samaipata, Vallegrande, Saipina, Mairana, Pampa Grande & Comarapa Areas
	- Management of San Isidro C/D Center	- Management of San Isidro C/D Center	- Management of San Isidro C/D Center	- Management of San Isidro, Samaipata, Saipina & Vallegrande C/D Centers

Table A.1.7-3. MAJOR FUNCTIONS/ACTIVITIES TO BE PERFORMED BY INSTITUTIONS CONCERNED - 2/2

Institutions	Major Activities/Functions To Be Performed			
	2004	2005	2006	2007
Prefecture Gov.	- Budget Allocation for Project	- Budget Allocation for Project	- Budget Allocation for Project	- Budget Allocation for Project
Project Office	- Coordination with St. Cruz City	- Coordination with St. Cruz	- Coordination with St. Cruz	- Coordination with St. Cruz
Sub-Project Office	- Project Budget Arrangement	- Project Budget Arrangement	- Project Budget Arrangement	- Project Budget Arrangement
	- Technical Extension Program for San Isidro, Samaipata, Vallegrande, Saipina, Mairana, Pampa Grande & Comarapa Areas	- Technical Extension Program for Samaipata, Vallegrande, Saipina, Mairana, P. Grande & Comarapa	- Technical Extension Program for Samaipata, Vallegrande, Saipina, Mairana, P. Grande & Comarapa	- Technical Extension Program for Mairana, P. Grande & Comarapa
San Isidro C/D Center	- Support Establishment of Users Cooperative in San Isidro	- Support Establishment of Users Cooperative in Samaipata, Vallegrande & Saipina	- Support Establishment of Users Cooperative in Samaipata, Vallegrande & Saipina	- Support Establishment of Users Cooperative in Mairana, Pampa Grande & Comarapa
Municipal Gov.	- Initial Stage of Operation	- Advanced Stage of Operation	- Advanced Stage of Operation	- Advanced Stage of Operation
	- Institutional Training/Guidance	- Tech. Extension/Inst. Guidance	- Tech. Extension/Inst. Guidance	- Tech. Extension/Inst. Guidance
	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D
Collection Center	- Support Establishment of Cooperative	- Support Establishment of Cooperative	- Support Establishment of Cooperative	- Support Establishment of Cooperative
Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative
Samaipata, Vallegrande & Saipina C/D Centers	- Initial Stage of Opera.	- Initial Stage of Operation	- Initial Stage of Operation	- Initial Stage of Operation
	- Institutional Training/Guidance	- Institutional Training/Guidance	- Institutional Training/Guidance	- Institutional Training/Guidance
Municipal Gov.	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D
Collection Center	- Support Establishment of Cooperative	- Support Establishment of Cooperative	- Support Establishment of Cooperative	- Support Establishment of Cooperative
Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative
Mairana, Pampa Grande & Comarapa C/D Centers	- Initial Stage of Operation	- Initial Stage of Operation	- Initial Stage of Operation	- Initial Stage of Operation
	- Institutional Training/Guidance	- Institutional Training/Guidance	- Institutional Training/Guidance	- Institutional Training/Guidance
Municipal Gov.	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D	- Management of Steering Committee for Operation of C/D
Collection Center	- Support Establishment of Cooperative	- Support Establishment of Cooperative	- Support Establishment of Cooperative	- Support Establishment of Cooperative
Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative	- Establishment of Users Cooperative
CIAT	- Technical Extension Programs in San Isidro, Samaipata, Vallegrande, Saipina, Mairana, Pampa Grande & Comarapa Areas	- Technical Extension Programs in Samaipata, Vallegrande, Saipina, Mairana, P. Grande & Comarapa Areas	- Technical Extension Programs in Samaipata, Vallegrande, Saipina, Mairana, P. Grande & Comarapa Areas	- Technical Extension Programs in Mairana, Pampa Grande & Comarapa Areas
ASOIFRUIT	- Management of San Isidro, Samaipata, Saipina & Vallegrande, Mairana & P. Grande C/D Centers	- Management of San Isidro, Samaipata, Saipina & Vallegrande, Mairana & P. Grande C/D Centers	- Management of Samaipata, Saipina, Vallegrande, Mairana & Pampa Grande C/D Centers	- Management of Mairana & Pampa Grande C/D Centers
EMCA	- Support Establishment of Cooperative in San Isidro	- Support Establishment of Cooperative in Samaipata, Vallegrande, Saipina	- Support Establishment of Cooperative in Samaipata, Vallegrande, Saipina	- Support Establishment of Cooperative in Mairana & Pampa Grande
	- Management of Comarapa C/D Center	- Management of Comarapa C/D Center	- Management of Comarapa C/D Center	- Management of Comarapa C/D Center
	- Support Estab. of Cooperative in Comarapa	- Support Estab. of Cooperative in Comarapa	- Support Estab. of Cooperative in Comarapa	- Support Estab. of Cooperative in Comarapa

Table A.1.7-4. OVERALL COSTS FOR PROJECT IMPLEMENTATION TO BE FINANCED BY THE PROJECT OFFICE

Unit: US\$ 1,000

Cost Items	Year											Total
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		
1. Institutional Training & Technical Extension Program Costs	9.0	26.4	83.8	159.0	163.8	131.7	119.2	63.0	66.9	27.5	850.3	
- Institutional Training Program Costs	9.0	15.5	57.2	105.2	48.0						234.9	
- Technical Extension Program Costs		10.9	26.6	53.8	115.8	131.7	119.2	63.0	66.9	27.5	615.4	
2. Administration Costs of Project Office & Sub-Project Office		180.2	146.2	193.4	153.4	119.6	119.6	119.6	119.6	119.6	1271.2	
<b>Total Costs for Project Implementation</b>	<b>9.0</b>	<b>206.6</b>	<b>230.0</b>	<b>352.4</b>	<b>317.2</b>	<b>251.3</b>	<b>238.8</b>	<b>182.6</b>	<b>186.5</b>	<b>147.1</b>	<b>2,121.5</b>	

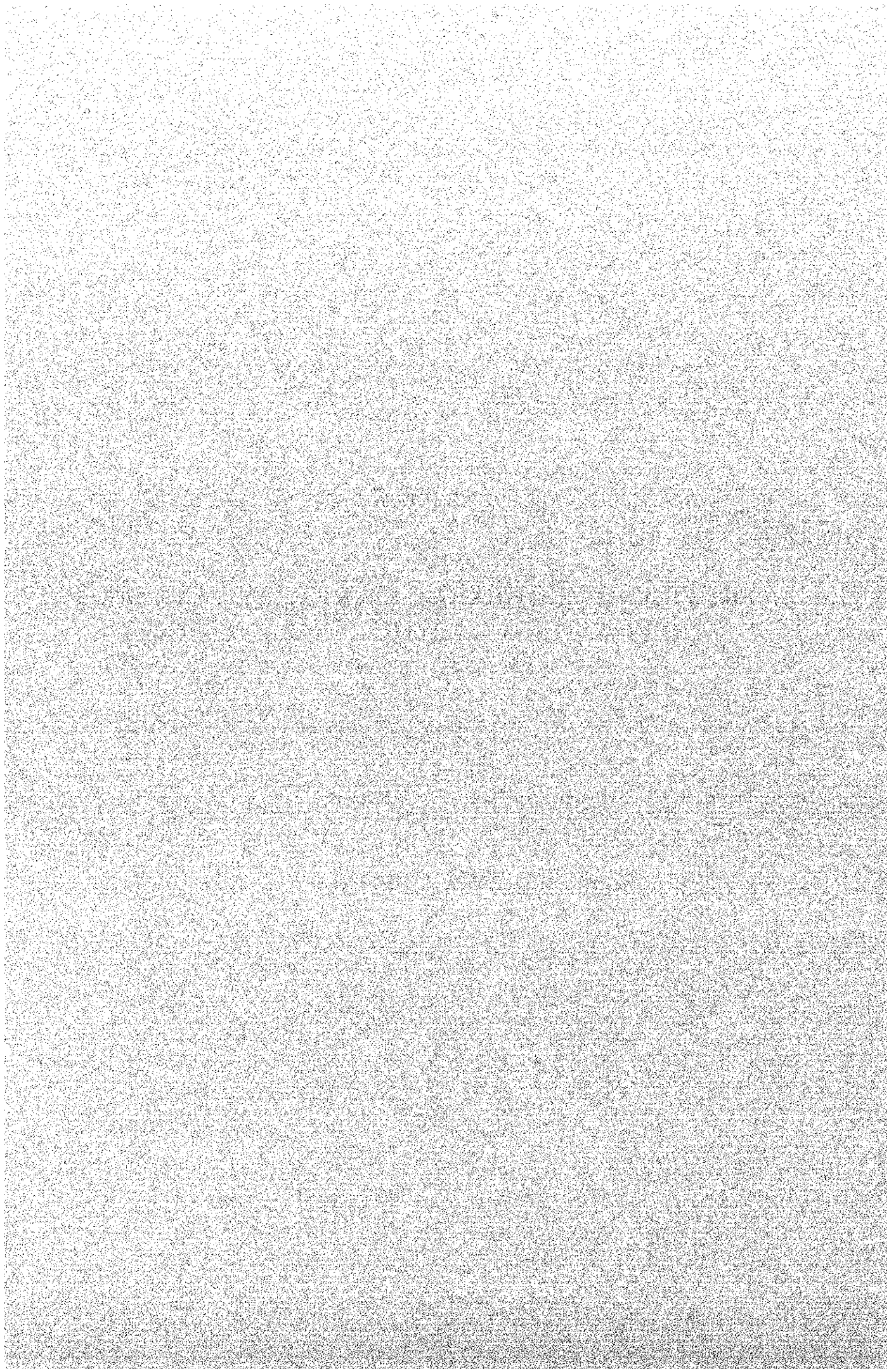
Remarks 1: Institutional Training & Technical Extension Program Costs --- details are shown in Tables A.1.6-6 & 6-8.

Remarks 2: Administration Costs of Project Office & Sub-Project Office --- details are shown in Tables A.1.7-1.

*Feasibility Study  
for the Improvement of Agricultural  
Marketing System  
in  
Santa Cruz*

## **ANNEX 2**

# **FRUIT AND VEGETABLE MARKETING SYSTEM, AND PLANNING OF WHOLESALE MARKET**





**ANNEX 2**  
**FRUIT AND VEGETABLE MARKETING SYSTEM, AND PLANNING OF**  
**WHOLESALE MARKET**

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## **ANNEX 2 FRUIT AND VEGETABLE MARKETING SYSTEM, AND PLANNING OF WHOLESALE MARKET**

### **1 REGIONAL DEVELOPMENT POLICY**

#### **1.1 Economical development trend in Santa Cruz Dept.**

In 1950, the contribution of Santa Cruz in national GDP was merely 5%. It has increased up to 30% of GDP in the nation that now occupies the 1st place among the departments in the country. The feature of GDP contribution in Santa Cruz is derived of non-traditional product.

The development history can be classified as the following two stages. The 1st stage was from 1954 to the middle of 1970s. During this time, the promotion of regional agricultural product such as rice, sugar cane, cotton and corn were focussed on. The 2nd stage started from the middle of 1970s aiming external growth of agricultural product. Unfortunately, there was the time of economic and political unstability that disturbs the development between 1978 to 1985. Only from 1985, the new economical policy has been settled in which the export promotion of non-traditional product such as sugar, cotton, wooden furniture, soybean, sunflower and its derivative have been taken into account.

#### **1.2 Governmental policy on agricultural development**

Since Benzel Government has established in 1997, the plan of agricultural development is still under the preparation by the central government. The policy only can be seen the Action Plan 1997 – 2002 that was published in December 1997. It says that the governmental policy will focus on equity (poverty alleviation), opportunity (adjustment social unfairness), dignity (countermeasure for drugs) and institutional building (rebuilding of justice). Regarding marketing of agricultural products, the government is under reviewing on enlargement for taxation basis, improvement for its administration system and modernization of custom office. These topics should be important issue for the improvement of financial revenue. The infra-structure arrangement and management unification is the next issue to connect production area with consumption area through which the plan of rural development would be viable and also lead to modernization of agricultural system and poverty alleviation. The improvement of marketing of fruit and vegetable would be involved in this category of the plan.

Due to the decentralization policy of the central government, each prefecture becomes responsible for regional development.

The priority of development plan has been settled by the Santa Cruz prefecture as follows:

- Investment for infra-structure of road to be free from transportation problems and to accomplish international road required for export corridor.
- Improvement of micro-irrigation infra-structure for small scale farmers in the valley area.
- Improvement of drainage infra-structure and flow control system for colonial farmers in the northern low land area
- Strengthening basic support services for agricultural and industrial development through modernization and exploitation of technology.

## **2 RECENT SITUATION OF MARKETING SYSTEM ON FRUIT AND VEGETABLE**

### **2.1 Supply and demand**

The demand of fruit and vegetable in the Santa Cruz City has been estimated as 314 kg per capita in a year at the time of the M/P survey carried out by JICA study team in 1994. The total demand in the Santa Cruz Dept. become 520,000 tons in 1998 because its population is increasing at annual ratio of 3.15%. Since the urban population is increasing at more rapid ratio than that of department average, the consumption in the Santa Cruz City is estimated as 287,000 tons among 520,000 tons. While the rural population in the valley area are kept as steady or slightly decreasing. The consumption in this area do not increasing when compared with the volume in 1994. (See Table A.2.2-1)

The supply of fruit and vegetable from the department is increasing moderately on potato, tomato and banana while both cassava and platano are not increasing. Some leaf vegetable in the valley area obtains good reputation because of its quality and distributed to the market in La Paz. Regarding supply volume, the product in the low land occupies far greater portion than those in the valley area particularly on fruit such as citrus and pineapple. These products are also marketed to other department and not for export. Supply and demand of fruit and vegetable has been summarized as tables showing its balance in 1994 and 1998. (See Table A.2.2-2 to 9)

### **2.2 Origin and destination of fruit and vegetable**

As shown from the production quantity (see Table A.2.2-10), the production of potato and banana in the department is not sufficient to fulfil the demand of the Santa Cruz Dept.. These product need to be transported from the outside the department. Per capita consumption of potato in Bolivia is about 50 kg in 1996. The department needs about 83,000 tons potato for their consumption, while its production is merely 63,000 tons at 1996/97. To fulfil the demand of potato and banana, fairly large amount shall be transported from the other department, mostly from Cochabamba and some imported from Argentine. On the contrary, tomato and cassava has been produced sufficiently in the department. These products should find market outside the department.

Origin and destination for fruit and vegetable has been summarized in the tables. (See Table A.2.2-11 to 18) About 90% of product consumed in the Santa Cruz City have been traded in the Abasto Market. The rest is traded directly from producers at the retail market (see Table A.2.2-19) including supermarket as well as the first class hotel to meet their quality specification. There are 18 supermarket and 19 hotels of 4 and 5 stars in the city. (See Table A.2.2- 20 and 21). They do not prefer to purchase fruit and vegetable from the existing Abasto Market due to not sanitary environment problem.

### **2.3 Inflow volume of fruit and vegetable to Abasto Market.**

The inflow volume of fruit and vegetable to Abasto Market has been analyzed by counting the numbers of incoming truck together with asking drivers on its loaded product and quantity, and their origin. The analysis has been made in August 1998 of the 1st phase survey for successive 7 days and in November 1998 of the 2nd phase survey for two days. The figure in the case of November was calculated as 7 days equivalent for the convenience of comparison. The result is summarized in the Table A.2.2-22.



In August, inflow volume was 3,230 tons in total among which banana, potato and onion were dominant. Whereas in November, the inflow volume was 2,700 tons in total among which potato, banana and tomato were dominant. Apparently, there is the seasonal variation on inflow products. In November, it was the season for banana (including platano) and onion was already out of the season. The major origin of banana was the Cochabamba Dept..

The significant difference between August and November was observed in potato. Due to the drought in the Alti Plano where is the major potato producing area in the country, the production of domestic potato has been reduced that enables of the inflow for imported potato from Argentine. The imported potato has occupied about 80% potato in the market in November 1998. The price of imported potato is cheaper than that of domestic potato.

In November, 65.3% product that inflows to Abasto Market has comprised of the product from outside the department. This means the product coming from the department has decreased to 34.5% from 44.1% observed in the survey during August. Although the phenomenon seems to temporary due to less production caused by the drought and also by the seasonal factor, the revision of the figures on supply and demand prepared in the survey during August 1998 does not necessary.

The ratio of truck capacity incoming to Abasto Market was 50.0: 19.4: 16.7: 13.9 for less than 5 tons, 5 to 10 tons, 10 to 20 tons and 20 to 30 tons respectively. This is almost the same ratio as surveyed in August. Generally speaking, the product from the valley area comes by smaller truck and from the outside department including imported product comes by larger truck. (See Table A.2.2-23)

Regarding the origin of truck, the largest numbers come from outside Santa Cruz Dept., then followed valley area, import and low land respectively. (See Table A.2.2-24)

The distribution of product entered to Abasto Market can be classified as shown in Table A.2.2-25. 93% of the product entered to Abasto Market has been handled by traders. The break down is as follows: 65.5% for wholesalers in Abasto Market, 18.1% for retailers in Abasto Market and 9.1% for retailers in other market. The significant difference has been seen for the handling volume by retailers. It was increased from 7.5% at 1994 to 18.1% at 1998. The reason comes from the disorder increase of small retailers in Abasto Market that brings chaos in the market. The handling volume by public consumers and supermarket has decreased 7% of the total volume from 14% at 1994. Wholesalers sell 53.2% to retailers in Abasto Market, 21.3% to retailers in other market and 21.2% to public consumers. (See Table A.2.2-26) The volume sold to public consumers has increased to 21.2% compared with the survey at 1994 that was 11.3%. This comes from increase number of small retailers in the market.

#### **2.4 Pricing mechanism**

Market price of fruit and vegetable has been decided by the quantity of supply and demand. Since the demand is stable because of the strong purchasing power in the region due to the highest income level among the department in the country, the supply situation should be limiting factor for pricing and its fluctuation. Due to poor irrigation facility and poor farming management at the production area, the supply situation of fruit and vegetable in Bolivia is unstable. Pricing mechanism shall be clarified focussing on major products such as potato and tomato.

(1) Potato

Normally, the wholesale price of tomato is in between Bs.1.0 to 2.0/kg (Bs.12 to 23/arroba) and it has been kept rather lower price from July to September in 1997. From the beginning of 1998, it has increased as high as Bs.2.5 to 3.0/kg. The farmgate price at that time was Bs.1.12/kg in average for producer farmers in the valley area. (See Table A.2.2-27) Another survey carried out at production area revealed that producers net income for potato was US\$220/ton that is equivalent to Bs.1.21/kg. The potato price has been stable and slightly became cheaper in the middle of the 1st phase study during July to September 1998. (See Table A.2.2-28) During the period, there was imported potato from Argentine in the market, although its occupancy ratio was about 35% of potato in the market.

It was revealed that the occupancy ratio of imported potato has reached more than 70% in the market in November 1998 during 2nd phase study. The reason is the less production of the domestic potato due to the drought in the Alti Plano where is the major potato producing area in the country. The wholesale price of domestic potato is as high as Bs.30/arroba (Bs.2.61/kg). While imported potato price is merely Bs.15/arroba (Bs.1.30/kg) even it has been paid transportation cost from Argentine. This market price situation is almost the same either in Santa Cruz or in Cochabamba.

Regarding price fluctuation of potato, it is summarized in the Table A.2.2-29. In Santa Cruz, the ratio of maximum and minimum price was 2.71 from the data for past 2 years. The price fluctuation in Cochabamba was similar to Santa Cruz (See Table A.2.2-30), and the price in La Paz was less than those of in Santa Cruz and Cochabamba in the same season (See Table A.2.2-31).

The price fluctuation of imported fruit such as apples from Argentine is very small in the 3 cities surveyed. This will be attributed by the controlled delivery by traders well acquainted of market.

(2) Tomato

The wholesale price of tomato in 1997 was normally in between Bs.1.0 to 1.5/kg at the market. But it went up over Bs.2.5/kg from August to October 1997. Farmgate price at that time was Bs.0.74/kg in average in the Valley areas (see Table A.2.2- 32). Every farmer in the Valley areas has begun to grow tomato since then resulting in excess production in this season. The wholesale price in November 1998 in Abasto was less than Bs.1.0/kg (see Table A.2.2- 33). Another survey carried out in production areas revealed that producers' net income for tomato was US\$135/ton that is equivalent to Bs.0.74/kg.

Tomato is the typical product showing severe price fluctuation in the market of Santa Cruz. During past 2 years, the ratio of maximum and minimum price showed 8.45, as clearly indicated from the Table A.2.2-29. Farmers have well recognized that tomato is a risky product. The transportation cost from the valley area to consumption area usually cost Bs.4 to 5/box which equivalent to Bs.0.2 to 0.25/kg. Farm management practice should be well organized for farmers to avoid severe price fluctuation.

While in Cochabamba and La Paz, the price of tomato do not fluctuate so much compared with that of in Santa Cruz. There are many reasons estimated. One of the major reasons comes from controlled delivery by wholesalers in Cochabamba or in other departments, because Cochabamba and La Paz is not tomato producing area but it has to be transported from the other department, mainly from Santa Cruz. The second reason comes from the

wider commercial zone. The market of Cochabamba includes the distribution to La Paz and Orulo. Their urban population is twice than that of Santa Cruz. As a proof, producers in the Caballero Province, such as Comarapa and Saipina prefer to send their product to Cochabamba because of its large market and better accessibility than to Santa Cruz. It was also recognized from the workshop held in Comarapa that traders and transporters in Cochabamba have given the credit for farmers in this area to secure the collection of product. This is likely additional reason why producers in Comarapa and Saipina sell their product to the market in Cochabamba even the price may cheaper than in Santa Cruz.

## **2.5 Daily tendency of sales volume and price in Abasto Market.**

In order to know periodical price fluctuation and sales volume in Abasto Market, the survey has been made on 20 and 21 November 1998 at every 3 hours along with numbers of incoming truck and its cargo. The wholesale and retail price of major product and volume of sales has been collected to know margins for traders. Also the data on losses during sales were collected.

### **(1) Incoming time of truck to Abasto**

Almost large capacity trucks from outside the department are entering to Abasto from the late in the evening till early in the morning. Trucks entering in the day time are small trucks coming from the valley area and Cochabamba Dept.. (See Table A.2.2-34 to 36)

### **(2) Sales volume and pricing**

Potato wholesalers can sell almost product until evening both domestic and imported potato without reducing price. While tomato wholesalers are suffering excess incoming product from the valley area. They can sell about 70% product until evening without adding any surcharge on the price when purchased. Banana wholesalers are similar situation to tomato wholesalers. They have to reduce the price of product in the afternoon less than the price when purchased. Wholesalers of other vegetables, such as lettuce, carrot and pimenton are enjoying good business. They can sell out their product within rather short time by adding 10 to 20% surcharge. The loss of product is very few at the stage of wholesalers. (See Figures)

Potato retailers can sell their product by adding Bs.2 each arroba (Bs.0.17/kg) as surcharge and never reduce their selling price. The price at the end of November 1998 was as high as Bs.28/arroba (variety: harinosa) that correspond to Bs.2.5/kg. Tomato retailers also suffer from similar problem with wholesalers. But they have a good business by kilogram-basis trade. Platano retailers have to reduce the price less than at purchasing time before noon because of newly arrived fresh product in the market from production area. Lettuce retailers also have to reduce selling price in the afternoon because of its deteriorate nature. The margin for retailers is not clear because they use different weight unit when they purchase and when they sell.

There are some losses of product discarded by retailers. The quantity of loss by each product is as follows: 4 to 8 pieces/arroba for potato; 0.5kg per 20 kg box for tomato; 0.5 basket per 4 basket for lettuce; 0.5 bag per 30 bags for pimenton.

## 2.6 Transportation cost

The transportation of fruit and vegetable is carried out by trucks, and railway is not utilized due to no network is established in the country and inconvenience of loading and unloading work derived of incomplete packaging system.

The transportation cost from major production area in the valley to Santa Cruz has been summarized in the Table A.2.2-37. The truck association decides the cost by weight and by product. Tomato and vegetables are generally required higher transportation cost than potato because they need much space for wooden boxes and lighter specific gravity.

Among the data, most reliable one is the data collected at Comarapa. This is just in between Santa Cruz and Cochabamba, and the distance is 240 km. The transportation cost for potato is Bs.6/QQ (Bs.129/ton) and Bs.3.5/box for tomato (Bs.175/ton).

According traders in Cochabamba, about 35% of potato coming to Cochabamba is sent to La Paz, and 25% is transported to Santa Cruz by large capacity truck (480 QQ = 22.3 tons). The transportation cost to Santa Cruz is Bs.10/QQ that correspond to Bs.108/ton. Tomato has never been transported to Santa Cruz from Cochabamba due to its deteriorate nature.

Regarding the transportation cost of imported potato from Argentine, it is Bs.15/QQ (Bs.323/ton) from the boarder (Yacuiba) to Cochabamba. The distance is 1,026 km. The transportation cost from the boarder to Santa Cruz is Bs.140/ton. The distance is 564 km. The transportation costs of potato for the long distance have been summarized in the Table A.2.2-38.

It should be noted that the transportation cost is one of limiting factor to decide the market price of fruit and vegetable, but it is not everything. The purchasing capacity also relates to the pricing of product. The wholesale price for some typical product in major cities in Bolivia has been summarized in the Table A.2.2-39. As seen from the table, the price of potato is rather cheap and stable in Cochabamba and La Paz, than that of in Santa Cruz because the former cities are in the production area. The price of tomato is also cheap and stable in the cities in higher elevation than that of in Santa Cruz. Nevertheless Santa Cruz locate in the production area of tomato, sometimes the price become cheaper and the fluctuation of price is very wide. This will come from poor farming management and no controlled delivery among farmers. It is strange that the price of citrus in La Paz is cheaper and stable than that of in Santa Cruz located in the center of production area.

## 2.7 Comparison with international price

The wholesale price of fruit and vegetable in the market of Buenos Aires, Argentine and Sao Paulo, Brazil has been collected for the price comparison with Bolivian product. The price of Buenos Aires shows monthly average during January to September 1998 and that of Sao Paulo shows the price in November 1998. For the convenience of comparison, the conversion by Bolivian currency equivalent has been calculated for each product.

### (1) Argentine

Potato price has never exceeded beyond as high as Bs.1.0/kg equivalent. It is usually Bs.0.5 to 0.8/kg. There is good price competitiveness for Argentine potato even it is paid the transportation cost that crosses the boarder when the price of Bolivian potato goes up to Bs.1.5/kg. The price difference comes from the production quantity and productivity as

shown in the Table A.2.2-40. Apparently those indexes for Bolivian potato are far behind from those of Argentine and Brazil.

Tomato price is the lowest in February (Bs.1.5/kg equivalent) and become the highest in August (Bs.4.7/kg equivalent). The ratio of maximum and minimum price is 2.70 that means very stable price. It may have opportunity for Bolivian tomato for exporting in winter season of Argentine. Suitable packaging should be required if exporting besides the clearance of phytosanitary inspection. Onion and carrot prices are almost the same with those products' price in Bolivia. There is no opportunity both for export and import.

Banana price is stable throughout the year that ranges Bs.2.02 to 3.5/kg equivalent. The highest price appears in August, that is winter in Argentine. The comparison of price is difficult since no price data is available in terms of weight in Bolivia. There are many black spot on the skin of banana in the market. It is difficult for Bolivian banana to be international trade commodity from the aspect of product quality.

Citrus price is also stable throughout the year that ranges Bs.1.18 to 1.85/kg equivalent. No price data is available in terms of weight in Bolivia. The Bolivian citrus price is usually Bs.8 to 10 per 25 pieces. That is estimated as Bs.1.8 to 2.0/kg. There is no price competitiveness for Bolivian citrus for export to Argentine.

Pineapple price is the highest from April to June that ranges from Bs.5.04 to 5.38/kg equivalent. No price data is available in terms of weight in Bolivia. It is usually Bs.280 to 435 per arroba depend on variety and size. It may have export opportunity in winter season only for large size variety.

Peach price suddenly become as high as Bs.30/kg equivalent in August and September. No price data is available in terms of weight in Bolivia. It is Bs.45 to 57/arroba in Bolivia. It may have price competitiveness when package problem could be solved. (See Table A.2.2-41)

## (2) Brazil

The wholesale price of potato in Sao Paulo is less than Bs.1.0/kg equivalent that is almost the same situation as in Buenos Aires. The distance of transportation from Sao Paulo to Santa Cruz is about 4 times longer compared with that from Argentine. This is the reason why Brazilian potato never comes to Bolivia.

Tomato, onion and carrot are similar price to those in Bolivia. There are no opportunities both for export and import.

Among fruits, only pineapple price seems slightly higher than that of in Bolivia. It may have export opportunity for Bolivian pineapple when packaging, transportation and phytosanitary problems are solved. (See Table A.2.2-42)

## 2.8 Standardization of weight system

In Bolivia, every transaction of fruit and vegetable have been made on the basis of traditional weight system such as bolsa (bag), canasta (basket), racimo (bunch), caja (box), arroba, quintal, dozen and piece. Sometimes bolsa means different quintals or arroba, and different type of package such as bolsa and canasta is used for the same product. Banana (including platano) traders purchase by racimo (bunch) and sell by dozen. Lettuce also was being purchased by canasta and sold by piece. It is very difficult

to compare with metric weight system and to clarify the size of margin between transactions. It is always disadvantage for seller's side mostly producer farmers. The system being adapted at the market in Bolivia is far behind from the international standard. The system should be urgently improved along with international metric system. It is also inevitable as one of countermeasure to prepare MERCOSUR participation. The need of improvement for metric system has been referred to as one of topics in the President Benzel's Action Plan (1997 to 2002). No attempt has ever seen for this action plan as yet.

## **2.9 Countermeasure for MERCOSUR participation**

Sanitary inspection of fruit and vegetable is a big problem for Bolivia to participate MERCOSUR. The prefecture department of Agriculture and Livestock has started the project entitled "Integrated service for agriculture and livestock sanitation in the Dept. of Santa Cruz" from 1998. The project has a plan to install 11 control points for the sanitary inspection. It requires US\$12 million for 5 years and some portion shall be managed by the service to issue sanitary certificate for export and import. In 1998, their budgetary allocation is merely US\$300,000.

Another division of the department, Dept. of Export Promotion, has a plan to investigate "Study of implementation of collection center for export promotion" from January 1999. This is very comprehensive study covering from production technology till international marketing focussing on sanitation and quality. The budget of the study is estimated as Bs.216,000 that is equivalent to US\$38,000. Close cooperation with farmers, traders and government officials who relate to sanitation and trading should be inevitable. No description has seen on the project paper regarding the project being implemented by the Dept. of Agriculture and Livestock.

Not only phyto- and zoo-sanitary inspection, but also residual pesticides has keen concerns for worldwide trading of fruit and vegetable. The joint committee with WHO/FAO has prepared international standard for maximum residue limit of various foods including fruit, vegetable, meat and milk. In Bolivia, CIAT has a function to conduct experiment of pesticides for its efficacy and to authorize its registration for use in the field. There is a list of pesticides that are prohibited to apply in the field. (See Table A.2.2-43) But there is no laboratory to have analysis on residual pesticides quantity for every food including fruit and vegetable in Bolivia. The Dept. of Control and Prevention is trying to obtain the budget from the central government but has not succeeded so far.

There are many plans and projects to improve sanitary inspection and safety aspect for fruit and vegetable particularly on the products that are produced in Santa Cruz. No coordination and cooperation can be seen between the central government and the prefecture, and within the prefecture department regarding implementation of the project/study. Every section has its own plans and projects. This situation will cause the waste of time, budget and human resources.

## **2.10 Investigation on cold storage installation**

There are some request from farmers and wholesalers to have a cold storage in public wholesale market for fruit and vegetable. At present, there are a few private refrigerating company in Santa Cruz that preserve fruit imported from Argentine. The investigation has been made as follows.

(1) Assumption for the operation and management of cold storage

1) Technical aspect

- Washing and sterilization is necessary before storage to avoid disease infection.
- Pre-cooling operation is necessary.
- Lapping by paper/polyethylene film is required to avoid water evaporation.
- Each commodity has its own specific temperature for cold storage. (see Table A.2.2-44 and 45)
- Some kind of fruit cannot be stored in the same room due to gas evolution.

2) Economical aspect

- Supply of electricity and water should be stable.
- Commodity of high commercial value should be selected for effective storage.
- Users have to pay depreciation and operation cost throughout the year.

Judging from the present situation of Abasto Market in Santa Cruz, it cannot be conceivable to wash, sterilize and lapping products prior to cold storage due to incomplete packaging system and also who will be responsible such necessary handling procedure. Technical incapability will rationalize that the cold storage installation is ridiculous matter before economical burden to be charged by users.

Moreover, there was a cold storage in existing Abasto Market when it was built. It was said that this cold storage was granted from Argentine. But this facility now disappeared from the market and it was never operated. The elucidation of the evidence should be inevitable if Bolivian counterpart hope to have reinstallation of cold storage in public market.

(2) Case of Frigorifico Santa Cruz

Frigorifico Santa Cruz is a private company that locates in the Industrial Park of Santa Cruz. They are importing apple from Argentine and storage it in the cold room before delivery to the market. The quantity of imported apple is 1,000 boxes (1 box contains 20 kg) at one delivery and usually 48 to 50 delivery has been made in one year. Refrigerating truck is used for the transportation from Argentine. The peak harvest season of apple in Argentine is March. But they can keep stable price throughout the year due to good post-harvest technology and facility in the country. Carton box or wooden box is used for the transportation and storage. When importation, they submit MACA the phytosanitary inspection certificate and pay its charge. The operation index for cold storage is as follows:

- Capacity of cold room: 10m x 10m x 5m (500 m<sup>3</sup>) with 15 HP refrigerator. They can store 6,000 boxes that mean 120 tons apple. (1 box apple cost Bs.100)
- Rental fee of cold room: US\$ 1,000/month = US\$ 12,000/year This cost is similar to the depreciation cost. (It has passed 18 years since established.)
- Running cost: US\$ 800/month including electricity, water, labor and spare parts.

- Required operation cost: US\$ 1,000 + US\$ 800 = US\$ 1,800/month = Bs. 10,116
- Burden of cold storage operation for imported apple:

Operation cost/ Commercial price of stored commodity = Bs. 10,116/ Bs. 600,000 = 1.68% (1 month). This means the cost of apple will increase 1.68% when stored in cold room for 1 month.

(3) The case study when using a cold room similar to Frigorifico Santa Cruz.

Typical fruit and vegetable are selected for case study. The ratio of cost increase has been calculated when they are stored rather cheap market price. The volume of stored product is 120 tons respectively.

	Tomato	Peach	Pineapple	Mandarin
Most preferable temperature for cold storage	12 – 13°C	0°C	10 – 13°C	4 – 6°C
Shelf life	1 – 2 W	2 – 4 W	2 – 4 W	4 – 6 M
Operation cost for one month storage	Bs.10,116	Bs.10,116	Bs.10,116	Bs.10,116
Market price when stored	Bs.12/caja	Bs.45/arroba	Bs.200/100 pieces	Bs.12/100 pieces
Commercial value of stored product	Bs.72,000	Bs.470,000	Bs.240,000	Bs.144,000
<b>Ratio of cost increase</b>	<b>14%</b>	<b>2.15%</b>	<b>4.2%</b>	<b>7.0%</b>

- Commercial value of tomato is cheap that becomes high ratio of cost increase for storage. The extend of shelf life is also short. Tomato is not suitable for cold storage.
- Commercial value of peach is the highest among fruit produced in Santa Cruz. The ratio of cost increase almost the same with apples imported from Argentine. The problem is short shelf life. The effective marketing is inevitable.
- Pineapple is the only fruit being exported from Santa Cruz, although its quantity is decreasing year by year due to packaging problem and high transportation cost.
- It is difficult to judge the positive effect on cold storage for mandarin. The Japanese Cooperative in San Juan is under experiment of mandarin storage at warehouse located in high altitude area. The ambient temperature is about 10°C throughout the year.

## 2.11 Marketing Information System

At present, there are two marketing information systems. One is run by a private organization that transports products to Santa Cruz City. The other is public, including newspaper, radio and television. The information transmitted as such only covers the price of products and does not include traded volume.

### (1) Private-owned System

Big-scale producers with telephone line can obtain price information from wholesalers in Abasto Market before shipping their products to Santa Cruz. Small-scale producers without telephone can opt for the traditional information system on individual information



conveyed by producers, intermediaries or truck drivers (transporters). These individuals frequent the City constantly to sell their products at Abasto Market, when they return to the production areas, they provide price information of the market. This is a common system found in the Department of Santa Cruz.

(2) Public System

Presently, CAO collects price information though incomplete, early in the morning at Abasto, Ramada and Los Pozos Markets everyday. The collected information would be disseminated through "Radio Santa Cruz" from 5am to 6am each day and also reported in "El Mundo" newspaper every 2 to 3 days. This radio program is especially an important source of price information for producers.

According to the socio-economic survey, 86% of farmer households in production areas own a radio. Marketing information communicated by radio is useful for producers. However, such information is insufficient for producers, as price at market closing and inflow volume of products are not available. Also until recently, ASOFRUT collected price information though their financial situation did not allow them to continue. The Municipal Government irregularly gathers information on price and inflow volume in Abasto Market, but does not undertake its compilation, processing and publishing. CAO plans to establish an information network linking La Paz, Cochabamba and Tarija.