Ministry of Water Resources and Meteorology, Ministry of Agriculture, Forestry and Fisheries, The Kingdom of Cambodia

BASIN-WIDE BASIC IRRIGATION AND DRAINAGE MASTER PLAN STUDY IN THE KINGDOM OF CAMBODIA

FINAL REPORT

VOLUME-IV APPENDIXES (PRE-FEASIBILITY STUDY FOR PRIORITY SIX SUB-PROJECTS) (2/2)

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BASIN-WIDE BASIC IRRIGATION AND DRAINAGE MASTER PLAN STUDY IN THE KINGDOM OF CAMBODIA

FINAL REPORT

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APPENDIX-D COST ESTIMATES

CHAPTER D1 BASIC CONDITIONS

D1.1 Basic Conditions for Cost Estimate

The basic conditions and assumptions employed for cost estimation of the Project are as follows:

- Cost estimate refers to the prices as of September 2008.
- Exchange rate are as of September 2008, and they are as follows:

1 US Dollar (US\$) = 4,107 Riel

= 107.99 Yen

- Unit prices of labor, construction materials, engineering works, etc., were collected from MOWRAM and market.
- Construction is undertaken on the contract basis, and V.A.T is excluded from construction costs.
- The Initial Investment cost consists of the following items, and assumptions and contents of each item are explained in table below:

Item	Item Descriptions	Assumption	Contents for Item / Remarks
No.	Item Descriptions	(%) and Key Items	Contents for field / Kemarks
1.	Construction Cost	See Section 9.2.3	1-1 Headworks and Major Related Structures
			1-2 Main and Secondary Sysytems
			1-3 On-farm Development
2.	Project Supporting Pograms Cost	5 % of Item 1	2-1 Meteo-hydrological Observation Strengthen-
			ing Program
			2-2 MOWRAM Staff Capacity Development
			2-3 PDOWRAM Staff Capacity Development
3.	Physical Contingencies	10 % of Items (1+2)	
4.	Sub-Total	Items (1+2+3)	
5.	Consulting Services Cost		5-1 Detail Design (D/D)
			5-2 Construction Supervision (C/S)
			5-3 FWUC Establishment and Strengthening
			5-4 Agricultural Extension Activities
6.	Tax & Duty	10 % of Items (4+5)	
7.	Land Acquisition Cost	See Section 9.2.4	For anticipated area
8.	Project Administration Cost	10 % of Item 4	
9.	Price Escalation	5 % /annum	Referred to IMF World Economic Outlook Database,
		of Item 4	October 2007

Items and Assumptions for Initial Investment Costs for the Project

Prepared by JICA Study Team

- Price escalation rate (Item 9) is assumed to be at 5.0 %/annum; i.e., based on the average of annual change ratio of inflation (consumer price) in Cambodia between year

2003 and 2008 (five years).

Cambodia		U	Remarks				
Items	2003	2004	2005	2006	2007	2008	Average change ratio 2003-2008
1. GDP (Current Price)	4.662	5.338	6.293	7.272	8.488	9.623	+0.992/year
Change Ratio (%)	-	14.5	17.9	15.6	16.7	13.37	15.6%/year
GDP Deflator	105.38	110.51	117.17	122.60	128.68	135.45	+6.01/year
Change Ratio (%)	-	4.9	6.0	4.6	5.0	5.3	5.2%/year
2. GDP (Constant Price)	4.424	4.830	5.371	5.931	6.596	7.104	+0.536/year
Change Ratio (%)	-	9.2	11.2	10.4	11.2	7.7	8.1%/year
3. Inflation (Av. Consumer Price)	104.72	108.69	115.06	120.48	128.32	135.37	+6.13/year
Change Ratio (%)	1.2	3.8	5.9	4.7	6.5	5.5	5.3%/year

Annual Change of Economic Index in Cambodia

GDP(Constant Price)=GDP(Current Price) ÷GDP Deflator, 100 = Year 2000

Prepared by JICA Study Team based on "IMF World Economic Outlook Database, October 2007"

- Construction costs are divided into foreign currency portion (FC) and local currency portion (LC). Ratios of the FC and the LC are estimated for each component as follows, referring to similar types of the projects in Cambodia:

Ratio for Foreign and Local Currency Portion

Item	Sub-Item		Currency Portion Rat		
No.	Item Descriptions		Foreign Currency	Local Currency	
1-1	Headworks and Major Related Structures	Earthwork Mechanic Works (Gate) Other than the above (Such as concrete works)	0.2 0.9 0.7	0.8 0.1 0.3	
1-2	Main and Secondary Sysytems		0.7	0.3	
1-3	On-farm Development		0.2	0.8	

CHAPTER D2 SUMMARY OF COST ESTIMATES

D2.1 Cost Estimate

D2.1.1 Initial Investment Costs

The initial investment cost for the Project are summarized and shown in the following table. The initial investment cost is estimated at about US\$ 97.95 millions, which is equivalent to Riel. 402 billions. The cost estimates of the initial investment cost are shown in Table D2.1-1 for the Project, and in Tables D2.1-2 to D2.1-7 for the Sub-projects bases, respectively.

No.	Item	Amount	Remarks		
		(US\$ 1,000)			
1.	Construction Cost	48,764	See Sub-Section 9.2.2 for detail		
2.	Project Supporting Programs Cost	2,438	5 % of Item 1		
3.	Physical Contingencies	5,120	10 % of Items (1+2)		
4.	Sub-Total	56,322	Items (1+2+3)		
5.	Consulting Services Cost	14,332			
6.	Tax & Duty	7,065	10 % of Item (4+5)		
7.	Land Acquisition Cost	841	For 391.9 ha		
8.	Project Administration Cost	5,632	10 % of Item 4		
9.	Price Escalation	13,762	5 %/annum of Item 4		
10.	Grand Total	97,954	Items 4+5+6+7+8+9		

Initial Investment Costs for the Project

Prepared by JICA Study Team

D2.1.2 Disbursement Schedule

The annual disbursement schedule for the Project is shown in the table.

Na	Item	Amount (US\$ 1,000)							
No.	Ltem	Total	2010	2011	2012	2013	2014	2015	2016
1.	Construction Cost	48,764	0	3,428	23,449	18,587	3,149	151	0
2.	Project Supporting Programs Cost	2,438	0	610	488	488	488	364	C
3.	Physical Contingencies	5,120	0	404	678	1,908	364	50	0
4.	Sub-Total	56,322	0	4,442	26,331	20,983	4,001	565	0
5.	Consulting Services Cost	14,332	2,150	3,153	5,016	2,723	860	287	143
6.	Tax & Duty	7,056	215	760	3,134	2,371	486	85	14
7.	Land Acquisition Cost	841	252	589	-	-	-	-	
8.	Project Administration Cost	5,632	0	0	2,633	2,098	400	57	0
9.	Price Escalation	13,762	0	0	5,674	5,797	1,361	230	0
10.	Grand Total	97,954	2,617	10,088	42,788	33,972	7,108	1,224	157

Annual Disbursement Schedule for the Project

Years 2008, 2009, 2017 are omitted from the above table due to no disbursement scheduled.

D2.2 Construction Cost and Related Costs

D2.2.1 Construction Cost

Cost estimates of construction costs (Item 1) were carried out for the following components of each sub-project. Construction cost includes costs for general items, miscellaneous works and contractor's expense, such as overhead.

Item 1-1: Headworks and Major Related Structures

Diversion weir, intake structures and other important major structures for each Sub-project

Item 1-2: Main and Secondary Systems

Irrigation and drainage canals including related structures.

Item 1-3: On-farm Development

Tertiary systems and their related facilities, including FWUC office, drying yards and storage for paddy for each sub-project.

The construction cost for the Project and each sub-project are summarized in the following table. It ranges from US\$ 15.2 millions, equivalent to Riel. 62.4 billions (for Lum Hach), to US\$ 4.0 millions, equivalent to Riel. 16.6 billions (for Wat Chre). The Construction cost becomes relatively higher for the sub-projects in which the headworks systems are to be rehabilitated/ re-constructed. The breakdown of the construction cost for the Sub-projects bases are shown in Tables D2.2-1A to D2.2-6A, respectively.

			Remarks					
No.	Item	Amount	Cost Bre					
		(US\$ 1,000)	(L					
1.	Construction Cost	Total	1-1	1-2	1-3			
	A. Ream Kon Rehabilitation Sub-Project	10,586	3,747	5,805	1,034	w/ HW		
	B. Por Canal Rehabilitation Sub-Project	5,175	57	4,058	1,060			
	C. Damnak Ampil Rehabilitation Sub-Project	6,371	3,348	1,791	1,232	w/ HW		
	D. Wat Loung Rehabilitation Sub-Project	7,403	-	6,030	1,373			
	E. Wat Chre Rehabilitation Sub-Project	4,034	1,774	1,680	580	w/ HW		
	F. Lum Hach Rehabilitation Sub-Project	15,195	5,869	7,660	1,666	w/ HW		
	Total Construction Cost	48,764	14,795	27,024	6,945			

Construction Cost for the Sub-Project

w/HW: Headworks will be re-built in the particular sub-projects.

Prepared by JICA Study Team

D2.2.2 Land Acquisition Cost

Land acquisition cost for the Project is estimated based on the actual anticipated area for each sub-project. Total area of the land acquisition is expected to be 391.9 ha (details are referred to Chapter 7), and cost is estimated at about US\$ 0.84 million, which is equivalent to about Riel. 3.45 billions. The land acquisition cost for Sub-projects are shown in Tables D2.2-1B to D2.2-6B, respectively.

D2.2.3 O & M Cost

O & M cost for the major facilities, such as headworks, main and secondary systems of each sub-project is divided into the following 2 categories under conditions and assumptions explained below:

- Annual O&M cost: Estimated at about 2 % of the construction costs for the major facilities (Items 1-1 and 1-2).
- Major repair cost: Major repair including replacement will be executed every 10 years, and the cost is assumed to be 10 % of the construction costs for the major facilities (Items 1-1 and 1-2).

The annual O & M cost for the Project is estimated at about US\$ 836,000, which is equivalent to Riel 3,435 millions. In addition, major repair cost for the Project is estimated at about US\$ 4.18 millions, which is equivalent to Riel 17.2billions. The summary of the O & M cost is given in table below. The O&M cost for each Sub-project are shown in Tables D2.2-1B to D2.2-6B, respectively.

	Item		Remarks					
No.		Amount	Cost Breakdown of Item 1					
		(US\$ 1,000)	(L	J S\$ 1,000)				
1.	Construction Cost		1-1	1-2	1-3			
	A. Ream Kon Rehabilitation Sub-Project	9,552	3,747	5,805	-	w/	HW	
	B. Por Canal Rehabilitation Sub-Project	4,115	57	4,058	-			
	C. Damnak Ampil Rehabilitation Sub-Project	5,139	3,348	1,791	-	w/	HW	
	D. Wat Loung Rehabilitation Sub-Project	6,030	-	6,030	-			
	E. Wat Chre Rehabilitation Sub-Project	3,454	1,774	1,680	-	w/	HW	
	F. Lum Hach Rehabilitation Sub-Project	13,529	5,869	7,660	-	w/	HW	
	Total Construction Cost	41,819	14,795	27,024	-			
12-A	Annual O&M Cost (every year)	836	2 %	of Items (1-	-1, 1-2)			
		(Riel.3,435 millions)						
12-B	Major repair Cost (every 10 year,	4,182	10 %	of Items (1-	-1, 1-2)			
	including replacement)	(Riel.17.2 billions)						

O&M Costs for the Project

Prepared by JICA Study Team

D2.3 Currency Portion for Project Evaluation

Construction costs are divided into foreign currency portion (FC) and local currency portion (LC) as explained in Section D1.1, and are used in the project evaluation. The results of are shown in Table D2.3-1 for the Project basis, and in Tables D2.3-2 to D2.3-7 for the Sub-projects bases, respectively.

Tables

Table D2.1-1 Summary Initial Investment Costs for the West Tonle Sap Irrigation and Drainage Rehabilitation and Improvement Project

Project Name:West Tonle Sap Irrigation and Drainage Rehabilitation and Improvement ProjectRiver Basins:Moung Russei, Pursat, Boribo River BasinsProvince:Battambang, Pursat, Kampong. Chhnang ProvincesProposed Irrigation Area:12,760 ha

No.	Item	US\$	Remarks
1	Construction	48,764,000	
	1-1 Headworks and Major Related Structures	14,795,000	
	1-2 Main and Secondary Systems	27,024,000	
	1-3 On-farm Development	6,945,000	
2	Project Supporting Program Cost	2,438,000	2 = 1 x 5%
3	Physical Contingency	5,120,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	56,322,000	4 = SUM (1 to 3)
5	Consulting Services	14,332,000	
6	Tax & Duty	7,065,000	6 = 10 % of (4+5)
7	Land Acquisition	841,000	
8	Project Administration	5,632,000	8 =4 x 10 %
	Total (=4 to 8)	84,192,000	SUM (4 to 8)
9	Price Escalation	13,762,000	9 = 4 × 5 %)
10	Grand Total (=4 to 9)	97,954,000	10 = SUM (4 to 9)

Summary Initial Investment Costs

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Project O & M Cost	US\$	Remarks	
1 Annual O & M Cost	836,000		
2 Major repairs (every 10th year)	4,182,000	n n t	

Table D2.1-2Summary Initial Investment Costs for the
Ream Kon Rehabilitation Sub-project

Sub-Project Name: River Basin: Province: Proposed Irrigation Area: Ream Kon Rehabilitation Sub-project Moung Russei River Basin Battambang Province 1,890 ha

Summary Initial Investment Costs

No.	ltem	US\$	Remarks
1	Construction	10,586,000	
	1-1 Headworks and Major Related Structures	3,747,000	
	1-2 Main and Secondary Systems	5,805,000	
	1-3 On-farm Development	1,034,000	
2	Project Supporting Program Cost	529,000	2 = 1 x 5%
3	Physical Contingency	1,112,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	12,227,000	4 = SUM (1 to 3)
5	Consulting Services	3,111,000	
6	Tax & Duty	1,534,000	6 = 10 % of (4+5)
7	Land Acquisition	95,000	
8	Project Administration	1,223,000	8 =4 x 10 %
	Total (=4 to 8)	18,190,000	SUM (4 to 8)
		· · ·	
9	Price Escalation	2,877,000	9 = 4 x 5 %)

 10 Grand Total (=4 to 9)
 21,067,000
 10 = SUM (4 to 9)

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Project O & M Cost	US\$	Remarks	
1 Annual O & M Cost	191,000		
2 Major repairs (every 10th year)	955,000		

Table D2.1-3Summary Initial Investment Costs for the
Por Canal Rehabilitation Sub-project

Sub-Project Name: River Basin: Province: Proposed Irrigation Area: Por Canal Rehabilitation Sub-project Moung Russei River Basin Battambang Province 1,940 ha

Summary Initial Investment Costs

No.	Item	US\$	Remarks
1	Construction	5,175,000	
	1-1 Headworks and Major Related Structures	57,000	
	1-2 Main and Secondary Systems	4,058,000	
	1-3 On-farm Development	1,060,000	
2	Project Supporting Program Cost	259,000	2 = 1 x 5%
3	Physical Contingency	543,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	5,977,000	4 = SUM (1 to 3)
5	Consulting Services	1,521,000	
6	Tax & Duty	750,000	6 = 10 % of (4+5)
7	Land Acquisition	100,000	
8	Project Administration	598,000	8 =4 x 10 %
	Total (=4 to 8)	8,946,000	SUM (4 to 8)

	0,940,000	30W (4 10 0)	
9 Price Escalation	1,318,000	9 = 4 x 5 %)	
10 Grand Total (=4 to 9)	10,264,000	10 = SUM (4 to 9)	

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Project O & M Cost	US\$	Remarks	
1 Annual O & M Cost	82,000		
2 Major repairs (every 10th year)	412,000		

Table D2.1-4 Summary Initial Investment Costs for the Damnak Ampil Rehabilitation Sub-project

Sub-Project Name: River Basin: Province: Proposed Irrigation Area: Damnak Ampil Rehabilitation Sub-project Pursat River Basin Pursat Province 2.270 ha

Summary Initial Investment Costs

No.	Item	US\$	Remarks
1	Construction	6,371,000	
	1-1 Headworks and Major Related Structures	3,348,000	
	1-2 Main and Secondary Systems	1,791,000	
	1-3 On-farm Development	1,232,000	
2	Project Supporting Program Cost	319,000	2 = 1 x 5%
3	Physical Contingency	669,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	7,359,000	4 = SUM (1 to 3)
5	Consulting Services	1,872,000	
6	Tax & Duty	923,000	6 = 10 % of (4+5)
7	Land Acquisition	76,000	
8	Project Administration	736,000	8 =4 x 10 %
	Total (=4 to 8)	10,966,000	SUM (4 to 8)
9	Price Escalation	1,538,000	9 = 4 x 5 %)
10	Grand Total (=4 to 9)	12,504,000	10 = SUM (4 to 9)

Prepared by JICA Study Team

Project O & M Cost	US\$	Remarks	
1 Annual O & M Cost	103,000		
2 Major repairs (every 10th year)	514,000		

Table D2.1-5 Summary Initial Investment Costs for the Wat Loung Rehabilitation Sub-project

Sub-Project Name: **River Basins: Province: Proposed Irrigation Area:** Wat Loung Rehabilitation Sub-project Pursat River Basin Pursat Provinces 2,540 ha

Summary Initial Investment Costs

No.	Item	US\$	Remarks
1	Construction	7,403,000	
	1-1 Headworks and Major Related Structures	0	
	1-2 Main and Secondary Systems	6,030,000	
	1-3 On-farm Development	1,373,000	
2	Project Supporting Program Cost	370,000	2 = 1 x 5%
3	Physical Contingency	777,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	8,550,000	4 = SUM (1 to 3)
5	Consulting Services	2,176,000	
6	Tax & Duty	1,072,000	6 = 10 % of (4+5)
7	Land Acquisition	198,000	
8	Project Administration	855,000	8 =4 x 10 %
	Total (=4 to 8)	12,851,000	SUM (4 to 8)
9	Price Escalation	2,104,000	9 = 4 x 5 %)

10 Grand Total (=4 to 9) 10 = SUM (4 to 9) 14,955,000 Prepared by JICA Study Team

Project O & M Cost	US\$	Remarks	
1 Annual O & M Cost	121,000		
2 Major repairs (every 10th year)	603,000		

Table D2.1-6 Summary Initial Investment Costs for the Wat Chre Rehabilitation Sub-project

Sub-Project Name: River Basins: Province: Proposed Irrigation Area: Wat Chre Rehabilitation Sub-project Pursat River Basin Pursat Provinces 1,020 ha

Summary Initial Investment Costs

No.	ltem	US\$	Remarks
1	Construction	4,034,000	
	1-1 Headworks and Major Related Structures	1,774,000	
	1-2 Main and Secondary Systems	1,680,000	
	1-3 On-farm Development	580,000	
2	Project Supporting Program Cost	202,000	2 = 1 x 5%
3	Physical Contingency	424,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	4,660,000	4 = SUM (1 to 3)
5	Consulting Services	1,186,000	
6	Tax & Duty	585,000	6 = 10 % of (4+5)
7	Land Acquisition	90,000	
8	Project Administration	466,000	8 =4 x 10 %
	Total (=4 to 8)	6,987,000	SUM (4 to 8)
9	Price Escalation	1,406,000	9 = 4 x 5 %)
10	Grand Total (=4 to 9)	8,393,000	10 = SUM (4 to 9)

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Project O & M Cost	US\$	Remarks	
1 Annual O & M Cost	69,000		
2 Major repairs (every 10th year)	345,000		

Table D2.1-7 Summary Initial Investment Costs for the Lum Hach Rehabilitation Sub-project

Sub-Project Name: River Basin: Province: Proposed Irrigation Area: Lum Hach Rehabilitation Sub-project Boribo River Basin Kampong. Chhnang Province 3,100 ha

Summary Initial Investment Costs

No.	Item	US\$	Remarks
1	Construction	15,195,000	
	1-1 Headworks and Major Related Structures	5,869,000	
	1-2 Main and Secondary Systems	7,660,000	
	1-3 On-farm Development	1,666,000	
2	Project Supporting Program Cost	759,000	2 = 1 x 5%
3	Physical Contingency	1,595,000	3 = (1+2) x 10%)
4	Sub-Total (=1 to 3)	17,549,000	4 = SUM (1 to 3)
5	Consulting Services	4,466,000	
6	Tax & Duty	2,201,000	6 = 10 % of (4+5)
7	Land Acquisition	282,000	
8	Project Administration	1,754,000	8 =4 x 10 %
<u>, , , , ,</u>	Total (=4 to 8)	26,252,000	SUM (4 to 8)
9	Price Escalation	4,519,000	9 = 4 x 5 %)
10	Grand Total (=4 to 9)	30,771,000	10 = SUM (4 to 9)

Project O & M CostUS\$Remarks1Annual O & M Cost270,000270,0002Major repairs (every 10th year)1,353,0001,353,000

Table D2.2-1A Summary Sheet of Construction Costs: Ream Kon Rehabilitation Sub-project

Sub-Project Name: Ream Kon Rehabilitation Sub-project Moung Russei River Basin River Basin: Province Name: Battambang System Name: Ream Kon 1,890 Ha (Sub-Project Total) Proposed Area:

	COSTESTIMATES								
Item	Description	Unit	Quantity	Amount	Remarks				
No				(USD)					
1-1	Headworks and Major Related Structures								
	Moung Russei Diversion Weir	nos.	1.00	2,977,000.00					
2)	Intake Structures	nos.	1.00	45,000.00					
3)	Operation and Maintenance office	nos.	1.00	22,000.00					
4)	Collector Drain-2 (CD-2)	nos.	1.00	138,000.00					
5)	Closure Dike for Collector Drain-2 (CD-2)	nos.	1.00	347,000.00					
6)	Excavation of River	L.S	1.00	218,000.00					
	Sub-Total of 1-1			3,747,000.00					
1-2	Main and Secondary Systems								
1)	Main Irrigation Canal	L.S	1.00	1,397,000.00	L=18.4km				
2)	Secondary Irrigation Canal	L.S	1.00	767,000.00					
3)	Drainage Canal	L.S	1.00	2,400,000.00					
4)	Canal Related Structure Work	L.S	1.00	1,241,000.00	150 nos.				
	Sub-Total of 1-2			5,805,000.00	F				
1-3	On-farm Development								
1)	Teriary Irrigation Canal System	L.S	1.00	839,000.00	L=57 km				
2)	Tertiary Draiange Canal	L.S	1.00	147,000.00	L=57 km				
3)	FWUC Office, Drying Yard, Paddy Storage	L.S	1.00	48,000.00	1 set				
	Sub-Total of 1-3			1,034,000.00					
	1. Total of Construction Cost			10,586,000.00					

COST ESTIMATES

Prepared by JICA Study Team

Table D2.2-1B Summary Sheet of Other Costs: Ream Kon Rehabilitation Sub-project (Related to Construction Cost)

(Itelated to colla	a a ca	0000		
3 Physical Contingencies (for Construction Cost)	L.S		1,587,000.00	
7 Land Acquisition Cost	L.S		95,000.00	A=71.0 ha
11 Project O&M Costs				
1) Annual O&M Cost	L.S	1.00	191,000.00	
2) Major repairs (every 10th year)	L.S	1.00	955,000.00	

Table D2.2-2ASummary Sheet of Construction Costs:Por Canal Rehabilitation Sub-project

Sub-Project Name:Por Canal Rehabilitation Sub-projectRiver Basin:Moung Russey River BasinProvince Name:BattambangSystem Name:Por CanalProposed Area:1,940 Ha (Sub-Project Total)

COST ESTIMATES

	COOTECTIMATED								
Item	Description	Unit	Quantity	Amount	Remarks				
No	·			(USD)					
1-1	Headworks and Major Related Structures								
1)	Intake Structure	nos.	1.00	57,000.00					
	Sub-Total of 1-1			57,000.00					
1-2	Main and Secondary Systems								
1)	Main Irrigation Canal	L.S	1.00	1,061,000.00	L=12.7km				
2)		L.S	1.00	990,000.00	L=15.8km				
3)	Drainage Canal	L.S	1.00	1,526,000.00	L=34.1km				
4)	Canal Related Structure Work	L.S	1.00	481,000.00	115 nos.				
	Sub-Total of 1-2			4,058,000.00					
1-3	On-farm Development								
1)	Teriary Irrigation Canal System	L.S	1.00	861,000.00	L=55 km				
2)		L.S	1.00	151,000.00	L=55 km				
3)	FWUC Office, Drying Yard, Paddy Storage	L.S	1.00	48,000.00	1 set				
í í	Sub-Total of 1-3			1,060,000.00					
	1. Total of Construction Cost			5,175,000.00					

Prepared by JICA Study Team

Table D2.2-2B Summary Sheet of Other Costs: Por Canal Rehabilitation Sub-project (Related to Construction Cost)

(Related to Cons	truction	COSIJ		
3 Physical Contingencies (for Construction Cost)	L.S		776,000.00	
7 Land Acquisition Cost	L.S		100,000.00	A=74.2 ha
11 Project O&M Costs				
1) Annual O&M Cost	L.S	1.00	82,000.00	
2) Major repairs (every 10th year)	L.S	1.00	412,000.00	

Table D2.2-3ASummary Sheet of Construction Costs:Damnak Ampil Rehabilitation Sub-project

Sub-Project Name:Damnak Ampil Rehabilitation Sub-projectRiver Basin:Pursat River BasinProvince Name:PursatSystem Name:Damnak AmpilProposed Area:2,270 Ha (Sub-Project Total)

	COSTESTIMATES							
ltem	Description	Unit	Quantity	Amount	Remarks			
No				(USD)				
1-1	Headworks and Major Related Structures							
1)	Gate Improvement for Damnak Ampil Weir	L.S	1.00	2,820,000.00	7 gates			
2)	Temporary works for Gate Improvement	L.S	1.00	172,000.00	4 gates			
3)	Installation of Fish Ladder	nos.	1.00	356,000.00				
	Sub-Total of 1-1			3,348,000.00				
	· · · · · · · · · · · · · · · · · · ·							
1-2	Main and Secondary Systems							
1)	Main Irrigation Canal	L.S	1.00	0.00				
2)	Secondary Irrigation Canal	L.S	1.00		L=17.6km			
3)	Drainage Canal	L.S	1.00	588,000.00	L=28.2km			
4)	Canal Related Structure Work	L.S	1.00	528,000.00	148 nos.			
	Sub-Total of 1-2			1,791,000.00				
1-3	On-farm Development							
1)	Teriary Irrigation Canal System	L.S	1.00	1,007,000.00	L=85 km			
2)	Tertiary Draiange Canal	L.S	1.00	177,000.00	L=85 km			
3)	FWUC Office, Drying Yard, Paddy Storage	L.S	1.00	48,000.00	1 set			
	Sub-Total of 1-3			1,232,000.00				
	1. Total of Construction Cost			6,371,000.00				
Dremound by UCA Study Team								

COST ESTIMATES

Prepared by JICA Study Team

Table D2.2-3B Summary Sheet of Other Costs: Damnak Ampil Rehabilitation Sub-project (Related to Construction Cost)

3 Physical Contingencies (for Construction Cost	t) L.S		955,000.00	
7 Land Acquisition Cost	L.S		76,000.00 A=73.	0 ha
11 Project O&M Costs				
1) Annual O&M Cost	L.S	1.00	103,000.00	
2) Major repairs (every 10th year)	L.S	1.00	514,000.00	

Table D2.2-4ASummary Sheet of Construction Costs:Wat Loung Rehabilitation Sub project

Sub-Project Name:Wat Loung Rehabilitation Sub projectRiver Basin:Pursat River BasinProvince Name:PursatSystem Name:Wat LoungProposed Area:2,540 Ha (Sub-Project Total)

Item No	Description	Unit	Quantity	Amount (USD)	Remarks
1-1	Headworks and Major Related Structures	-	-		
	Sub-Total of 1-1			0.00	
1-2	Main and Secondary Systems				
	Main Irrigation Canal	L.S	1.00	1,886,000.00	L=20.3km
	Secondary Irrigation Canal	L.S	1.00	1,685,000.00	L=31.1km
	Drainage Canal	L.S	1.00	1,379,000.00	L=37.7km
4)	Canal Related Structure Work	L.S	1.00	1,080,000.00	152 nos.
	Sub-Total of 1-2			6,030,000.00	
1-3	On-farm Development				
1)	Teriary Irrigation Canal System	L.S	1.00	1,127,000.00	L=81 km
2)		L.S	1.00	198,000.00	L=81 km
3)	FWUC Office, Drying Yard, Paddy Storage	L.S	1.00	48,000.00	1 set
	Sub-Total of 1-3			1,373,000.00	
	1. Total of Construction Cost			7,403,000.00	

COST ESTIMATES

Prepared by JICA Study Team

Table D2.2-4BSummary Sheet of Other Costs:Wat Loung Rehabilitation Sub project

(Related to Construction Cost)

(Itolatoa to con	00000			
3 Physical Contingencies (for Construction Cost)	L.S		1,110,000.00	
7 Land Acquisition Cost	L.S		198,000.00	A=119.5 ha
11 Project O&M Costs				
1) Annual O&M Cost	L.S	1.00	121,000.00	
2) Major repairs (every 10th year)	L.S	1.00	603,000.00	

Table D2.2-5ASummary Sheet of Construction Costs:Wat Chre Rehabilitation Sub project

Sub-Project Name:Wat Chre Rehabilitation Sub projectRiver Basin:Pursat River BasinProvince Name:PursatSystem Name:Wat ChreProposed Area:1,020 Ha (Sub-Project Total)

	0031 E3				
Item	Description	Unit	Quantity	Amount	Remarks
No				(USD)	
1-1	Headworks and Major Related Structures				
1)	Wat Chre Diversion Weir	nos.	1.00	1,524,000.00	
2)	Intake for Wat Chre	nos.	1.00	17,000.00	
3)	Operation and Maintenance office	nos.	1.00	22,000.00	
	Excavation of River	nos.	1.00	211,000.00	
/	Sub-Total of 1-1			1,774,000.00	
1-2	Main and Secondary Systems				
	Main Irrigation Canal	L.S	1.00	373,000.00	L=4.7km
		L.S	1.00	748,000.00	L=14.7km
	Drainage Canal	L.S	1.00	255,000.00	L=14.8km
	Canal Related Structure Work	L.S	1.00	304,000.00	71 nos.
	Sub-Total of 1-2			1,680,000.00	
1-3	On-farm Development				
1)	Teriary Irrigation Canal System	L.S	1.00	452,000.00	L=27 km
2)	Tertiary Draiange Canal	L.S	1.00	80,000.00	L=27 km
	FWUC Office, Drying Yard, Paddy Storage	L.S	1.00	48,000.00	1 set
	Sub-Total of 1-3			580,000.00	
	1. Total of Construction Cost			4,034,000.00	

COST ESTIMATES

Prepared by JICA Study Team

Table D2.2-5B Summary Sheet of Other Costs: Wat Chre Rehabilitation Sub project (Related to Construction Cost)

	(Related to Cons	uuuuuu	0030		
3	Physical Contingencies (for Construction Cost)	L.S		605,000.00	
7	Land Acquisition Cost	L.S		90,000.00	A=51.5 ha
11	Project O&M Costs				
1	Manual O&M Cost	1.5	1 00	69 000 00	

1)	Annual O&M Cost	L.S	1.00	69,000.00	
2)	Major repairs (every 10th year)	L.S	1.00	345,000.00	

Table D2.2-6ASummary Sheet of Construction Costs:Lum Hach Rehabilitation Sub-project

Sub-Project Name:Lum Hach Rehabilitation Sub-projectRiver Basin:Boribo River BasinProvince Name:Kampong ChhnangSystem Name:Lum HachProposed Area:3,100 Ha (Sub-Project Total)

COST ESTIMATES

Item	Description	Unit	Quantity	Amount	Remarks
No				(USD)	
1-1	Headworks and Major Related Structures				
1)	Lum Hach Diversion Weir	nos.	1.00	5,141,000.00	
2)	Intake for Lum Hach, O Roluss	nos.	2.00	453,000.00	
3)	Weir Operation and Maintenance Office	nos.	1.00	22,000.00	
4)	Approach Canal	L.S	1.00	120,000.00	L=750m
5)	Closure Dike for 7th January Canal	nos.	1.00	43,000.00	
6)	Excavation of River	nos.	1.00	90,000.00	
	and Acces Road (3km, Laterite t=15cm)				
	Sub-Total of 1-1			5,869,000.00	
1-2	Main and Secondary Systems				
1)	Main Irrigation Canal	L.S	1.00	1,700,000.00	
2)	Secondary Irrigation Canal	L.S	1.00	2,321,000.00	
3)	Drainage Canal	L.S	1.00	1,455,000.00	and the second se
4)	Canal Related Structure Work	L.S	1.00	2,184,000.00	184 nos.
	Sub-Total of 1-2			7,660,000.00	
1-3	On-farm Development				
1)	Teriary Irrigation Canal System	L.S	1.00	1,376,000.00	
	Tertiary Draiange Canal	L.S	1.00	242,000.00	and the second se
	FWUC Office, Drying Yard, Paddy Storage	L.S	1.00	48,000.00	1 set
	Sub-Total of 1-3			1,666,000.00	
	1. Total of Construction Cost			15,195,000.00	

Prepared by JICA Study Team

Table D2.2-6BSummary Sheet of Other Costs:Lum Hach Rehabilitation Sub-project(Related to Construction Cost)

3 Physical Contingencies (for Construction Cost)	L.S		2,279,000.00	
7 Land Acquisition Cost	LS		282,000.00 A=2	70.7 ha
	<u> </u>	LI		
11 Project O&M Costs				
1) Annual O&M Cost	L.S	1.00	270,000.00	
2) Major repairs (every 10th year)	L.S	1.00	1,353,000.00	

Table D2.3-1Summary Sheet of Currency Portion: West Tonle Sap Irrigation and
Drainage Rehabilitation and Improvement Project

Project Name:	West Tonle Sap Irrigation and Drainage Rehabilitation and Improvement Project
River Basin:	Moung Russei, Pursat, Boribo River Basins
Province Name:	Battambang, Pursat, Kampong. Chhnang Provinces
Proposed Area:	12,760 Ha (Sub-Project Total)

	COST ESTIMATES						
Item	Description	Amount	FC	LC	Remarks		
No		(USD)	(US\$)	(US\$)			
1-1	Headworks and Major Related Structures	14,795,000	10,333,000	4,462,000			
	Main and Secondary Systems	27,024,000	18,918,000	8,106,000			
1-3	On-farm Development	6,945,000	1,389,000	5,556,000			
	1. Total of Construction Cost	48,764,000	30,640,000	18,124,000			
For	eign Currency (FC) Portion/ Local Currency (LC)	Portion Ratio	0.63	0.37			

Table D2.3-2 Summary Sheet of Currency Portion: Ream Kon Rehabilitation Sub-project

Sub-Project Name: River Basin: Province Name: System Name: Proposed Area: Ream Kon Rehabilitation Sub-Project Moung Russei River Basin Battambang Ream Kon 1,890 Ha (Sub-Project Total)

COST ESTIMATES

Item	Description	Amount	FC	LC	Remarks
No		(USD)	(US\$)	(US\$)	
1-1	Headworks and Major Related Structures	3,747,000	2,473,000	1,274,000	
1-2	Main and Secondary Systems	5,805,000	4,064,000	1,741,000	
1-3	On-farm Development	1,034,000	207,000	827,000	
	1. Total of Construction Cost	10,586,000	6,744,000	3,842,000	
For	Foreign Currency (FC) Portion/ Local Currency (LC) Portion Ratio		0.64	0.36	

Prepared by JICA Study Team

Table D2.3-3 Summary Sheet of Currency Portion: Por Canal Rehabilitation Sub-project

Sub-Project Name:	Por Canal Rehabilitation Sub-project
River Basin:	Moung Russey River Basin
Province Name:	Battambang
System Name:	Por Canal
Proposed Area:	1,940 Ha (Sub-Project Total)

COST ESTIMATES

Item	Description	Amount	FC	LC	Remarks	
No	·	(USD)	(US\$)	(US\$)		
1-1	Headworks and Major Related Structures	57,000	39,000	18,000		
1-2	Main and Secondary Systems	4,058,000	2,841,000	1,217,000		
1-3	On-farm Development	1,060,000	212,000	848,000		
	1. Total of Construction Cost	5,175,000	3,092,000	2,083,000		
For	eign Currency (FC) Portion/ Local Currency (LC) F	ortion Ratio	0.60	0.40		

Prepared by JICA Study Team

Table D2.3-4 Summary Sheet of Currency Portion: Damnak Ampil Rehabilitation Sub-project

Sub-Project Name:	Damnak Ampil Rehabilitation Sub-project
River Basin:	Pursat River Basin
Province Name:	Pursat
System Name:	Damnak Ampil
Proposed Area:	2,270 Ha (Sub-Project Total)

COST ESTIMATES

Item	Description	Amount	FC	LC	Remarks
No		(USD)	(US\$)	(US\$)	
1-1	Headworks and Major Related Structures	3,348,000	2,712,000	636,000	
1-2	Main and Secondary Systems	1,791,000	1,254,000	537,000	
1-3	On-farm Development	1,232,000	246,000	986,000	
	1. Total of Construction Cost	6,371,000	4,212,000	2,159,000	
For	Foreign Currency (FC) Portion/ Local Currency (LC) Portion Ratio		0.66	0.34	

Table D2.3-5 Summary Sheet of Currency Portion: Wat Loung Rehabilitation Sub-project

Sub-Project Name:	Wat Loung Rehabilitation Sub project
River Basin:	Pursat River Basin
Province Name:	Pursat
System Name:	Wat Loung
Proposed Area:	2,540 Ha (Sub-Project Total)
5	5

COST ESTIMATES

Item	Description	Amount	FC	LC	Remarks
No	•	(USD)	(US\$)	(US\$)	
1-1	Headworks and Major Related Structures	0	0	0	
1-2	Main and Secondary Systems	6,030,000	4,221,000	1,809,000	
1-3	On-farm Development	1,373,000	275,000	1,098,000	
	1. Total of Construction Cost	7,403,000	4,496,000	2,907,000	
Foreign Currency (FC) Portion/ Local Currency (LC) Portion Ratio		0.61	0.39		

Prepared by JICA Study Team

Table D2.3-6 Summary Sheet of Currency Portion: Wat Chre Rehabilitation Sub-project

Sub-Project Name:	Wat Chre Rehabilitation Sub project
River Basin:	Pursat River Basin
Province Name:	Pursat
System Name:	Wat Chre
Proposed Area:	1,020 Ha (Sub-Project Total)

COST ESTIMATES

Item	Description	Amount	FC	LC	Remarks	
No		(USD)	(US\$)	(US\$)		
1-1	Headworks and Major Related Structures	1,774,000	1,118,000	656,000		
1-2	Main and Secondary Systems	1,680,000	1,176,000	504,000		
		580,000	116,000	464,000		
	1. Total of Construction Cost	4,034,000	2,410,000	1,624,000		
For	eign Currency (FC) Portion/ Local Currency (LC) F	ortion Ratio	0.60	0.40		

Prepared by JICA Study Team

Table D2.3-7 Summary Sheet of Currency Portion: Lum Hach Rehabilitation Sub-project

Sub-Project Name:	Lum Hach Rehabilitation Sub-project
River Basin:	Boribo River Basin
Province Name:	Kampong Chhnang
System Name:	Lum Hach
Proposed Area:	3,100 Ha (Sub-Project Total)

COST ESTIMATES

Item	Description	Amount	FC	LC	Remarks
No		(USD)	(US\$)	(US\$)	
1-1	Headworks and Major Related Structures	5,869,000	3,991,000	1,878,000	
	Main and Secondary Systems	7,660,000	5,362,000	2,298,000	
1-3	On-farm Development	1,666,000	333,000	1,333,000	
	1. Total of Construction Cost	15,195,000	9,686,000	5,509,000	
For	reign Currency (FC) Portion/ Local Currency (LC) I	Portion Ratio	0.64	0.36	

Appendix-E Project Evaluation

BASIN-WIDE BASIC IRRIGATION AND DRAINAGE MASTER PLAN STUDY IN

THE KINGDOM OF CAMBODIA

FINAL REPORT

APPENDIX-E PROJECT EVALUATION

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CHAPTER E1 OBJECTIVES OF PROJECT EVALUATION

E1.1 Objectives

The objectives of the project evaluation are as follows:

- Examination of the economic viability of the proposed project;
- Examination of the financial impact of investment to irrigation system rehabilitation on beneficiary farmers' capacity to pay in each sub-project area; and
- Examination of indirect benefit, intangible benefit and socio-economic impact of the proposed project.

The results of the examinations are to be employed as factors in judging the economic viability, financial soundness and social acceptance of the proposed project.

E1.2 Proposed Sub-projects for Evaluation

Citing the screening results of 21 candidate schemes made in the M/P study, the proposed project has been formulated by selecting the following six candidate schemes as described in Chapter 4. As it is planned to implement all the construction works, project supporting programs, consulting services, land acquisition and project administration in the form of one package for seven years from 2010 to 2016, the project evaluation in this Chapter is to be made for the proposed project, not for the respective sub-projects.

River Basin	Sub-project	Command Area under Proposed Project (ha)
Moung Russei	Ream Kon Rehabilitation	1,890
0	Por Canal Rehabilitation	1,940
Pursat Dan	Damnak Ampil Rehabilitation	2,270
	Wat Loung Rehabilitation	2,540
	Wat Chre Rehabilitation	1,020
Boribo	Lum Hach Rehabilitation	3,100
	Proposed Project	12,760

List of Evaluated Sub-projects

CHAPTER E2 ECONOMIC EVALUATION

E2.1 Economic Evaluation Procedures

The both project benefit and cost are estimated based on the following conditions;

- All the prices are expressed in constant prices as of September 2008, and the foreign currency exchange rate is fixed at USD 1.00 = Riel 4,107;
- The project life is assumed to be 50 years starting from 2010, the proposed year for commencement of project implementation;
- Economic farm gate prices of internationally traded agricultural inputs and outputs are calculated in the form of export and import parity prices as shown in Table E2-1, citing the World Bank Commodity Price Forecasts as of August 2008;
- A standard conversion factor (SCF) is determined at 0.986 as the average value for the last six years between 2001 and 2006 for the adjustment of prices reflecting the market distortion, which is estimated based on the formula as mentioned below

$$SCF = (I + E) / [(I - Is + It) + (E + Es - Et)]$$

Where, I = Total import value (CIF) to Cambodia, E = Total export value (FOB) from Cambodia, s = subsidy, and t = tax;

- A shadow wage rate (SWR) is assumed to be 0.30 for the adjustment of labor costs reflecting the market distortion, which is defined as the ratio of the total annual labor force requirement for the whole candidate irrigation project areas against the total annual labor force available in the same areas. Various relevant sources¹ are referred to for this calculation and the ratio calculated based on 2020 projected population is adjusted by multiplying by SCF (SWR = 8,102,121/26,430,987 x 0.986 = 0.3022);
- Financial construction cost is assumed to be composed of 70% for foreign currency portion and 30% for local currency portion. The foreign currency portion is further broken down into 35% for equipment cost and 65% for material cost, while the local currency portion is formed of 15% for equipment cost, 15% for material cost, 20% for common labor cost and 50% for skilled labor cost; and
- Conversion factors of financial construction cost to economic values are determined as0.81 for material costs and 0.73 for equipment costs in the foreign currency portion as well as 0.86 for material costs and 0.78 for equipment costs in the local currency portion, all of which are estimated by excluding transfer payments such as taxes, duties, subsidies, interest, land acquisition cost, etc. included in the financial construction costs.

¹ Cambodia Statistical Yearbook 2006, NIS, Ministry of Planning; First Revision, Population Projection for Cambodia 1988 – 2020; and SEIRA Commune Database 2005, Ministry of Interior

E2.2 Economic Benefit

In the four river basins, irrigation and drainage benefits are expected to be derived from the increase in irrigated paddy field area coupled with the increase in paddy yield and cultivation area of upland crops and vegetables. The economic benefit is defined as the incremental net benefit between the present "Without Project" condition and the future "With Project" condition. In constructing proposed irrigation and drainage facilities, some part of existing paddy field will be acquired. Such change in the "right of way" area has been taken into account in formulating the future land use plan. In this regard, no production foregone as negative benefit is considered in estimating the annual economic benefit.

The project benefit is assumed to be realized from the early wet crop season of the next year after construction works are finished according to the construction schedule. The target crop yield is also assumed to be fully realized at the fifth crop season. Based on these assumptions, the irrigation benefit of each sub-project is estimated as shown below, and the project benefit is fully realized from 2020 onward.

All	Annual Frogress of Construction works and increase in Froject benefits											
Sub-project	Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020~	
Ream Kon	Work progress	10	60	98	100	-	-	-	-	-	-	
(W/O: 2,020 ha)	Yield build-up	-	60	70	80	90	100	100	100	100	100	
(W/P: 1,890 ha)	Benefit increase	-	27	47	67	77	87	96	99	100	100	
Por Canal	Work progress	15	75	97	100	-	-	-	-	-	-	
(W/O: 2,070 ha)	Yield build-up	-	60	70	80	90	100	100	100	100	100	
(W/P: 1,940 ha)	Benefit increase	-	28	48	68	79	89	97	99	100	100	
Damnak Ampil	Work progress	25	90	97	100	-	-	-	-	-	-	
(W/O: 2,430 ha)	Yield build-up	-	60	70	80	90	100	100	100	100	100	
(W/P: 2,270 ha)	Benefit increase	-	31	56	71	81	91	99	99	100	100	
Wat Loung	Work progress	-	55	95	100	-	-	-	-	-	-	
(W/O: 2,720 ha)	Yield build-up	-	-	60	70	80	90	100	100	100	100	
(W/P: 2,540 ha)	Benefit increase	-	-	49	64	75	85	95	99	100	100	
Wat Chre	Work progress	-	-	60	100	-	-	-	-	-	-	
(W/O: 1,090 ha)	Yield build-up	-	-	-	60	70	80	90	100	100	100	
(W/P: 1,020 ha)	Benefit increase	-	-	-	36	66	76	86	96	100	100	
Lum Hach	Work progress	-	45	95	99	100	-	-	-	-	-	
(W/O: 3,320 ha)	Yield build-up	-	-	60	70	80	90	100	100	100	100	
(W/P: 3,100 ha)	Benefit increase	-	-	34	54	74	84	94	99	100	100	

Annual Progress of Construction Works and Increase in Project Benefits

Note: W/O; Present/Without project condition, and W/P; With project condition Prepared by JICA Study Team

Based on the above, the annual increase in irrigation area, paddy production and incremental net benefit of the proposed project are estimated as summarized below. The details of economic benefit estimate by sub-project are given in Tables E2-2 to E2-15.

Annual increase in Flojeet benefits												
Annual Increase	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020~		
Cropped area under irrigation	(ha)	950	7,541	12,517	13,343	13,385	13,385	13,385	13,385	13,385		
Paddy production	(ton)	420	4,660	10,760	15,700	20,570	25,020	27,050	27,360	27,370		
Increment economic benefit	(M. Riel)	682	6,290	12,852	17,369	21,580	25,426	27,180	27,450	27,462		
	('000 US\$)	166	1,532	3,129	4,229	5,254	6,191	6,618	6,684	6,687		

Annual Increase in Project Benefits

E2.3 Economic Cost

The following are to be taken up as economic investment cost items:

- Direct construction cost including head works and major related structures rehabilitation, main and secondary system rehabilitation, on-farm development, miscellaneous works and contractor's expense;
- Project supporting program cost;
- Consulting services cost; and
- Physical contingencies.

The economic investment cost is estimated by applying relevant conversion factors to each cost components like materials, equipment, common labor and skilled labor of the both foreign and local currency portions. According to the construction schedule, the annual disbursement schedule of the estimated economic investment cost as shown below. The details of economic cost estimate by sub-project are given in Tables E2-9 to E2-14.

The annual O&M cost and major repairing cost are also converted to economic values in the same manner. The latter is allocated every 10 years.

								Un	it: Millio	on Riel
Economic Cost	2010	2011	2012	2013	2014	2015	2016	Total	2025	2026
Initial investment cost	0	9,150	62,267	49,237	8,330	404	0	129,389	-	-
Supporting program cost	0	738	590	590	590	443	0	2,951	-	-
Physical contingency, 10%	0	989	6,286	4,983	892	85	0	13,235		
Consulting services cost	4,255	6,240	9,928	5,389	1,702	567	284	28,365	-	-
Total economic cost	4,255	17,117	79,071	60,199	11,514	1,499	284	173,939	-	-
(<i>'000 US\$</i>)	1,036	4,168	19,253	14,658	2,804	365	69	42,353	-	-
Annual O&M cost	-	-	27	99	169	181	182	-	182	182
Major repairing cost	-	-	-	-	-	-	-	-	6,983	3,366

Annual Disbursement of Economic Cost

Prepared by JICA Study Team

E2.4 Economic Evaluation and Sensitivity Analysis

In conducting economic evaluation, the economic cost and benefit stream is prepared for the project life period of 50 years, comprising the project investment cost, annual O&M cost and major repairing cost for the cost stream as well as annual irrigation and drainage benefit in the build-up and full swing stages for the benefit stream.

Sensitivity analysis is made for the following four cases:

- Case-1: Construction cost 10% up;
- Case-2: Irrigation water supply 1 year delay;
- Case-3: Target yield of crops 10% down; and
- Case-4: Case-1 combined with Case-3.

The results of economic evaluation and sensitivity analysis are expressed by the economic internal rate of return (EIRR), surplus between net present values of benefit and cost (B–C) at

- - -

discount rate of 8% and benefit-cost ratio (B/C) as summarized as below, and the details are given in Tables E2-15 to E2-19.

		EIDD	Net P	resent Value (8	% discount i	rate)	
Item		EIRR	Benefit	Cost	B-C	B/C	
		(%)		(Million Riel) F			
Economic Evaluation	12.8	229,181	141,526	87,655	1.62		
Sensitivity Analysis	Case-1	11.9	229,181	153,398	75,783	1.49	
• •	Case-2	11.6	211,661	141,504	70,157	1.50	
	Case-3	10.3	182,329	141,504	40,825	1.29	
	Case-4	9.5	182,329	153,398	28,931	1.19	

Results of Economic Evaluation and Sensitivity Analysis

Prepared by JICA Study Team

As seen in the above, it can be said that the proposed project is economically feasible under the conditions set up as described.

CHAPTER E3 FINANCIAL EVALUATION

E3.1 Financial Evaluation Procedures

The prospected impact of the proposed project on beneficiary farmers' capacity to pay is indicated by estimating farm budget based on typical farm size and farming practice type of each sub-project area. The increase in net return between the present "Without Project" and future "With Project" conditions reveals that how much additional capacity to pay after deducting farming cost beneficiary farmers can expect to gain through participation to the proposed project.

To estimate the farm budget on the financial price basis, actual farm gate prices of all farm inputs and outputs as of September 2008 are to be used. Further, the balance between non-farm income and family expenditure is estimated. Then the sum of net return to be gained from farm operation and balance of non-farm activities is calculated as net surplus which can be defined as farmer's capacity to pay.

E3.2 Increase in Farmers' Capacity to Pay

Based on the examination results on financial crop budget and farm household economy of typical farm size in each sub-project area under the both conditions of present/without project and with project as presented in Appendix-B, the increase in farmers' capacity to pay is estimated as below.

	Crop Season,	Farm	Net Si	urplus	Inc	У		
Sub-project	Planting and	Size	W/O	W/P	Amount			Rate
	Irrigation	ha	'000 R	'000 R	4000 R	TR/ha	US\$/ha	times
Ream Kon Rehabilitation	WT-Normal	2.2	569	3,940	3,371	1,532	373	6.9
	WT-Pump	2.2	569	2,521	1,952	887	216	4.4
	WD-Normal	2.2	-243	3,071	3,314	1,506	367	33.1
	WD-Pump	2.2	-243	2,349	2,592	1.178	287	25.9
Por Canal Rehabilitation	WT-Normal	2.4	1,593	5,126	3,533	1,472	358	3.2
	WD-Normal	2.4	271	3,634	3,363	1,401	341	13.4
Dam Nak Ampil Rehabilitation	WT-Normal A	1.2	192	1,491	1,294	1,083	264	7.8
	WT-Pump A	1.2	192	917	725	604	147	4.8
	WT-Normal B	1.2	685	1,491	806	672	164	2.2
Wat Loung Rehabilitation	WT-Normal	1.4	632	2,372	1,740	1,243	303	3.8
	WT-Pump	1.4	632	1,701	1,069	764	186	2.7
Wat Chre Rehabilitation	WT-Normal	1.6	670	2,831	2,161	1,351	257	4.2
	WT-Pump	1.6	670	2,064	1,394	871	212	3.1
Lum Hach Rehabilitation	WT-Normal	1.4	266	3,321	3,055	2,182	531	12.5
	WT-Pump	1.4	266	2,235	1,969	1,406	342	8.4

Increase in Farmers' Capacity to Pay

Note: W/O; Present/Without project condition, W/P; With project condition, R; Riel, TR; 1,000 Riel, WT; Wet season transplanting, and WD; Wet season direct sowing

Prepared by JICA Study Team

The result shows that beneficiary farmers will be able to gain additional net surplus ranging from 604,000 Riel/ha or 147 US\$/ha to 2,182,000 Riel/ha or 531 US\$/ha. This reveals that every participated farmer in the proposed Sub-project may fully shoulder the annual O&M cost of their on-farm facilities and also pay water charge if it is set up at affordable rate.

E3.3 Indirect Benefit, Intangible Benefit and Socio-economic Impacts

E3.3.1 Indirect Benefit

As described in Appendix-C, supplemental irrigation water supply can be expected to downstream paddy fields of the Damnak Ampil Main Canal as well as the left bank area of the Lum Hach Head Works. In the both cases, surplus of discharge to be created at off-peak irrigation water supply time to Damnak Ampil, Wat Loung and Wat Chre Sub-projects as well as Lum Hach Sub-project can be used by farmers who are growing paddy in the areas where the surplus discharge can take in through the said canal or head works. These areas are excluded in defining a direct benefit to born by irrigation water supply by the proposed rehabilitation works of the existing irrigation structures. By utilizing the surplus discharge, however, paddy yield in the concerned areas will be able to be raised to a certain extent.

If it is assumed to make the present paddy yield level increase by 0.5 ton for the wet season through practicing the use of surplus discharge by farmers, the following increase in paddy production is anticipated as indirect benefits of the proposed Sub-project implementation. This increasing paddy yield is equivalent to the yield difference between supplemental irrigation paddy field and rain-fed paddy field.

	-		
Existing Structure to be	Scheme Indirectly	Command	Increase in Paddy
Rehabilitated by Project	Benefited	Area (ha)	Production (ton)
Damnak Ampil Main Canal	Damnak Ampil Extension	7,650	3,825
-	Bakan & Krouchi Seuchi	1,000	500
	Svay Don Keo River	2,200	1,100
Lum Hach Head Works	O Roluss Irrigation	3,400	1,700

Anticipated Indirect Benefit

Prepared by JICA Study Team

E3.3.2 Intangible Benefit

Though rehabilitation works of the existing irrigation and drainage systems in the proposed project area, the annual paddy production can be expected to go up from 21,000 tons before the proposed project implementation to 48,400 tons after the implementation as estimated in Tables E2-4 for Ream Kon Rehabilitation Sub-project, E2-6 for Por Canal Rehabilitation Sub-project, E2-8 for Damnak Ampil Rehabilitation Sub-project, E2-10 for Wat Loung Rehabilitation Sub-project, E2-12 for Wat Chre Rehabilitation Sub-project and E2-24 for Lum Hach Rehabilitation Sub-project. The summarized estimate is as shown below.

Annual	Increase in Pa	ddy Production	i in Proposed P	roject Area	
	Present Paddy	Present Paddy	Future Paddy	Future Paddy Production	Increased Paddy Production
Sub-project/Project	Cropped Area	Production	Cropped Area		
	(ha)	(ton)	(ha)	(ton)	(ton)
Ream Kom Rehabilitation	2,220	3,110	2,970	7,790	4,680
Por Canal Rehabilitation	2,480	3,870	3,060	8,170	4,300
Damnak Ampil Rehabilitation	2,490	4,050	2,270	7,490	3,440
Wat Loung Rehabilitation	2,765	4,260	2,540	8,380	4,120
Wat Chre Rehabilitation	1,090	1,660	1,020	3,370	1,710
Lum Hach Rehabilitation	3,320	4,080	4,400	13,200	9,120
Whole Project Area	14,365	21,030	16,260	48,400	27,370

Annual Increase in Paddy Production in Proposed Project Area

Prepared by JICA Study Team

In addition to such prospected increase in paddy production as the tangible benefit of the proposed Sub-projects, it can be considered that the availability of rice processed products like rice flour and ancillary business chances as typical intangible benefits attribute to the project implementation will be enhanced to a large extent. As a result, such increasing availability will be able to heighten a contribution degree to rural and individual farm economies through increase in inputs to be purchased and transported as well as value addition of outputs in the course of processing, transporting and transacting of rice and its product.

E3.3.3 Socio-economic Impacts

Citing the socio-economic survey findings, the average labor force is presumed at 2.5 persons a farm family in the six Sub-project areas and total farm households are estimated at around 8,300. If the annual working day of one family labor force is assumed to be 236 days, the available annual family labor force of 8,300 farm households in the six Sub-project areas is estimated at 4.9 million man-days. On the other hand, the annual farm labor requirement in the whole command areas of the six Sub-project sis estimated at approximately 1.5 million man-days under the present/without project condition based on the result of farm survey. Thus, the both estimates show that the whole farm labor requirement for the present farm operation can be covered by the available family labor force of farm households in the six Sub-project command areas.

However, the said farm survey result also points out such fact that every farm household is using 8 to 18 hired labors per 1 ha at peak times of farm operation like transplanting and harvesting in early wet crop season and wet crop season. Furthermore, the proposed rice cultivation practice under the normal or pump irrigation condition needs more farm labor inputs than as it is for the peak time of farm operation for every crop season. In this regard, the hired labor requirements are to be set up at 11 to 17 man-day/ha according to paddy cropping systems.

From this viewpoint, it can be considered that a sustainable socio-economic impact attribute to improvement of rice cultivation under irrigated condition as one of prospected fruits of the proposed project implementation is to provide jobless workers in rural areas with seasonal job opportunities to earn a certain incomes either in kind or cash. Based on the farm labor requirements for different cropping patterns proposed to the respective Sub-projects, therefore, necessary hired labor inputs are to be calculated and then increased hired labor inputs are estimated as an indicator of socio-economic impact. The estimated increase in the total hired labor inputs for each Sub-project is tabulated as below.

In view of socio-economy in the proposed six Sub-subject areas, the impact of project implementation can be expressed by increasing hired labor inputs by 82,370 persons or 54% every year. This increase reveals that employment opportunities even though temporary will be created at the peak time of farm operation like transplanting and harvesting in three rice cropping seasons consisting of early wet season, wet season and dry season.

	Present	Condition	Future (Condition	Increased
Sub-project	Cropped	Hired Labor	Cropped	Hired Labor	Hired Labor
	Area (ha)	Input (No.)	Area (ha)	Input (No.)	Input (No.)
Ream Kon Rehabilitation	2,230	33,804	3,254	53,969	20,165
Por Canal Rehabilitation	2,480	38,335	3,350	56,565	18,230
Dam Nak Ampil Rehabilitation	3,360	20,540	5,020	27,380	6,840
Wat Loung Rehabilitation	2,795	22,550	2,920	30,630	8,080
Wat Chre Rehabilitation	1,120	8,990	1,170	12,295	3,305
Lum Hach Rehabilitation	3,360	27,040	5,020	52,790	25,750
Total	15,345	151,259	20,734	233,629	82,370

Increase in Hired Labor Inputs as Socio-economic Impact Indicator

Prepared by JICA Study Team

Tables

t Parity Pr	rice	Expo	ort Parity P	rice
Unit	Price	Operation	Unit	Price
US\$/ton	400		US\$/ton	400
%	90	х	%	90
US\$/ton	360	=	US\$/ton	360
US\$/ton	14	-	US\$/ton	14
US\$/ton	374	=	Riel/kg	346
Riel/kg	1,536	=	Riel/kg	1,421
Riel/kg	33	-	Riel/kg	35
Riel/kg	33	-	Riel/kg	35
Riel/kg	1,602		Riel/kg	1,351
Riel/kg	27	-	Riel/kg	27
%	64	х	%	64
Riel/kg	116	+	Riel/kg	116
Riel/kg	1,124	=	Riel/kg	963
Riel/kg	17	-	Riel/kg	17
Riel/kg	1,107	=	Riel/kg	946
		50%	Ď	
Riel/kg	1,027			
US\$/ton	160		US\$/ton	160
US\$/ton	43			
US\$/ton	203	=	US\$/ton	160
US\$/ton	14	-	US\$/ton	14
US\$/ton	217	=	Riel/kg	146
Riel/kg	891	=	Riel/kg	600
Riel/kg	33	-	Riel/kg	35
Riel/kg	33	-	Riel/kg	35
Riel/kg	957	-	Riel/kg	530
Riel/kg	17	-	Riel/kg	17
Riel/kg	940	=	Riel/kg	513
		50%	, 0	
Riel/kg	730			
F	Riel/kg	Riel/kg 940	$\frac{\text{Riel/kg}}{50\%} = \frac{1}{50\%}$	Riel/kg 940 = Riel/kg 50%

Table E2-1 Economic Farm Gate Price of Internationally Traded Goods (1/2)

Note: /a; Nominal index based on 2007 real international market prices, Prosects for the Global Economy, the World Bank, 2008

: Thai, milled, 5% broken, FOB Bangkok Rice

Maize : US No.2, Yellow, FOB Gulf Ports

/b; Assumed at the same price at Bangkok port in Thailand

4,107 (As of September 2008) /c; Exchange rate US = Riel 0.986

/d; Adjusted with SCF of

/e; Rice bran: Riel 500 /kg of rice bran, 18% of paddy weight Broken rice: Riel 520 /kg of broken rice, 5 % of paddy weight.

	I	mport Parity P	rice
Item	Operation	Unit	Price
III. Fertilizer			
(1) Urea			
1. Forcasted 2020 World Price (in 2007 price) /a		US\$/ton	220
2. International Shipping and Handling	+	US\$/ton	43
3. CIF/FOB Price at Sihanouk Ville International Port	=	US\$/ton	263
4. Port Charge, Handling and Warehousing	+	US\$/ton	14
5. Price at Sihanouk Ville International Port	=	US\$/ton	277
Equivalent in Riel / kg /b	=	Riel/kg	1,138
6. Transportation Cost /d (Sihanouk Ville-Pursat)	+	Riel/kg	66
7. Trade Price in Pursat		Riel/kg	1,204
8. Transport/Handling to Farmgate /c	+	Riel/kg	17
9. Farmgate Price	=	Riel/kg	1,221
Price of Nutrient (N) /d		Riel/kg	2,654
(2) DAP (Diammonium Phosphate)			
1. Forcasted 2020 World Price (in 2007 price) /a		US\$/ton	260
2. International Shipping and Handling	+	US\$/ton	49
3. CIF/FOB Price at Sihanouk Ville International Port		US\$/ton	309
4. Port Charge, Handling, Warehousing and Bagging	+	US\$/ton	14
5. Price at Sihanouk Ville International Port	=	US\$/ton	323
Equivalent in Riel / kg /b	arres-	Riel/kg	1,327
6. Transportation Cost /c (Kampong Som-Kampong Speu)	+	Riel/kg	66
7. Trade Price in Kampong Speu	=	Riel/kg	1,393
8. Transport/Handling to Farmgate /c	+	Riel/kg	17
9. Farmgate Price	=	Riel/kg	1,410
Price of Nutrient (P) /d		Riel/kg	3,065
Price of Nutrient (N) /d		Riel/kg	7,833
(3) Potassium Chloride (KCl)			
1. Forcasted 2020 World Price (in 2007 price) /a		US\$/ton	200
2. International Shipping and Handling	+	US\$/ton	43
3. CIF/FOB Price at Sihanouk Ville International Port	=	US\$/ton	243
4. Port Charge, Handling, Warehousing and Bagging	+	US\$/ton	14
5. Price at Sihanouk Ville International Port	-	US\$/ton	257
Equivalent in Riel / kg /b	=	Riel/kg	1,055
6. Transportation Cost /c (Kampong Som-Takeo)	+	Riel/kg	66
7. Trade Price in Takeo	=	Riel/kg	1,121
8. Transport/Handling to Farmgate /c	+	Riel/kg	17
9. Farmgate Price	=	Riel/kg	1,138
Price of Nutrient (K) /d		Riel/kg	1,897

Table E2-1 Economic Farm Gate Price of Internationally Traded Goods (2/2)

Note: /a; Nominal index based on 2007 real international market prices, Prosects for the Global Economy, the World

	Bank, 2008					
		Urea	:	Bagged, FOB Black Sea		
		DAP	:	Bulk, FOB US Gulf		
		KCl	:	Bulk, FOB Vancouver		
/b;	Exchange rat	te :		US = Riel	4,107	(As of September 2008)
/c ;	Adjusted wit	h SCF of		0.986		

/d; Nutrient content is 46%, 46%(18-46-0), and 60%, respectively for Urea, DAP and KCL.

_		· · · · · · · · · · · · · · · · · · ·	Financial	Conversion	Economic
	Particulars	Unit	Price / a	0011010101	Price
1	Farm Products	Unit	The /a		Thee
1		(Biol/kg)	1,100	b	1,027
	Dry paddy	(Riel/kg) (Riel/kg)	1,100	b	1,027
	Dry paddy (Early wet season)	(Riel/kg)	2,900		2,859
	Mungbean	· · · · ·		c	2,839
	Upland crops (Average-1)	(Riel/kg)	2,750	c	2,712
	Upland crops (Average-2)	(Riel/kg)	2,550	c	2,314
~	Vegetables (Averages)	(Riel/kg)	370	с	305
2	By-Products		50/ of arose r	oturn of noddy	/0
	By-products of paddy	4 - 1- 1		eturn of paddy	
~	By-products of upland crops and ve	getables	2% of gross f	eturn of upland	l crops /c
3	Seeds	(D1-1/1)	1 100	_	1 0.95
	Paddy (Present/Without)	(Riel/kg)	1,100	с	1,085
	Paddy (Present/Without for EWS)	(Riel/kg)	1,000	С	986
	Paddy (With)	(Riel/kg)	1,400	С	1,380
	Mungbean	(Riel/kg)	6,000	С	5,916
	Upland crops (Average-1)	(Riel/kg)	6,000	c	5,916
	Upland crops (Average-2)	(Riel/kg)	5,000	с	4,930
	Vegetables (Average)	(Riel/kg)	24,500	с	7,405
4	Fertilizer				1.001
	Urea	(Riel/kg)	3,500	b	1,221
	DAP	(Riel/kg)	5,000	b	1,410
	Compound (16-20-0)	(Riel/kg)	3,100	b	1,050
	Compound (15-15-15)	(Riel/kg)	3,400	b	1,142
	Compound (20-20-15)	(Riel/kg)	3,400	b	1,428
	Compost	(Riel/ton)	50,000	d	15,112
5	Agro-chemicals				6 0 1 7
	Liquid chemicals (paddy)	(Riel/litre)	20,000	d	6,045
	Liquid chemicals (upland crops)	(Riel/litre)	15,000	d	4,534
	Dust chemicals (paddy)	(Riel/kg)	10,000	d	3,022
	Dust chemicals (upland crops)	(Riel/kg)	8,000	d	2,418
6	Labor				
	Hired labor	(Riel/manday)	10,000	d	3,022
	Family labor	(Riel/manday)	0	d	3,022
7	Land Preparation				
	Direct sowing (Present/Without)	(Riel/ha)	200,000	d	60,449
	Transplanting (Present/Without)	(Riel/ha)	250,000	d	75,562
	Direct sowing (With for WSR)	(Riel/ha)	200,000	d	60,449
	Direct sowing (With for EWS/WS)		250,000	d	75,562
	Transplanting (With for WSR)	(Riel/ha)	250,000	d	75,562
	Transplanting (With for EWS/WS)	(Riel/ha)	350,000	d	105,787
	Mungbean	(Riel/ha)	100,000	d	30,225
	Upland crops	(Riel/ha)	150,000	d	45,337
	Vegetables	(Riel/ha)	120,000	d	36,270
8	Pumping				
	Early wet season (Present/Without)	(Riel/ha)	300,000	e & f	231,000
	Wet season (With)	(Riel/ha)	200,000	e & f	154,000
	Early wet / Dry seasons (With)	(Riel/ha)	400,000	e&f	292,000
9	Transportation				
	Ox cart	(Riel/ton)	40,000	d	12,090
10	Miscellaneous	, ,			
	5% of total of cost items 3 to 9	(Riel)			

Table E2-2 Summary of Financial and Economic Prices Applied

Remarks:

/a; August. 2008 prices

[/]b ; Economic price estimate based on the WB Commodity Markets Forecast

[/]c ; Financial prices are converted to economic value multiplying by SCF0.986/d ; Multiplied by shadow wage rate and SCF0.3022/e ; Average conversion factors of materials (50%) and equipment (50%)0.77/f ; Conversion factor of materials0.81Conversion factor of equipment0.73

2
1
-project
Sub
Rehabilitation
Kon
Ream
for
Budget
Q
Economic Cro
Table E2-3

Unit Supplmental irrigation area Unit Supplmental irrigation area Rief O'ty Price Value O'ty Rief 2,500 1,027 2,696 2,500 straw Rief 2,500 1,027 2,696 2,500 kg 2,500 1,027 2,696 2,500 1,027 2,696 2,500 kg 140 986 138 14(945 14(945 14(14(945 14(14(945 14(14(14(945 14(umping area* Price (Riel) (7 1,027 1,027 1,211 1,410 1,428 1,428	Value 000 Riel) 2,696 2,568 945 945 128 138 138 128 138 122 85	Supplemental irriga Q'ty Price 2,200 1,027 2,200 1,027 80 1,027 75 1,221 75 1,221 60 1,410 60 1,410 75 1,221 60 1,410	Supplemental irrigation area Q'ty Price Value Q'ty Price Value 2,372 2,200 1,027 2,372 113 2,200 1,027 2,259 113 80 1,085 872 242 80 1,085 872 242	Q'ty 1,700	Rainfed area Price (Riel) (Value '000 Riel)	Suppleme Q'ty	Supplemental irrigation area Q'ty Price Value	on area Value	C'ty	rea	
Ordition Unit $Q^{t}y$ Price Value $Q^{t}y$ Item Riel Q'100 Riel Q'10 Riel Q'100 Riel Q'10 Income Riel 2,500 1,027 2,568 2,500 2,666 2,500 Product (straw) Riel 2,500 1,027 2,568 2,500 140 Product (straw) Riel 140 986 138 140 and Riel 140 986 138 140 anne (wet) ton 0 1,212 0 0 DAP kg 100 1,221 122 100 DAP kg 0 1,410 85 66 DAP kg 0 1,410 85 66 Dust kg 0 1,410 85 66 Dust kg 0 1,428 0 66 Dust kg 0 3,022 2 66	Price (Riel) (' 1.027 986 15,112 1,212 1,212 1,428 1,428	Value 2.696 2.568 2.568 945 945 122 122 122 85 85	2'ty Pri (Ri (Ri 80 1, 0 15, 1, 75 1, 1, 75 1, 1, 75 1, 1, 75 1, 1, 75 1, 1, 75 1, 1, 75 1, 1, 75 1, 75 1, 1, 75 1, 75 1, 75 1, 76 1, 77 1, 76 1, 77 1, 76 1, 77 1, 76 1, 77 1	(ce Value el) (000 Riel) 2,372 027 2,259 113 048 648 085 242 085 242 085 242	Q'ty 1,700		Value 000 Riel)	Q'ty	Price	Value	0.41		
Item (Riel) (000 Riel) Income Riel 2,500 1,027 2,668 2,5 in products kg 2,500 1,027 2,668 2,5 in products kg 2,500 1,027 2,668 2,5 effon Cost Riel 945 945 945 effon Cost Riel 140 966 138 1 ad nume (wet) ton 0 15,112 0 122 1 DAP kg 100 1,221 122 1 1 122 1 DAP kg 0 1,410 85 0	(Riel) (1.027 1.027 15,112 1,410 1,428 1,428			(1000) (2, 2) (2, 1000)	1,700	Ŭ .	'000 Riel)		10 N		ŝ		Value
Income Rief 2,500 2,596 2,5 in products kg 2,500 1,027 2,568 2,5 product (straw) kg 2,500 1,027 2,568 2,5 effor Cost Riel 945 945 945 347 effor Cost Riel 140 986 138 1 ad kg 140 986 138 1 mre (wet) ton 0 15,112 122 1 DAP kg 60 1,410 85 0 DAP kg 0 1,428 0 0 Dust kg 0.8 3,025 2 0	-			ч с і	1,700	1 027			(Kiel)	'000 Riel)		(Riel) ('('000 Riel)
in products kg 2,500 1,027 2,568 2,5 Product (straw) Riel 2,50 1,027 2,568 2,5 Product (straw) Riel 128 2,45 2,5 2,5 effort Cost Riel 140 986 138 148 345 112 0 1128 2,5 145 2,5 1,6 1,2 1,2 1,2 1,2 1,1 2 1,1 2 1,4 </td <td>-</td> <td></td> <td></td> <td>5</td> <td>1,700</td> <td>1 0.77</td> <td>1,833</td> <td></td> <td></td> <td>1,618</td> <td></td> <td></td> <td>1,078</td>	-			5	1,700	1 0.77	1,833			1,618			1,078
product (straw) $-$ 128 effor Cost Riel 945 ad kg 140 946 ad kg 140 986 347 ad kg 140 986 138 1 nure (wet) ton 0 15,112 0 1 122 122 1 DAP kg 100 1,221 122 1 122 1 2 0 1 100 85 0 1 0 1 122 1 122 1 122 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 0 1 0	-	128 945 347 138 138 122 85 85				140,1	1,746	1,500	1,027	1,541	1,000	1,027	1,027
cition Cost Riel 945 ad $Riel$ 945 ad kg 140 986 347 ad kg 140 986 138 1 admuce (wet) ton 0 15,112 1 2 1 thilzer: Urea kg 100 1,221 122 1 22 1 DAP kg 60 1,410 85 0 0 1 22 1	-	945 347 138 138 122 85 85					87			11			51
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	-	347 138 122 85 85					587			558			517
ed kg kg 140 986 138 1 mure (wet) ton 0 15,112 0 Tilizer: Urea kg 100 1,221 122 1 DAP kg 60 1,410 85 compound (20-20- kg 0 1,410 85 no-chemicals: Liqu liter 0 6,045 0 Dust kg 0.8 3,022 2 Dust <i>Riel</i>	-	138 0 85 85					209			233			207
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	-	0 122 85			80	1,085	87	120	1,085	130	120	1,085	130
trilizer: Urea kg 100 1,221 122 1 DAP kg 60 1,410 85 0 <		122 85			0	15,112	0	0	15,112	0	0	15,112	0
DAP kg 60 1,410 85 Compound (20-20- kg 0 1,428 0 1,428 0 0,045 0 0,045 0 0,045 0 0,045 0 0,045 0 0,045 0 0,045 0 0,045 0 0,045 0 0,045 0,0		85			60	1,221	73	50	1,221	61	40	1,221	49
Compound (20-20-) kg 0 1,428 0 pro-chemicals: Liqu liter 0 6,045 0 Dust kg 0.8 3,022 2 <i>Ruel</i> 232		9			35	1,410	49	30	1,410	42	20	1,410	28
gro-chemicals: Liqu liter 0 6,045 0 Dust kg 0.8 3,022 2 <i>Riei</i> 232					0	1,428	0	0	1,428	0	0	1,428	0
Dust kg 0.8 3,022 2 <i>Riel</i> 232		0			0	6,045	0	0	6,045	0	0	6,045	0
Riel 232		7			0	3,022	0	0	3,022	0	0	3,022	0
		232		272			253			220			214
45	15 3,022	45		3,022 54	17	3,022	51	15	3,022	45	14	3,022	42
3,022 187	62 3,022	187	72 3,		67	3,022	202	58	3,022	175	57	3,022	172
2.3 Land preparation Riel 60		60					76			60			60
Draft animal/Tractor ha 1 60,449 60 1	1 60,449	60	1 75,	75,562 76	-	75,562	76		60,449	60		60,449	60
2.4 Pumping Riel 231		231					0			0			0
ng ha 1 231,000 231 1	1 231,000	231	0 231,000	0 000	0	231,000	0	0	231,000	0	0	231,000	0
2.5 Transportation Riel 30		30					21			18			12
Ox-cart ton 2.5 12,090 30 2.5	2.5 12,090	30	2.2 12,	12,090 27	1.7	12,090	21	1.5	12,090	18	1.0	12,090	12
2.6 Miscellaneous Riel 45		+5		31			28			27			54
3. Net Return Riel 1,751		1,751		1,724			1,246			1,061			561

Present / Without Project		Early Wet	Early Wet Season Upland Crop	land Crop
	Init	Rainfed	Rainfed area (Mungbeans)	igbeans)
CUBURION		Q'ty	Price	Value
Item			(Riel)	('000 Riel)
I. Gross Income	Riel			1,459
Main products	kg	500	2,859	1,430
By-product (straw)	kg Kg			29
2. Production Cost	Riel			657
2.1 Inputs	Riel			+2+
Seed	kg	09	5,916	355
Manure (wet)	ton		15,112	15
Fertilizer: Urea	kg	40	1,221	49
DAP	kg.	25	1,410	35
Compound (20-20-1	kg	0	1,428	0
Agro-chemicals: Liqu	liter	0	1,061	0
Dust	kg	0	2,418	0
2.2 Labor	manday			136
Hired labor	manday	2	3,022	15
Family labor	manday	40	3,022	121
2.3 Land preparation	Riel			30
Draft animal/Tractor	ha	-	30,225	30
2.4 Pumping	Riel			0
Pumping	ha	0	231,000	0
2.5 Transportation	Riel			9
Ox-cart	ton	0.5	12,090	9
2.6 Miscellaneous	Riel			31
3 Not Return	Riel			000

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			Earl	Early Wet Season	1 Direct Sowing	wing					Wet Se	Wet Season Transplanting	planting				Wet Sea	Wet Season Direct Sowing	Sowing
With Project Condition	1114	Norma	Normal irrigation area	n area		Pump irrigation area	area	Norm	Normal irrigation area	n area	Pam	Pump irrigation area	area	Ľ	Rainfed area	-	Norm	Normal irrigation area	area
9		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value
Item			(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)
I. Gross Income	Riel			3,235			3,235			3,775			3,595			1,833			3,020
Main products	kg	3,000	1,027	3,081	3,000	1,027	3,081	3,500	1,027	3,595	3,500	1,027	3,595	1,700	1,027	1,746	2,800	1,027	2,876
By-product (straw)	,			154			154			180			0			87			144
2. Production Cost	Riel			838			1,145			886			1,048			587			831
2.1 Inputs	Riel			+26			426			3+8			348			209			423
Seed	kв	80	1,380	110	80	1,380	110	25	1,380	35	25	1,380	35	80	1,085	87	80	1,380	110
Manure (wet)	ton	-	15,112	15		15,112	15	-	15,112		Γ	15,112	15	0	15,112	0	****	15,112	15
Fertilizer: Urea	kg	80	1,221	98	80	1,221	98	80	1,221		80	1,221	98	60	1,221	73	80	1,221	98
DAP	кg	0	1,410	0	0	1,410	0	0	1,410		0	1,410	0	35	1,410	49	0	1,410	0
Compound (20-20-	ġ	140	1,428	200	140	1,428	200	140	1,428		140	1,428	200	0	1,428	0	140	1,428	200
Agro-chemicals: Liqu	liter	0	6,045	0	0	6,045	0	0	6,045		0	6,045	0	0	6,045	0	0	6,045	0
Dust	kg	1	3,022	ŝ	-	3,022	3	0	3,022		0	3,022	0	0	3,022	0	_	3,022	
2.2 Labor	Riel			260			260			348			348			253			260
Hired labor n	manday	17	3,022	51	17	3,022	51	23	3,022	70	23	3,022	70	17	3,022	51	17	3,022	51
	manday	69	3,022	209	69	3,022	209	92	3,022	278	92	3,022	278	67	3,022	202	69	3,022	209
	Riel			76			76			106			106			76			26
Draft animal/Tractor	ha	1	75,562	16	-	75,562	76	-	105,787	106	-	105,787	106	-	75,562	76	-	75,562	76
2.4 Pumping	Riel			0			292			0			154			0			0
Punping	ha	0	292,000	0	-	292,000	292	0	154,000	0	-	154,000	154	0	154,000	0	0	154,000	0
2.5 Transportation	Riel			36			36			<i>71</i>			72			21			34
Ox-cart	ton	m	12,090	36	33	12,090	36	3.5	12,090	42	3.5	12,090	42	1.7	12,090	21	2.8	12,090	34
2.6 Miscellaneous	Riel			0+			55			<i>t</i> 5			50			28			38
3. Net Return	Riel			2,397			2,091			2,889			2,547			1,246			2,189
				Wet Season Direct Sowing	irect Sowin	a a				Dry Season	Dry Season Cropping	.							
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			H	Wet Season Direct Sowing	rect Sowing	50				Dry Season Cropping	Cropping		
With Project Condition	11-14	Pump	Pump irrigation area	area	R	Rainfed area	_	n	Upland crops	s		Vegetables	
5		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value
Item			(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)
I. Gross Income	Riel			3,020			1,078			2,848			3,641
Main products	kg	2,800	1,027	2,876	1,000	1,027	1,027	1,000	2,712	2,712	9,500	365	3,468
By-product (straw)	kg K			144			51			136			173
2. Production Cost	Riel			866			517			844			680
2.1 Inputs	Riel			+26			207			563			238
Seed	kg	80	1,380	110	120	1,085	130	65	5,916	385	1.6	7,405	12
Manure (wet)	ton	I	15,112	15	0	15,112	0	2	15,112	30	2.5	15,112	38
Fertilizer: Urea	kg	80	1,221	98	40	1,221	49	35	1,221	43	50	1,221	61
DAP	kg.	0	1,410	0	20	1,410	28	15	1,410	21	0	1,410	0
Compound (16-20-6	ц,	0	1,050	0	0	1,050	0	80	1,050	84	100	1,050	105
Compound (15-15-	kg	0	1,142	0	0	1,142	0	0	1,142	0	0	1,142	0
Compound (20-20-	kg	140	1,428	200	0	1,428	0	0	1,428	0	7.5	1,428	11
Agro-chemicals: Liqu	liter	0	6,045	0	0	6,045	0	0	4,534	0	0	4,534	0
Dust	kg	1	3,022	m	0	3,022	0	0	2,418	0	4.5	2,418	=
2.2 Labor	manday			260			214			181			259
Hired labor	manday	17	3,022	51	14	3,022	42	9	3,022	18	8.5	3,022	26
Family labor	manday	69	3,022	209	57	3,022	172	55	3,022	166	<i>LL</i>	3,022	233
2.3 Land preparation	Riel			76			60			1 5			36
Draft animal/Tractor	ha	1	75,562	76		60,449	60	ļ	45,337	45	1	36,270	36
2.4 Pumping	Riel			154			0			0			0
Pumping	ha	-	154,000	154	0	154,000	0	0	292,000	0	0	292,000	0
2.5 Transportation	Riel			34			12			12			115
Ox-cart	ton	2.8	12,090	34	-	12,090	12	-	12,090	12	9.5	12,090	115
2.6 Miscellaneous	Riel			8†			24			01			32
3. Net Return	Riel			2,022			562			2,003			2,961

Table E2-4	Economic	Irrigation	Benefit for	r Ream Kon	Rehabilitation Sub-prog	ject
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	Prese	nt / Without	Condition	Wit	h Project C	ondition	
	Planted	Net Produ	uction Value	Planted	Net Prod	uction Value	Incrementa
Crops	Area	Per ha	Total	Area	Per ha	Total	NPV
•	(ha)	(Riel '000)	(Riel 'Million)	(ha)	(Riel '000)	(Riel 'Million)	(Riel 'Million
Rice	2,220		2,062	2,970		<u>5,246</u>	
Early Wet Season	<u></u>			<u></u>			
- Normal irrigation area	0	0	0	905	2,397	2,169	
- Pump irrigation area	Ő	Ő	0	175	2,091	, , , , , , , , , , , , , , , , , , ,	
- Supplemental irrigation area	50	1,751	88	0	_,1		
- Supplemental inigation area	150	1,751	263	Ő	Ő		
- Rainfed area	0	1,751	205	Ū	v		
Wet Season Transplanting	U U	0	v				
	0	0	· 0	400	2,889	1,155	
- Normal irrigation area		0	0	400	2,547	1,155	
- Pump irrigation area	-	-		0	2,547	0	
- Supplemental irrigation area	20	1,724	35		=	361	
- Rainfed area	788	1,246	982	290	1,246	501	
Wet Season Direct Sowing	_	0	~	(A.5	3 100	1 204	
- Normal irrigation area	0	0	0	605	2,189	1,324	
- Pump irrigation area		0	0	105	2,022	<u>_</u>	
- Supplemental irrigation area	30	1,061	32	0	0	0	
- Rainfed area	1,182	561	664	420	562	236	
Dry Season							
 Normal irrigation area 	0	0	0	0	0	0	
- Pump irrigation area	0	0	0	0	0		
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Upland Crops	<u>10</u>		<u>8</u>	<u>284</u>		<u>485</u>	
- Mungbean	10	802	8	0	0	0	
- Upland crops (Early wet seaso	0	0	0	128	2,003	256	
- Upland crops (Dry season)	0			70	2,003	140	
- Vegetables (Early wet season)	0			56	2,961		
- Vegetables (Dry season)	0	0	0	30	2,961	89	
Total	2,230		2,070	3,254		5,732	3,662
· · · · · · · · · · · · · · · · · · ·				-			
Total Physical Area	(ha)	2,020			1,890		
Cropping Intensity	(%)	110			172		
NPV per ha	('000 Riel)	1,025			3,033		
Exchange rate (1 USD equiv.)	(Riel)	4,107			4,107		
NPV per ha	(USD)	250			738		
Paddy Production Early Wet Season 	Area (ha)	Yield (ton/ha)	Production (ton)	Area (ha)	Yield (ton/ha) Production (ton))
- Normal irrigation area	0		0	905	3.0	2,715	
- Supplemental irrigation area	50	2.5	125	175	3.0	525	
- Rainfed area using small pump	150	2.5	375	0		0	
- Rainfed area	0		0	0		0	
 Wet Season (Transplanting) 							
- Normal irrigation area	0		0	400	3.5	1,400	
- Supplemental irrigation area	20	2.2	44	70	3.5	245	
- Rainfed area	788	1.7	1,340	290	1.7	493	
• Wet Season (Direct sowing)	^		0	205	2.8	1,694	
- Normal irrigation area	0	15	0 45	605 105	2.8 2.8	294	
- Supplemental irrigation area	30	1.5 1.0	45 1,182	420	2.8 1.0	294 420	
 Rainfed area Dry Season 	1,182	1.0	1,102	720	1.0	120	
- Normal irrigation area	0		0	0		0	
- Supplemental irrigation area	0		Ő	õ		0	
Total & Production Increase	2,220		3,111	2,970		7,786	4,675

 Table E2-5
 Economic Crop Budget for Por Canal Rehabilitation Sub-project (1/2)

Derrort / Witthant Derivet			Early	Early Wet Season Di	Direct Sowing	ving			M	Wet Season Transplanting	ansplantin	50			н	Wet Season Direct Sowing	irect Sowin	ы	
	11.11	Supplme	Supplmental irrigation area	on area	Pu	Pumping area*	*	Suppleme	Supplemental irrigation area	ion area	æ	Rainfed area		Supplem	Supplemental irrigation area	tion area	æ	Rainfed area	
Condition		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	0^{ty}	Price	Value	Q'ty	Price	Value
Item		•	(Riel)	(1000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)
1. Gross Income	Riel			2,696			2,696			2,372			1,833			1,618			1,078
Main products	kg	2,500	1,027	2,568	2,500	1,027	2,568	2,200	1,027	2,259	1,700	1,027	1,746	1,500	1,027	1,541	1,000	1,027	1,027
By-product (straw)	,			128			128			113			87			. <i>LL</i>			51
2. Production Cost	Riel			945			945			648			587			558			517
2.1 Inputs	Riel			347			347			2+2			209			233			207
Seed	kg	140	986	138	140	986	138	80	1,085	87	80	1,085	87	120	1,085	130	120	1,085	130
Manure (wet)	ton	0	15,112	0	0	15,112	0	0	15,112	0	0	15,112	0		15,112	0	0	15,112	0
Fertilizer: Urea	kв	100	1,221	122	100	1,221	122	75	1,221	92	60	1,221	73	50	1,221	61	40	1,221	49
DAP	, <mark>ж</mark>	90	1,410	85	60	1,410	85	45	1,410	63	35	1,410	49		1,410	42	20	1,410	28
Compound (20-20-1	kg g	0	1,428	0	0	1,428	0	0	1,428	0	0	1,428	0	0	1,428	0	0	1,428	0
Agro-chemicals: Liqu	liter	0	6,045	0	0	6,045	0	0	6,045	0	0	6,045	0	0	6,045	0	0	6,045	0
Dust	kg	0.8	3,022	7	0.8	3,022	2	0	3,022	0	0	3,022	0	0	3,022	0	0	3,022	0
2.2 Labor	Riel			232			232			272			253			220			214
Hired labor	manday	15	3,022	45	15	3,022	45	18	3,022	54	17	3,022	51	15	3,022	45	14	3,022	42
Family labor	manday	62	3,022	187	62	3,022	187	72	3,022	218	67	3,022	202	58	3,022	175	57	3,022	172
2.3 Land preparation	Riel			60			99			- 92			76			60			60
Draft animal/Tractor	ha	-	60,449	60	-	60,449	60	-	75,562	76	-	75,562	76	-	60,449	60	-	60,449	60
2.4 Pumping	Riel			231			231			0			0			0			0
Pumping	ha		231,000	231	-	231,000	231	0	231,000	0	0	231,000	0	0	231,000	0	0	231,000	0
2.5 Transportation	Riel			30			30			27			21			18			12
Ox-cart	ton	2.5	12,090	30	2.5	12,090	30	2.2	12,090	27	1.7	12,090	21	1.5	12,090	18	1.0	12,090	12
2.6 Miscellaneous	Riel			1 5			45			31			28			27			24
3. Net Return	Riel			1,751			1,751			1,724			1,246			1,061			561
Note: *: Farmers use small moval pump in rainfed paddy field	ump in rainfe	ed paddy field																	

Durrant / Witthant Durlant		Early Wet	Season Up	Early Wet Season Upland Crop
	11-64	Rainfed	Rainfed area (Mungbeans)	gbeans)
Condition		Q'ty	Price	Value
Item			(Riel)	('000 Riel)
1. Gross Income	Riel			1,459
Main products	kg	500	2,859	1,430
By-product (straw)	kg			29
2. Production Cost	Riel			657
2.1 Inputs	Riel			t2t
Seed	kg	60	5,916	355
Manure (wet)	ton	-	15,112	15
Fertilizer: Urea	kg	40	1,221	49
DAP	kg	25	1,410	35
Compound (20-20-1	kg	0	1,428	0
Agro-chemicals: Liqu	liter	0	1,061	0
Dust	kg	0	2,418	0
2.2 Labor	manday			136
Hired labor	manday	5	3,022	15
Family labor	manday	40	3,022	121
2.3 Land preparation	Riel			30
Draft animal/Tractor	ha		30,225	30
2.4 Pumping	Riel			0
Pumping	ha	0	231,000	0
2.5 Transportation	Riel			9
Ox-cart	ton	0.5	12,090	6
2.6 Miscellaneous	Riel			31
3. Net Return	Riel			802

	-		Early	Early Wet Season D	Direct Sowing	vine					Wet Sea.	Wet Season Transplanting	anting				Wet Seas	Wet Season Direct Sowing	owing
With Project Condition	- -	Normal	Normal irrigation area	area		Pump irrigation area	area	Norma	Normal irrigation area	area	Pump	Pump irrigation area	arca		ea		Norma	Normal irrigation area	area
ltem		Q'ty	Price (Riel)	Value ('000 Riel)	Q'ty	Price (Riel)	Value ('000 Riel)	Q'ty	Price (Riel)	Value ('000 Riel)	Q'ty	Price (Riel)	Value ('000 Riel)	Q'ty	Price (Riel) ('	Value ('000 Riel)	Q'ty	Price (Riel) (Value (1000 Riel)
1 Grove Incomo	Dial		1	3 2 2 5			3 2 3 5 5			3 775			\$ 505			1.822			3.020
	kg	3,000	1,027	3,081	3,000	1,027	3,081	3,500	1,027	3,595	3,500	1,027	3,595	1,700	1,027	1,746	2,800	1,027	2,876
2 Production Cost	Riel			838			1145			886			1.048			587			831
2 Innuts	Riel			426			426			348			348			209			423
Seed	ķ	80	1.380	110	80	1.380	110	25	1.380	35	25	1.380	35	80	1.085	87	80	1.380	110
Manure (wet)	ton	-	15,112	15	-	15,112	15	,	15,112	15	-	15,112	15	0	15,112	0	-	15,112	15
Fertilizer: Urea	кg	80	1,221	98	80	1,221	98	80	1,221	98	80	1,221	98	99	1,221	73	80	1,221	98
DAP	, ay	0	1,410	0	0	1,410	0	0	1,410	0	0	1,410	0	35	1,410	49	0	1,410	0
Compound (20-20-	, a	140	1,428	200	140	1,428	200	140	1,428	200	140	1,428	200	0	1,428	0	140	1,428	200
Agro-chemicals: Liou	liter	0	6,045	0	0	6.045	0	0	6.045	0	0	6.045	0	0	6,045	0	0	6,045	0
Dust	kα	-	3.022	ŝ		3.022	ŝ	0	3.022	0	0	3,022	0	0	3.022	0		3,022	Ś
2.2 Labor	Riel		-	260			260			348			348			253			260
-ed lahor	mandav	17	3 022	l's	17	3 022	51	23	3 022	70	23	3 022	70	17	3 022	51	17	3.022	51
-	vanan	69	3.022	209	69	3.022	209	92	3.022	278	92	3.022	278	67	3.022	202	69	3.022	209
	Riel)		92	5		76	ļ		106			106			76			76
Draft animal/Tractor	ha	-	75.562	76	-	75 562	76	-	105.787	106	-	105.787	106		75.562	76	_	75.562	76
2 1 Pumina	Ripl			0	,		202			0	ı		154			0	I		0
Pumning	- eq	C	292,000	, C		292.000	292	C	154.000	0		154.000	154	0	154.000	. 0	0	154.000	0
2.5 Transportation	Riel			36		Î	36			77			- 21			21		-	34
Ox-cart	ton	"	12, 090	36	"	12.090	36	3.5	12.090	42	3.5	12.090	42	1.7	12.090	21	2.8	12.090	34
2.6 Miscellaneous	Riel	1		0+	1		55			7			50		ĺ	28			38
3 Not Return	Rief		the strength of the second	2.397			2.091			2.889			2.547			1.246			2.189
							s s s s s s s s s s s s s s s s s s s												
			W.	Wet Season Direct Sowing	irect Sowin	50				Dry Season Cropping	Cropping								
With Project Condition		Pump	Pump irrigation area	urea		Rainfed area			Upland crops	5		Vegetables							
,		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty	Price	Value	Q'ty		Value						
Item			(Riel) (('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)		(Riel)	('000 Riel)						
1. Gross Income	Riel			3,020			1,078			3,132			3,641						
Main products	kg B	2,800	1,027	2,876	1,000	1,027	1,027	1,100	2,712	2,983	9,500	365	3,468						
By-product (straw)	kg			144			51			149			173						
2. Production Cost	Riel			866			517			845			680						
2.1 Inputs	Riel			+26			207			563			238						
Seed	ke	80	1.380	110	120	1,085	130	65	5,916	385	1.6	7,405	12						
Manure (wet)	, to	-	15,112	15	0	15,112	0	7	15,112	30	2.5	15,112	38						
Fertilizer: Urea	kg	80	1.221	98	40	1.221	49	35	1,221	43	50	1,221	61						
DAP	, 2	0	1,410	C	20	1,410	28	15	1.410	21	0	1,410	0						
Compound (16-20-6	ko K	0	1.050	0	0	1.050	0	80	1,050	84	100	1,050	105						
Compound (15-15-	ke (0	1.142	0	0	1.142	0	0	1,142	0	0	1,142	0						
Compound (20-20-	, o k	140	1.428	200	C	1.428	C	0	1 428	0	7.5	1.428	=						
Agro-chemicals: Light	liter	0	6.045	0	0	6.045	0	0	4.534	0	0	4.534	0						
Dust	kα	_	3.022		0	3.022	0	0	2.418	0	4.5	2.418							
	mandary	I		260			112			181			259						
Hired lahor	mandav	17	3 022	51	14	3 022	42	9	3.022	8	8.5	3.022	26						
	manday	69	3 077	000	5	3 077	171	55	3 077	166	11	3 077	733						
	Dial	5		72			60	1		55		1	**						
2.2 Land Preparation	ha	-	75 562	192	-	60 449	60	-	45 337	45	-	36 270	36						
2 1 Pumping	Diel	•		<i>T</i> 51	•	1 1 1 2 2	20			. e									
Dimmin	ha	-	154 000	154	0	154.000	. c	C	292 000	. c	C	000 262	, c						
1 Transport	Piel	•	000/101	. 72	>	000/101		>	22214	5/	>	222.4	115						
Ox-cart	ton	2.8	12.090	34	-	12.090	12	1.1	12.090	13	9.5	12.090	115						
2.6 Miscellaneous	Riel		-	-18			54			01			32						
3. Net Return	Riel			2,022			562			2,287			2,961						

 Table E2-5
 Economic Crop Budget for Por Canal Rehabilitation Sub-project (2/2)

Table E2-6 Economic Irrigation Benefit for Por Canal Rehabilitation Sub-project

	Prese	nt / Without	Condition	Wit	h Project C	ondition	
	Planted	Net Prod	uction Value	Planted	Net Prod	uction Value	Incremental
Crops	Area	Per ha	Total	Area	Per ha	Total	NPV
Crops	(ha)		(Riel 'Million)	(ha)	(Riel '000)	(Riel 'Million)	(Riel 'Million
Dias	2,480	(1111 + 11)	2,638	3,060		6,433	
Rice Farly Wat Space	2,400		2,038	<u>3,000</u>		0,455	
Early Wet Season	0	0	0	1,120	2,397	2,685	
- Normal irrigation area	0		0	1,120	2,397	2,005	
- Pump irrigation area		0	-	-	0	0	
- Supplemental irrigation area	100	1,751	175	0		0	
- Pumping rainfed area	310	1,751	543	0	0	0	
- Rainfed area	0	0	0				
Wet Season Transplanting		<u>_</u>	0	(10	2 000	1.7(2)	
- Normal irrigation area	0	0	0	610	2,889	1,762	
- Pump irrigation area	0	0	0	0	0	0	
 Supplemental irrigation area 	50	1,724	86	0	0	0	
- Rainfed area	985	1,246	1,228	360	1,246	449	
Wet Season Direct Sowing				1			
- Normal irrigation area	0	0	0	610	2,189	1,335	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	50	1,061	53	0	0	0	
- Rainfed area	985	561	553	360	562	202	
Dry Season							
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Upland Crops	<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	-	<u>0</u>	290		667	
- Mungbean	$\frac{\bullet}{0}$	0	$\overline{\overline{0}}$	0	0		
- Upland crops (Early wet seaso	-	Ő	ů	130	2,003	260	
- Upland crops (Dry season)	0	0	Ő	70	2,003	140	
 Vegetables (Early wet season) 		0	Ő	60	2,961	178	
- Vegetables (Dry season)	0 0	0	0	30	2,961	89	
		0	-		2,701	7,100	4,462
Total	2,480		2,638	3,350		7,100	4,40
	(ha)	2,070			1,940		
Total Physical Area Cropping Intensity	(ha) (%)	120			1,940		
NPV per ha	('000 Riel)	1,274			3,660		
Exchange rate (1 USD equiv.)	(Riel)	4,107			4,107		
NPV per ha	(USD)	310			891		
Paddy Production	Area (ha)	Yield (ton/ha) Production (ton)) Area (ha)	Yield (ton/ha) Production (ton)
 Early Wet Season 							
- Normal irrigation area	0		0	1,120	3.0	3,360	
- Supplemental irrigation area	100	2.5	250	0		0	
- Rainfed area using small pump	310	2.5	775	0		0 0	
- Rainfed area	0		0	0		0	
Wet Season (Transplanting) Normal invitation area	0		0	610	3.5	2,135	
 Normal irrigation area Supplemental irrigation area 	50	2.2	110	010	0,0	2,155	
- Supplemental inigation area - Rainfed area	985	1.7	1,675	360	1.7	612	
• Wet Season (Direct sowing)	,	•••	.,	•	-		
- Normal irrigation area	0		0	610	2.8	1,708	
- Supplemental irrigation area	50	1.5	75	0		0	
- Rainfed area	985	1.0	985	360	1.0	360	
 Dry Season 						-	
- Normal irrigation area	0		0	0		0	
 Supplemental irrigation area Total & Production Increase 	0 2,480		0 3,870	0 3,060		0 8,175	4,306
	/ // ¥/)		5 ð / U	3.000		0.175	+,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

Condition Unit Supplmental irrig. Gross Income Net Supplmental irrig. Main products Riel 2,000 1,027 Production Cost Riel 2,000 1,025 Production Cost Riel 2,000 1,025 Seed Riel 2,000 1,025 Production Cost Riel 2,010 1,025 Seed Riel 0 1,418 DAP Lefor Riel 9 3,022 DAP Labor Riel 9 3,022 Entrop Riel Net 9 3,022 Hinguas Riel Net 1 75,562 Dast Dast manday 79 3,021 Labor Riel Normal irrigati 1 75,562 Parati animal/Tractor Riel Normal irrigati 0 231,000 Transportation Riel Normal irrigati 0 231,000 1,02 Noceatt <th>Q'ty Q'ty Q'ty Q'ty Q'ty Q'ty Q'ty Q'ty 0 0 0 0 0 0 0 0 0 0</th> <th>Rainfed area Price Value (Riel) ('000 Riel)</th> <th>0</th> <th>b irrigation</th> <th></th> <th></th> <th></th> <th></th>	Q'ty Q'ty Q'ty Q'ty Q'ty Q'ty Q'ty Q'ty 0 0 0 0 0 0 0 0 0 0	Rainfed area Price Value (Riel) ('000 Riel)	0	b irrigation				
Other Other Price $Riel 2,000 1,027 Riel 2,000 1,023 Riel 2,010 1,035 Riel 0 1,112 Riel 0 1,123 Riel 0 1,410 Riel 0 3,025 Riel 0 3,023 Riel 0 3,023 Riel 0 3,023 Riel 0 2,31,000 Riel 0 $	<u>, </u>		ō 	D	area			
Gross harme Main productsRiel kg2,0001,027Main productskg2,0001,027Main productskg2,0001,027By-product (straw)kg801,085Seedkg751,211Familizer: Ureakg751,410DAPCompound (20-20-kg751,410Fertilizer: Ureakg751,410Agro-chemicals: Liquiter03,022Hired labormanday93,021EaborRielnanday793,020UnsitRielnanday793,020UnsitRielnanday793,020UnsitRielno231,0001,022Pompinghaa0231,0001,022UnsitRielno231,0001,022MiscellaneousRiel0231,0001,022MiscellaneousRielno231,0001,022MiscellaneousRielno231,0001,022MiscellaneousRielno231,0001,022MiscellaneousRielno231,0001,022MiscellaneousRielno231,0001,022MiscellaneousRielno231,0001,022MiscellaneousRielno0231,000SecdMiscellaneousRielno231,000Gross thermeRielno1,012Miscellaneous<			y	ty Price Va (Riel) (1000	Value ('000 Rieh			
Main productskg 2.000 1.027 By-product (straw)Riel 80 1.035 By-product (straw)Riel 80 1.035 By-product (straw) $Riel801.035Seedkg801.035Manure (wet)1.011.015DustRiel801.035Agro-chemicals: Liqu1.012.0001.025DustRiel801.212DustRiel93.022Hired laborRiel93.021DustRiel93.021DustRiel93.023LaborRiel93.023Draft animal/TractorRiel0231,000RielRiel0231,000Draft animal/TractorRiel0231,000RielRiel0231,000RielRiel0231,000RielRiel0231,000RielRiel0231,000RielRiel0231,000RielRiel00.05MixsellaneousRiel00.0231,000MixsellaneousRiel00.0231,000MixsellaneousRiel00.0231,000MixsellaneousRiel00.0231,000MixsellaneousRiel00.01,020MixsellaneousRiel$		1.618			2.696			
Production CostRiel $Production CostRielProduction CostRielPollocion CostRielSeedRelManuce (wet)kgDAPkgDAPkgDAPkgDAPkgDAPkgDAPkgDAPkgDAPkgDAPkgDAPkgDAPkgDastRielDustmandayPolicionRielDraft animal/TractorRielDraft animal/TractorRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRielMiscellaneousRiel$	α φ. φ.	1,027 1,541	2,500	1,027	2,568			
Insummer InputsRef Nature (wet)Ref kg801.085 5.112Fertifizer: Urea DAP Compound (20-20- Dast Trainiv laborkg551.211 6.045Fertifizer: Urea Compound (20-20- Dustkg6.045 6.0453.022 93.022 9Hired labor Transportation Interprisekg01.410 6.045Labor DustRiel Riel93.023 93.021 9Labor Draft animal/TractorRiel Riel93.023 9Punping MiscellaneousRiel Riel0231,000 7Main project Condition MiscellaneousUnit Riel0231,000 7Main project Condition Main product (straw)Unit Riel0231,000 9Main project Condition Main product (straw)Unit Riel0231,000 9Main project Condition Main product (straw)Unit Riel01,022 9Main project Condition Main product (straw)Kiel 801,022 1,022Main project Condition Compound (16-20- Compound (16-20- 8Kiel 93,022 3,0221,032 1,040Agro-chemicals: Liqu Manure (wet)Kiel 801,022 1,040Compound (16-20- Compound (16-20- By DustKiel 93,022 3,0221,032 1,040Labor Manure (wet)Kiel 911,057 1,0401,057 		\$70			033			
Seedkgkg801,085Manure (wet) kg 75 1,2112Faritizer. Ureakg 75 1,2112DAPCompound (20-20)kg 75 1,410Compound (20-20)kg 6045 3022 Hired labormanday 9 $3,022$ Hired labormanday 79 $3,022$ Hired labormanday 79 $3,022$ Draft animal/TractorRiel 9 $3,020$ PunpingRiel 1 $75,562$ PunpingRiel 2 $231,000$ PrompingRiel 0 $231,000$ MixeellameonsRiel 0 $1,02$ MixeellameonsRiel 0 $1,02$ Main productsKiel 0 $1,02$ Main productsKiel 0 $1,02$ Main productsKiel 0 $1,02$ Main product (straw)Kiel 0 $1,02$ Main product (straw)kg $3,000$ $1,02$ DAPCompound (16-20-kg 0 $1,02$ Compound (16-20-kg 0 $1,02$ Manure (wet)kg 0		209			259			
Manure (wet)toin015,112Ferlifizer: Ureakg 75 1,221Forlifizer: Ureakg 75 1,221EndorCompound (20-20-kg 0 $3,022$ Agro-chemicals: Liqukg 0 $3,022$ LaborFired labormanday 79 $3,022$ Fired labormanday 79 $3,022$ Tanily labormanday 79 $3,022$ DustRiel 79 $3,022$ Family laborRiel 79 $3,022$ InapingRiel 79 $3,022$ PumpingRiel 0 $231,000$ CransportationRiel 0 $231,000$ InnspingRiel 0 $231,000$ MiscelianeonsRiel 0 $231,000$ MiscelianeonsRiel 0 $231,000$ MiscelianeonsRiel 0 $231,000$ Main Project ConditionUnit 0^{1} Main productskg $3,300$ $1,02$ Main productskg $3,300$ $1,02$ By production CostRiel 0 $1,02$ Seedkg $2,02$ kg 0 Compound (16-20-6kg 0 $1,02$ Seedcompound (16-20-6kg 0 Compound (10-20-6kg 0 $1,02$ Manure (wet)kg 0 $1,02$ By compound (16-20-6kg 0 $1,02$ Compound (16-20-6kg 0 $1,02$ <td></td> <td>1,085 87</td> <td></td> <td>1,085</td> <td>65</td> <td></td> <td></td> <td></td>		1,085 87		1,085	65			
Fertilizer: Ureakg751,221DAPDAPkg451,410DAPDustkg6,045LaborRiel1,4803,022LaborRiel93,022Land preparationRiel03,022Land preparationRiel93,022Land preparationRiel175,562PumpingRiel1793,022PumpingRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000IransportationRiel0231,000MiscellarenRiel0231,000Main productsRiel01,020Main productskg3,3001,021By-productKgel1,0102412Seedkg3,3001,021InfourRiel01,012Productkg01,012Datation Costkg3,0001,021InfourCompound (16-20-kg01,012DatationRielkg01,012Paning InbusRie	9 O 			15,112	0			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	m		95	1,221	116			
Compound (20-20)kg01428DustAgro-chemicals: Liquliter000DustRiefnanday793,022Hired labormanday793,022Draft animal/TractorRief93,023PumpingRief175,553PumpingRief0231,000PumpingRief0231,000RieronorationRief22,000MiscellaneousRief22,000MiscellaneousRief21,000MiscellaneousRief21,000MiscellaneousRief21,000MiscellaneousRief21,000Main productsRief21,000Main productsRief21,000SeedNatin product (straw)kg3,3001,022Main product (straw)kg3,3001,022By-product (straw)kg3,3001,022Compound (16-20-kg01,045Compound (16-20-kg01,046Compound (16-20-kg01,045Compound (16-20-kg01,045Compound (16-20-kg01,045Compound (16-20-kg01,045Compound (16-20-kg01,045Compound (16-20-kg01,045Compound (16-20-kg01,045Compound (16-20-kg01,		1,410 49		1,410	78			
Agro-chemicals: Liquliter 0 6.045 Dust kg 0 3.022 LaborTried labor $Riel$ 9 3.022 Labor $Riel$ $Riel$ 9 3.022 Land preparation $Riel$ 9 3.022 Land preparation $Riel$ 1 75.562 Pumping $Riel$ 1 75.562 Pumping $Riel$ 0 231.000 Transportation $Riel$ 0 231.000 Transportation $Riel$ 0 231.000 Transportation $Riel$ 0 231.000 Miscellaneous $Riel$ 0 231.000 Miscellaneous $Riel$ 0 231.000 Main project ConditionUnit $Q'y$ $Riel$ Main product (straw) kg 3.300 1.02 Paraderline Cost $Riel$ 3.300 1.02 Main product (straw) kg 2.5 1.38 Main product (straw) kg 2.5 1.38 Dist head $Riel$ 0 1.02 Paraderline Cost kg 0 1.02 Paraderline Cost kg 0 1.02 Paraderline Cost kg 0 1.02 Paraderline Compound (16-20-6 kg 0 1.02 Paraderline Compound (20-20- kg 0 1.02 Paraderline Compound (16-20-6 kg 0 1.02 Dust $Riel1001.02Paraderline$		1,428 (0	1,428	0			
Labor Dust Kg 0 5,012 Labor Hired labor Riel 9 3,023 Family labor Riel 9 3,023 Land preparation Riel 9 3,023 Land preparation Riel 0 231,000 Pumping Riel 0 231,000 Pumping Riel 0 231,000 Pumping Riel 0 231,000 Miscellancens Riel 0 231,000 Mature Riel 0 102 Mature Riel 0 1,02 Mature Kg 3,300 1,02 By-product (straw) Kg 3,300 1,02 By-product (straw) Kg 3,300 1,02 By-product (straw) Kg 3,00 1,02 By-product (straw)		6,045	-	6,045	0 0			
LaborReiHired laborRielFamily laborRielDraft animal/TractorRielDraft animal/TractorRielPumpingRielPumpingIransportationPumpingRielPumpingRielPostRielPostRielPostRielPostRielPostRielPostRielPostRielPostRielRiel2MiscellaneousRielRielDritGross fromeRielMain productsRielProduct (straw)RielProduct (straw)RielSeedRielProduct (straw)RielDustCompound (16-20-Riel25JundCompound (16-20-Riel23DustRiel		3,022 J		5,022	0			
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Table E2-8 Economic Irrigation Benefit for Damnak Ampil Rehabilitation Sub-project

	Prese	nt / Without	Condition	Wit	h Project C	ondition	
	Planted	Net Produ	uction Value	Planted	Net Prod	uction Value	Incremental
Crops	Area	Per ha	Total	Area	Per ha	Total	NPV
	(ha)	(Riel '000)	(Riel 'Million)	(ha)	(Riel '000)	(Riel 'Million)	(Riel 'Million
Rice	2,490		2,871	2,270		6,007	
Early Wet Season	2,470		2,071	<u>2,270</u>		0,007	
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	0	0	0 0	0	Ő	Ő	
	0	0	0	0	0	ő	
- Supplemental irrigation area	0	0	0	0	0	0	
- Pumping rainfed area	0	0	0	0	0	0	
- Rainfed area	0	0	v	U	U	U	
Wet Season Transplanting	0	٥	0	1 770	2,682	4,747	
- Normal irrigation area	0	0	0	1,770	2,082	,	
- Pump irrigation area	0	0	0	500		1,260	
- Supplemental irrigation area	500	1,518	759	0	0	0	
- Rainfed area	1,930	1,040	2,006	0	0	0	
Wet Season Direct Sowing	-	-	~	^	0	0	
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Dry Season							
- Normal irrigation area	0	0	0	0	0	0	
 Pump irrigation area 	60	1,763	106	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Upland Crops	<u>0</u>		<u>0</u>	<u>340</u>		<u>792</u>	
- Mungbean	0	0	0	0	0	0	
- Upland crops (Early wet seaso	0	0	0	240	2,065	496	
- Upland crops (Dry season)	0	0	0	0	0	0	
- Vegetables (Early wet season)	0	0	0	100	2,961	296	
- Vegetables (Dry season)	0	0	0	0	0	0	
Total	2,490		2,871	2,610	4666-666	6,798	3,927
Iotai	2,470		<u> </u>	2,010			
Total Physical Area	(ha)	2,430			2,270		
Cropping Intensity	(%)	102			115		
NPV per ha	('000 Riel)	1,182			2,995		
Exchange rate (1 USD equiv.)	(Riel)	4,107			4,107		
NPV per ha	(USD)	288			729		
Paddy Production	Area (ha)	Yield (ton/ha)	Production (ton)	Area (ha)	Yield (ton/ha) Production (ton))
• Early Wet Season	0		0	0		0	
- Normal irrigation area	0		0 0	0 0		0	
 Supplemental irrigation area Rainfed area using small pump 	0		0	0		0	
- Rainfed area	0		0	0		0	
• Wet Season (Transplanting)	0		× v	0		-	
- Normal irrigation area	0		0	1,770	3.3	5,841	
- Supplemental irrigation area	500	2.0	1,000	500	3.3	1,650	
- Rainfed area	1,930	1.5	2,895	0		0	
 Wet Season (Direct sowing) 							
- Normal irrigation area	0		0	0		0	
- Supplemental irrigation area	0		0	0		0	
- Rainfed area	0		0	0		0	
Dr. Sooon							
Dry Season	^		0	~		0	
- Normal irrigation area - Supplemental irrigation area	0 60	2.5	0 150	0 0		0 0	

Image: Constraint of the state of	Present / Without Project		-	8	Wet Season Transplanting	ransplantin n			Dry Sea	Dry Season Transplanting	olanting			
Item OP Cold Dots Dots <thd< th=""><th>Condition</th><th>Unit</th><th>Suppline</th><th>ntal irrigati</th><th>ion area</th><th></th><th>Diffed area</th><th></th><th>Tuna -</th><th>Fump irrigation area</th><th>area</th><th></th><th></th><th></th></thd<>	Condition	Unit	Suppline	ntal irrigati	ion area		Diffed area		Tuna -	Fump irrigation area	area			
Grass former Rei 2,000 1,027 2,540 1,027 1,541 2,500 Bytain products Bytain Products <td< th=""><th>Item</th><th></th><th>ŝ</th><th>(Riel)</th><th>('000 Riel)</th><th>ŝ</th><th></th><th>(1000 Riel)</th><th>5</th><th>(Riel)</th><th>'000 Riel)</th><th></th><th></th><th></th></td<>	Item		ŝ	(Riel)	('000 Riel)	ŝ		(1000 Riel)	5	(Riel)	'000 Riel)			
Main product (straw) ks 2,000 1,027 2,034 1,500 1,027 1,541 2,500 Product (straw) ket ket 80 1,027 2,034 1,511 27 <th2< th=""><th>Gross Income</th><th>Riel</th><th></th><th></th><th>2,157</th><th></th><th></th><th>1,618</th><th></th><th></th><th>2,696</th><th></th><th></th><th></th></th2<>	Gross Income	Riel			2,157			1,618			2,696			
Production (acros) Ref 63 73 79 79 79 Production (acros) Ref 75 12.11 92 0 15.112 75 209 55 Seat Re 75 12.11 92 60 15.112 92 90 95 Production (acros) Re 60 15.112 92 60 15.112 93 55 12.01 9	Main products Buenroduct (straw)	kg	2,000	1,027	2,054	1,500	1,027	1,541	2,500	1,027	2,568			
Inviso Ref	đ	Riel			63.8			579			933			
Sect Manuer (wei) Failurer (wei) Base Failurer Kei Sol Failurer (Failurer Manuer (wei) Base Failurer (Failurer Manuer (Failurer Manuer		Piel			crc			000			259			
Manure (wet) Fertilizer: Urea Ago-chemicals: Lique Ago-chemicals: Lique Ago-chemicals: Lique Real Purpues v_{el} (v_{el} (v_{el}) v_{el}	di i	law low	80	1 085	247	80	1 085	87	60	1 085	59			
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Frame Fram Frame Frame <th< td=""><td></td><td></td><td>0 ¥</td><td>711,01</td><td>- S</td><td>n (9</td><td>211,01</td><td>2 5</td><td>0.50</td><td>11,01</td><td>911</td><td></td><td></td><td></td></th<>			0 ¥	711,01	- S	n (9	211,01	2 5	0.50	11,01	911			
$ \begin{array}{c cccc} Compound (20-2), kg & 0 & 1,428 & 0 & 0 & 1,428 & 0 & 0 \\ Age eleminals: Liqu liter & 0 & 6,045 & 0 & 0 & 1,428 & 0 & 0 & 0 \\ Family labor manday & manday & 9 & 3,022 & 228 & 87 & 0 & 0 & 0 & 1,428 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & $	PAD	an r	Ú K	177,1	1 2 2	3 %	1410	07	S 8	177'1	78			
Agro-chemicals: Liqu No. $(1,2)$ $(2,2)$	Compared (26.20	20 - 2	ç	017,1	, S		1 1 2 8	÷ ⊂	<u>_</u>	1 478	é c			
Agre-chemicals: Liqu Ref 0 0,043 0 0 0,043 0 0 0,043 0 0 0,043 0		Rg Rg	-	1,420			1,420			1,440				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Agro-cnemicals: Liqu	- IIIer		0,040	0		0,040			0,040,0				
Lation Mean 9 3.022 2.30 74 3.022 2.46 11 Transidiation Real 1 7.5,62 76 1 75 7 3 2.23 8 3 7 6 1 7.5,52 76 1 7 7 7 7 7 7 7 7 7 1 1 75,562 76 1 7 5 7 1 1 7 5 7 7 1 1 7 5 6 1 7 5 6 1 7 5 6 1 7 5 6 1 7 5 2 3 1 <td></td> <td>ж К</td> <td>></td> <td>770,0</td> <td>2</td> <td>0</td> <td>770,0</td> <td>2 9</td> <td>0</td> <td>770,0</td> <td></td> <td></td> <td></td> <td></td>		ж К	>	770,0	2	0	770,0	2 9	0	770,0				
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Family Instruction manday 79 3.022 2.39 74 3.022 2.66 76 1 87 Draft animal/Tractor Red 1 75,562 76 1 75,562 76 1 87 Prompring Read 1 75,562 76 1 75,562 76 1 87 Prompring Red 0 231,000 24 1,5 12,090 0 1 Misculaneous Red 2 1,58 1,53 2 2 1 9 2 2 2 2 2 2 2 2 2 3 1 1 1 1 3	Hired labor	manday	ן א	3,022	17	ю.	270,5	74	21	270,0	n S			
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$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	5 Transportation	kiel			54			18			05			
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$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	With Project Condition	Ilnit	Norm	al irrigation	n area	Pum	p irrigation	area		Upland crops			Vegetables	
Riel (Alc) (Alc) <th< th=""><th></th><th>5</th><th>Q'ty</th><th>Price</th><th>Value</th><th>Q'ty</th><th>Price</th><th>Value</th><th>0 ty</th><th>Price</th><th>Value</th><th>Q'ty</th><th>Price</th><th>Value</th></th<>		5	Q'ty	Price	Value	Q'ty	Price	Value	0 ty	Price	Value	Q'ty	Price	Value
ters ke hei 3,300 1,027 3,339 3,300 1,027 3,339 1,100 1,012 ke 3,300 1,027 3,399 1,100 1,012 ke 3,389 1,100 1,012 ke 3,389 1,100 1,012 ke 1 15,112 15 15 1,100 1,012 ke 1 15,112 15 15 15 15 15 15 15 15 15 15 15 15 15				(INCI)	(non viei)		(MCK)	1 000 AICI		(INICI)	1 DOD TOTAL		(INICI)	NW DOD
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M_{Ref} Ref 877 $1,038$ 378 328 338 328 338 338 338 338 338 338 338 338 337 341 3022 341 3022 341 3022 341 3022 3312 309 57 mad(15.15-16 kg 0 1,1422 0 0 1,1422 0 0 0 <td>Rv-nroduct (straw)</td> <td>20.2</td> <td>nnr'r</td> <td>170,1</td> <td>691</td> <td>000-10</td> <td>1,041</td> <td>169</td> <td>1,100</td> <td>+1<i>c</i>,4</td> <td>138</td> <td>000%</td> <td>202</td> <td>173</td>	Rv-nroduct (straw)	20.2	nnr'r	170,1	691	000-10	1,041	169	1,100	+1 <i>c</i> ,4	138	000%	202	173
Ref 3.48 3.48 3.48 3.48 5.48 75 Urea kg 25 1,380 35 25 1,380 35 75 Urea kg 0 1,5112 15 1 15,112 15 2 Urea kg 0 1,221 98 80 1,221 98 35 36 37 36 37 36 37 36 37 36 37 36 37 36 37 36 37 36 37 36 37 36 37 36 37 36 37	<i>p.</i> ,	Dial			877			1 028			838			686
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Piel			81.5			3.18			548			2.35
et) v_{g} ton v_{g} v_{g} ton v_{g} v_{g} v_{g}		1	35	1 380	35	25	1 380	35	75	4 930	370	16	7 405	-
(r_{ee}) $(r_{e$	Menure (mat)	а 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- - -	15 117	2 -	- ⁻	15117	51	ςς	15 113	05	2 Y C	15 112	- .
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	DAD	20 <u>1</u>	2	1 4 1 0	्	9 -	1410	χ¢	3 2	147,1			1410	~ -
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Compound (19-19-	20.5	140	1 178	000	071	1 478	200		1 428		2 4	1 478	-
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	I abou	- PE	>	770,0	202	>	770,0	2112	2	DIT.44		Ì	D11.'7	1 2 6
Intraductory I.1 $5,022$ $3,03$ $10,22$ $3,022$ $3,03$ $5,72$ $5,02$ $5,02$ $5,72$ $5,02$ $5,72$ $5,02$ $5,72$ $5,72$ $5,72$ $5,72$ $5,72$ $5,72$ $5,72$ 106 1 $105,787$ 106 1 $105,787$ 106 1 $105,787$ 106 1 $105,787$ 106 1 $105,787$ 106 1 $105,787$ 106 1 $105,787$ 106 106 1 106 106 106 <th< td=""><td>71</td><td>(mmm)</td><td>=</td><td>2 000</td><td>170</td><td>Ξ</td><td>2 0 3 7</td><td>140</td><td>5 9</td><td>2 077</td><td>100</td><td>2 5</td><td>2 077</td><td>j c</td></th<>	71	(mmm)	=	2 000	170	Ξ	2 0 3 7	140	5 9	2 077	100	2 5	2 077	j c
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Family labor	mandav		3 077	308	102	3 022	308	25	3.022	172	11	3.022	233
al/Tractor ha 1 105,787 106 1 105,787 106 1 Riel 0 154,000 0 1 154,000 154,00 154,00 164,00 1 Riel 0 154,000 0 1 154,000 154,00 164,00 1 Riel 3.3 12,090 40 3.3 12,090 40 1.1 Riel 3.3 12,090 40 3.3 12,090 40 1.1		Riel			106			106						ñ
Riel 0 154,000 0 154,000 154 0 ha 0 154,000 0 1 154,000 154 0 Riel 3.3 12,090 40 3.3 12,090 40 1.1 Riel 3.3 12,090 40 3.3 12,090 40 1.1		ha	1	105,787	106		105,787	106		45,337	45	-	36,270	ē
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4 Pumping	Riel			0			151						ĩ
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Pumping	ha	0	154,000	0		154,000	154	0	292,000		0	292,000	0
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	5 Transportation	Riel			0f			0t						511
Rief 27	Ox-cart	ton	3.3	12,090	40	3.3	12,090	40	I.I	12,090	[3	9.5	12,090	11
1907	2.6 Miscellaneous	Riel			72						0†			~ ~

Table E2-9 Economic Crop Budget for Wat Long Rehabilitation Sub-project

Table E2-10 Economic Irrigation Benefit for Wat Loung Rehabilitation Sub-project

	Prese	nt / Without	Condition	Wit	th Project C	ondition	
	Planted	Net Prod	action Value	Planted	Net Prod	uction Value	Incremental
Crops	Area	Per ha	Total	Area	Per ha	Total	NPV
Crops	(ha)	(Riel '000)	(Riel 'Million)	(ha)	(Riel '000)	(Riel 'Million)	(Riel 'Million
Dia	2,765	()	2,969	2,540		6,682	
Rice	2,705		2,909	2,540		0,002	
Early Wet Season	0	0	0	0	0	0	
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area		0	0	0	0	0	
- Supplemental irrigation area	0		0	0	0	0	
- Pumping rainfed area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Wet Season Transplanting	0	0	0	1 740	2,682	4,666	
- Normal irrigation area	0	0	0	1,740 800	2,082	2,016	
- Pump irrigation area	0	0	0		2,520	2,010	
- Supplemental irrigation area	130	1,518	197	0		0	
- Rainfed area	2,590	1,040	2,692	0	0	0	
Wet Season Direct Sowing	~	~	_	~	0	0	
- Normal irrigation area	0	. 0	0	0	0	0	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
 Rainfed area 	0	0	0	0	0	0	
Dry Season							
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	45	1,763	79	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Upland Crops	<u>0</u>		<u>0</u>	<u>380</u>		<u>883</u>	
- Mungbean	0	0	0	0	0	0	
- Upland crops (Early wet seaso	0	0	0	270	2,065	558	
- Upland crops (Dry season)	0	0	0	0	0	0	1
- Vegetables (Early wet season)	0	0	0	110	2,961	326	
- Vegetables (Dry season)	0	0	0	0	0	0	
Total	2,765		2,969	2,920		7,566	4,59
i otti	_,,						
Total Physical Area	(ha)	2,720			2,540		
Cropping Intensity	(%)	102			115		
NPV per ha	('000 Riel)	1,092			2,979		
Exchange rate (1 USD equiv.)	(Riel)	4,107			4,107		
NPV per ha	(USD)	266			725		
		Mind day float	Durduction (ton)	Area (ha)	Viold (ton/ho) Production (ton)	,
Paddy Production	Area (na)	Y leid (ton/na	Production (ton)	Alca (lla)	i iela (totona)
 Early Wet Season Normal irrigation area 	0		0	0		0	
- Supplemental irrigation area	ů		Ő	0		0	
- Rainfed area using small pump	0		0	0		0	
- Rainfed area	0		0	0		0	
 Wet Season (Transplanting) 							
- Normal irrigation area	0		0	1,740	3.3	5,742	
- Supplemental irrigation area	130	2.0	260	800	3.3	2,640	
- Rainfed area	2,590	1.5	3,885	0		0	
• Wet Season (Direct sowing)	~		0	0		0	
- Normal irrigation area	0		0 0	0 0		0	
- Supplemental irrigation area	0 0		0	0		0	
- Rainfed area • Dry Season	0		v	0		Ť	
 Dry Season Normal irrigation area 	0		0	0		0	
_		2.5		0		0	
 Supplemental irrigation area 	45	2.5	113	0		0	4,125

Present / Without Project			M	Wet Season Transplanting	ansplantin	88		Dry Seat	Dry Season Transplanting	lanting	Early We	Early Wet Season Vegetables	egetables	Dry Se	Dry Season Vegetables	tables
Condition	Init	Supplmer	Supplmental irrigation area	ion area		Rainfed area		Pump	Pump irrigation area	area	- i	Rainfed area			Rainfed area	
Condition		Q'ty	Price	Value	Q'ty	Price	Value	Q'ty		Value	Q'ty	Price	Value	Q'ty	Price	Value
ltem			(Kiel)	('000 Riel)			('000 Kiel)		(Kuel)	('000 Kiel)		(Kiel)	('000 Kiel)		(Ktel)	('000 Kiel
I. Gross Income Main products Bv-moduct (straw)	<i>Riel</i> kg	2,000	1,027	2,157 2,054 103	1,500	1,027	1,618 1,541 77	2,500	1,027	2,696 2,568 128	5,800	365	2,159 2,117 42	5,800	365	2,159 2,117 42
2. Production Cost	Riel			638	and the second second second second		579			933			450			45
~	Riel			242	ć		209	ŝ		259	-	i i i	121			121
Seed	kg	80	1,085	87	08 0	1,085	.87	09	1,085	69	1.6	7,405	2 :	1.6	7,405	
Manure (wet)	101 1	υž	211,CI		о (у	711,61	- r	0 Y	1001	116	- 9	1 2 1 1, 6 1	3 5	- 9	1 2217/01	
DAP	20 - 5	4	177'1	2 (5	30 %	1410	67	25	1410	78	2 2	1410	38	30	1410	- (
Compound (15-15-	9 <u>5</u>	2 O	1.142	30	, o	1.142	0	0	1.142	0	25	1.142	29	25	1.142	
Compound (20-20-	6 J	0	1.428	0	0	1.428	0	0	1.428	0	7.5	1.428	=	7.5	1.428	. –
Apro-chemicals: Dust		0	3.022	0	0	3,022	0	0	3,022	0	4.5	3,022	[4]	4.5	3,022	
2.2 Labor	~~~			266			248			293			205			20
Hired labor	mandav	6	3.022	27	~	3,022	24	10	3,022	30	7	3,022	21	7	3,022	
Family labor	manday	61	3,022	239	74	3,022	224	87	3,022	263	61	3,022	184	61	3,022	15
2.3 Land preparation	Riel			76			76			76			36			
Draft animal/Tractor	ha	-	75,562	16	-	75,562	76	-	75,562	76		36,270	36	-	36,270	
2.4 Pumping	Riel			0			0			231			0			
Pumping	ha	0	231,000	0	0	231,000	0		231,000	231	0	231,000	0	0	231,000	
2.5 Transportation	Riel			54			18			30			20			
Ox-cart	ton	2	12,090	24	1.5	12,090	18	2.5	12,090	30	5.8	12,090	70	5.8	12,090	70
0	Riel			30			28			#			18			
3. Net Return	Riel			1,518			1,040			1,763			1,709			1,71
			M	Wet Season Tranchlanting	-anenlantin				ĥa	Farly Wet Season Cronning	son Cronni	na				
With Project Condition		Norms	Normal irrigation area	area	Pum	Pumn irriestion area	97.P3	I	linland crons	s		Vevetables				
	Unit	0,tv	Price	Value	0,11	Price	Value	0'tv	Price	Value	0,17	Price	Value			
Item		7	(Riet)	('000 Riel)	•	(Riel)	('000 Riel)	,	(Riel)	('000 Riel)	,	(Riel)	('000 Riel)			
I. Gross Income	Riel			3,558			3,558			2,903			3,641			
Main products	kg	3,300	1,027	3,389	3,300	1,027	3,389	1,100	2,514	2,765	9,500	365	3,468			
By-product (straw)	kg			169			169			138			173			
2. Production Cost	Riel			877			1,038			838			680			
2.1 Inputs	Riel				3		348	ł		548			238			
Seed	kg	25	1,380		25	1,380	35	75	4,930	370	1.6	7,405	12			
Manure (wet)	ton	- :	15,112		- :	15,112	15	- 2	15,112	30		15,112	88			
Fertuizer: Urea	ŝ	80	1,221		80 80	1,221	86	S.F.	1,22,1	43 1		1,221	91			
DAP		0	1,410		0	1,410	0	15	1,410	21		1,410	0			
Compound (16-20-(0	1,050		0	1,050	0	80	1,050	84	-	1,050	105			
Compound (15-15-		0	1,142		0	1,142	0	0	1,142	0		1,142	0			
Compound (20-20-		140	1,428		140	1,428	200	0	1,428	0		1,428	Ξ			
Agro-chemicals: Liqu		0	6,045	0	0	6,045	0	0	4,534	0	0	4,534	•			
Dust	ж.	0	3,022		0	3,022	0	0	2,418	0		2,418	=			
2.2 Labor	manday			3+1			341			192			259			
Hired labor	manday	11	3,022	33	=	3,022	33	6.5	3,022	20	8.5	3,022	26			
Family labor	manday	102	3,022	308	102	3,022	308	57	3,022	172	11	3,022	233			
2.3 Land preparation		-		106	-		106	-	LCC 38	ት ነ	-	000000	95 97			
Uran animal/ Iractor		-	10,,601	anī	-	107,001	on r	-	100,04		-	017,00	ê, s			
2.4 Fumping Pumning	ner P	0	154 000	- C	-	154 000	154	0	292,000	- C	0	292.000	. C			
2.5 Transportation	Riel	,		01			0+			13		•.	115			
Ox-cart	ton	3.3	12,090	40	3.3	12,090	40	1.1	12,090	13	9.5	12,090	115			
2.6 Miscellaneous	Riel			t2			6 <i>t</i>			0t		Adh an an Anna 1980 Adh a tha 1980 Anna 1980 A	32			
3 Not Roturn	10:0													.		

Table E2-11 Economic Crop Budget for Wat Chre Rehabilitation Sub-project

	Prese	nt / Without	Condition	Wit	th Project C	ondition	
	Planted	Net Prod	uction Value	Planted	Net Prod	uction Value	Incremental
Crops	Area	Per ha	Total	Area	Per ha	Total	NPV
Stop.	(ha)	(Riel '000)	(Riel 'Million)	(ha)	(Riel '000)	(Riel 'Million)	(Riel 'Million)
Rice	1,090		1,162	1,020		2,671	
Early Wet Season							
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	0	ŏ	ŏ	Ő	0	0	
- Supplemental irrigation area	0	0	ő	Ő	ů	0	
	0	0	0	0	0	0	
- Pumping rainfed area			0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Wet Season Transplanting		0	0	(00)	0.000	1.((2	
- Normal irrigation area	0	0	0	620	2,682	1,663	
 Pump irrigation area 	0	0	0	400	2,520	1,008	
- Supplemental irrigation area	60	1,518	91	0	0	0	
- Rainfed area	1,030	1,040	1,071	0	0	0	
Wet Season Direct Sowing							
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	ő	Ő	0	0	
		0	v	Ū	v	0	
Dry Season		0	0	0	0	0	
- Normal irrigation area	0	0	0	0	0		
- Pump irrigation area	0	1,763	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
 Rainfed area 	0	0	0	0	0	0	
Upland Crops	<u>30</u>		<u>51</u>	<u>150</u>		<u>355</u>	
- Mungbean	0	0	0	0	0	0	
- Upland crops (Early wet seaso	0	0	0	100	2,065	207	
- Upland crops (Dry season)	0	0	0	0	0	0	
- Vegetables (Early wet season)	15	1,709	26	50	2,961	148	
- Vegetables (Dry season)	15	1,709	26	0	0	0	
Total	1,120		1,213	1,170		3,025	1,812
Total	1,120		1,215	1,170			-,
Total Physical Area	(ha)	1,090			1,020		
Cropping Intensity	(%)	103			115		
NPV per ha	('000 Riel)	1,113			2,966		
Exchange rate (1 USD equiv.)	(Riel)	4,107			4,107		
NPV per ha	(USD)	271			722		
Paddy Production	Area (ha)	Yield (ton/ha) Production (ton)	Area (ha)	Yield (ton/ha) Production (ton))
• Early Wet Season		,					
- Normal irrigation area	0		0	0		0	
- Supplemental irrigation area	0		0	0		0	
- Rainfed area using small pump	0		0	0		0	
- Rainfed area	0		0	0		0	
 Wet Season (Transplanting) 							
- Normal irrigation area	0		0	620	3.3	2,046	
- Supplemental irrigation area	60	2.0	120	400	3.3	1,320	
- Rainfed area	1,030	1.5	1,545	0		0	
 Wet Season (Direct sowing) 						_	
- Normal irrigation area	0		0	0		0	
- Supplemental irrigation area	0		0	0		0	
- Rainfed area	0		0	0		0	
Dry Season			<u>^</u>	-		0	
Normal irrigation area	0		0	0		0	

Table E2-12 Economic Irrigation Benefit for Wat Chre Rehabilitation Sub-project

0

0

1,665

0 0

1,090

0

0

1,020

0

0

3,366

1,701

Normal irrigation area
Supplemental irrigation area
Total & Production Increase

Descent / Without & With	F	*	Vet Season	Wet Season Transplanti	ng (Without Project)	t Project)		Dry Seasor	Dry Season (Without Project)	Project)	Ë	Early Wet Season Transplanting (With Project)	tson Transp	olanting (W	ith Project)		Early Wet Season (With Project)	eason (Wit	Project)
Ductor Condition	linit	Supplemental irrigation area	ntal irrigat.		Ŗ	Rainfed area	-		Vegetables		Norma	Normal irrigation area	area	Pump	Pump irrigation area	arca		Upland Crops	
I toject contriou		Q'ty	Price (Riel) (Value ('000 Riel)	Q'ty	Price (Riel) (Value (000 Riel)	Q'ty	Price (Riel) (Value	Q'ty	Price (Riel) (Value ('000 Riel)	Q'ty	Price (Riel)	Value ('000 Riel)	Q'ty	Price (Riel) (Value ('000 Riel)
1. Gross Income	Riel			1,833			1,294		1	2,223			3,081			3,235			2,903
	kg	1,700	1,027	1,746	1,200	1,027	1,232	5,800	365	2,117	3,000	1,027	3,081	3,000	1,027	3,081	1,100	2,514	2,765
				87			62			106			0.20			154			138
2. Production Cost	Dial			670			000			101			3.1.8			348			7 CO 81-3
2.1 inputs	ha ka	80	1 085	242	80	1 085	87	16	7 405	171	25	1.380	35	25	1.380	35	75	4.930	370
Manure (wet)	20 L	90	15 112	50	9 C	15 112	; c	2	15,112	1 2	9 —	15.112	15	- 1	15.112	15	i 7	15.112	30
Fertilizer Urea	ko.	75	1.221	92	09	1.221	73	01	1.221	12	80	1.221	98	80	1.221	98	35	1.221	43
DAP	e a	45	1.410	63	35	1.410	49	20	1.410	28	0	1,410	0	0	1,410	0	15	1,410	21
Compound (16-20-0	, gy	0	1,050	0	0	1,050	0	0	1,050	0	0	1,050	0	0	1,050	0	80	1,050	84
Compound (15-15-	kp.	0	1,142	0	0	1,142	0	25	1,142	29	0	1,142	0	0	1,142	0	0	1,142	0
Compound (20-20-	kg	0	1,428	0	0	1,428	0	7.5	1,428	Ξ	140	1,428	200	140	1,428	200	0	1,428	0
Agro-chemicals: Dust	kg	0	3,022	0	0	3,022	0	4.5	3,022	14	0	3,022	0	0	3,022	0	0	3,022	0
	Riel			260			242	1		205	:	0000	335	:	0000	335		0000	192
	manday	e 1	3,022	27	°° i	3,022	24		3,022	21	II.	3,022	33	II	3,022	33	2. E	3,022	07
	manday	11.	3,022	233	71	3,022	218	10	5,022	184	100	3,022	202	101	270,6	205	10	770,6	7/1
2.3 Land preparation	kiel ho	-	75 567	0/1	-	75 567	0/	-	36 770	36	-	105 787	106	-	105 787	106	-	45 337	44
Diali allillar Hactor	Dia/	-	705,51	2 0	ł	700,01	2 0	-	017,00		-	101,001	001	-	101101	202	-	10000	5 0
2.4 Lumpurg	ianv	c	231 000	5 C	C	231 000		C	231 000	. ⊂	C	292 000	~ C	-	292 000	202	0	292 000	, c
7 7 Transcrontration	Piel		000,107	10	>	000,107	51	>	000,107	202	>	000/4/4	9£	•	000.474	38	>	000	13
And approximity	ton	17	12 090	10	1 2	12 090	; <u>~</u>	8 5	12 090	70	"	12,090	36	"	12,090	36		12.090	5
2.6 Miscellaneous	Riel	-		30	1	200111	27	2		22	3		1+			36			39
3 Not Roturn	Riol			1 204			725			1.769	Management of the second s		2.215			2.062		NAMES OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTIONO	2.066
3. 114 Wents										1 22.42									~
Descent / Without Project	F	Early Wet Season (With Project)	eason (Wit	h Project)		Wet Seaso	n Transpla	Wet Season Transplanting (With Project)	Project)		Dry Season	Dry Season Transplanting (With)	ing (With)		Dry Se:	ason Cropp	Dry Season Cropping (With Project)	roject)	And a second
	T luit	•	Vegetables		Normal	al irrigation area	area	Pump	Pump irrigation area	area	Norma	Normal irrigation area	area		Upland Crops			Vegetables	
CONTINUE		Q'ty		Value	Q'ty		Value	Q'ty	Price	Value	Q'ty		Value	Q'ty	Price	Value	Q'ty	Price	Value
			(Kiel)	('000 Riel)		(Kiel) (('000 Riel)		(Kiel)	('000 Riel)		(Kiel)	('000 Kiel)		(Kiel)	('000 Kiel)		(Kiel)	('000 Kiel)
I. Gross Income Main products	kiel ka	9 500	345	3,041	3 000	1 027	3,235	3 000	1 027	3,235	3 000	1 027	3,081	1 100	2514	2,903	9 500	365	3,041
By-product (straw)	e ä	2024	2	173		110.44	154	222		154	2225	-	154			138		5	173
2. Production Cost	Riel			681			865			1,028			1,024			838			680
~	Riel			239			3-48			348			<i>498</i>			548			238
Seed	kg	1.6	7,405	12	25	1,380	35	25	1,380	35	25.0	7,405	185	75	4,930	370	1.6	7,405	12
Manure (wet)	ton	2.5	15,112	38	-	15,112	15	-	15,112	15	1.0	15,112	15	7	15,112	30	2.5	15,112	38
Fertilizer: Urea	kg.	50	1.221	61	80	1,221	86 0	80	1,221	8	80	1,221	86	35	1,221	43	20	1,221	61
DAP Commented of 30 (89 <u>-</u>	0 001	1,410	0 105		1.410			1.410	> <		1.050		C1 08	1 050	17	001	1,410	105
Compound (16-20-	30 <u>-</u>	100	000,1	0		1 147			000,1			1 147	00	000	1 147	ţ ⊂	001	1 142	
Compound (20-20-	ka V	, c	1 478		140	1 428	200	140	1 428	200	140	1,428	200		1,172	0	7.5	1.428	> =
Agro-chemicals: Dust	e a	4.5	3.022	, 4	0	3.022	0	0	3.022	0	0	3.022	0	0	2.418	0	4.5	2,418	Ξ
2.2 Labor	manday			259		6	335			335			335			192			259
	manday	8.5	3,022	26	11	3,022	33	11	3,022	33	Ξ	3,022	33	6.5	3,022	20	8.5	3,022	26
Family labor	manday	77	3,022	233	100	3,022	302	100	3,022	302	100	3,022	302	57	3,022	172	<i>LT</i>	3,022	233
2.3 Land preparation	Riel			36			106			106			106			45			36
Draft animal/Tractor	ha	-	36,270	36	-	105,787	106	-	105,787	106	-	105,787	106		45,337	45 °	-	36,270	36
2.4 Pumping	Riel		000 000	0	4	000 121	0	-	000 121	+c1	c	000 000	0 4	¢		0	<		0
Pumping	Dial Dial	•	000,242	115	0	104,000	° γ	-	104,000	36	0	272,000	° %	0	742,000	13	>	000,262	2//
Ox-cart	ton	9.5	12,090	115	ę	12,090	36	ŝ	12,090	36	б	12,090	36	1.1	12,090	13	9.5	12,090	115
2.6 Miscellaneous	Riel			32			0+			61			6†			0†			32
3. Net Return	Riel			2,960			2,370			2,207			2,211			2,065			2,961

Table E2-13 Economic Crop Budget for Lum Hach Rehabilitation Sub-project

Table E2-14 Economic Irrigation Benefit for Lum Hach Rehabilitation Sub-project

	Prese	nt / Without	Condition	Wit	th Project C	ondition	
	Planted	Net Prod	uction Value	Planted	Net Prod	uction Value	Incremental
Crops	Area	Per ha	Total	Area	Per ha	Total	NPV
Crops	(ha)	(Riel '000)	(Riel 'Million)	(ha)	(Riel '000)	(Riel 'Million)	(Riel 'Million
Diag	3,320	()	2,501	4,400	<u>_</u>	10,133	
Rice Early Wet Season	<u>3,340</u>		2,501	<u>4,400</u>		10,155	
•	0	0	0	1,030	2,215	2,281	
- Normal irrigation area	0	0	0	1,030	2,213	351	
- Pump irrigation area		_	0	0	2,002	0	
- Supplemental irrigation area	0	0	-		0	0	
- Pumping rainfed area	0	0	0			0	
- Rainfed area	0	0	0	0	0	0	
Wet Season Transplanting	0	0	0	2 (00	2 270	(275	
- Normal irrigation area	0	0	0	2,690	2,370	6,375	
- Pump irrigation area	0	0	0	410	2,207	905	
- Supplemental irrigation area	200	1,204	241	0	0	0	
- Rainfed area	3,120	725	2,260	0	0	0	
Wet Season Direct Sowing					~	-	
- Normal irrigation area	0	0	0	0	0	0	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Dry Season							
- Normal irrigation area	. 0	0	0	100	2,211	221	
- Pump irrigation area	0	0	0	0	0	0	
- Supplemental irrigation area	0	0	0	0	0	0	
- Rainfed area	0	0	0	0	0	0	
Upland Crops	40		<u>71</u>	<u>620</u>		1,442	
- Mungbean	0	0	0	0	0	0	
- Upland crops (Early wet seaso	Ő	0	0	150	2,066	310	
- Upland crops (Dry season)	Ő	0	Ő	290	2,065	599	
 Vegetables (Early wet season) 	0	0	0	60	2,960	178	
- Vegetables (Dry season)	40	1,769	71	120	2,960	355	
		1,707			2,701	11,574	9,002
Total	3,360		2,572	5,020		11,374	9,002
Total Physical Area	(ha)	3,320			3,100		
Cropping Intensity	(%)	101			162		
NPV per ha	('000 Riel)	775			3,734		
Exchange rate (1 USD equiv.)	(Riel)	4,107			4,107		
NPV per ha	(USD)	189			909		
Paddy Production	Area (ha)	Yield (ton/ha)	Production (ton)	Area (ha)	Yield (ton/ha)	Production (ton)	l .
Early Wet Season Normal irrigation area	0		0	1,030	3.0	3,090	
 Normal irrigation area Supplemental irrigation area 	0		0	1,030	3.0	510	
- Supplemental imgation area - Rainfed area using small pump	0		0	0	2.0	0	
- Rainfed area	0 0		0	0		0	
• Wet Season (Transplanting)							
- Normal irrigation area	0		0	2,690	3.0	8,070	
- Supplemental irrigation area	200	1.7	340	410	3.0	1,230	
- Rainfed area	3,120	1.2	3,744			0	
 Wet Season (Direct sowing) 						-	
- Normal irrigation area	0		0	0		0	
- Supplemental irrigation area	0		0	0		0	
- Rainfed area	0		0	0		0	
Dry Season	0		0	100	3.0	300	
 Normal irrigation area Supplemental irrigation area 	0		0	100	3.0	300 0	
			v			v	

Rean Kon Por Canal Damnak Ampil	Por Canal				Damnak Ampil	Dannak Ampil	nnak Ampil			17	Wat Loung			Wat Chre			Lum Hach		F	The Project	(Unit: Riels; Million) he Project
Increment W/O W/P Increment W/O	Increment W/O W/P Increment W/O	W/O W/P Increment W/O	W/P Increment W/O	Increment W/O	W/O	//M 0//M	//M		ncrement		W/P Ir	Icrement			Increment	M/0	. –	ncrement	W/0		Increment
0 2,070 0 2,638 2,638 0	0 2,638 2,638 0 2,871	2,638 2,638 0 2,871	2,638 0 2,871	0 2,871	2,871		2,8	71	0	2,969	2,969	0	1,213	1,213	0	2,572		0	14,333	14,333	0
243 0 2,871	0 2,638 2,638 0 2,871 137 2,638 2,881 243 2,871	2,638 2,638 0 2,871 2,638 2,881 243 2,871	2,638 0 2,871 2,881 243 2,871	0 2,871 243 2,871	2,871		61 m	178	302	2,969 2 969	2,969 2,969		1,213	1,213		2,572 2,572	2,572 2,572	0 0	14,333 14,333	14,333 15.015	682
2,949 879 2,638 3,961 1,323 2,871	879 2,638 3,961 1,323 2,871	2,638 3,961 1,323 2,871	3,961 1,323 2,871	1,323 2,871	2,871		4	1,128	1,257	2,969	3,833	864	1,213	1,213	0	2,572	4,540	1,968	14,333	20,623	6,290
2,070 3,813 1,743 2,638 4,850 2,213 2,871 -	1,743 2,638 4,850 2,213 7 337 7 538 5 888 7 050	2,638 4,850 2,213 7,638 5,588 7,050	4,850 2,213 5 588 7 950	2,213		2,871	•	4,824 5 520	1,953	2,969 7 060	4,877 5,675	1,908 7 706	1,213	1,574	361 784	2,572	7,247 8 521	4,675	14,333 14 333	27,186 31 702	12,852
4,975 2,905 2,638 6,298 3,660	2,905 2,638 6,298 3,660	2,638 6,298 3,660	6,298 3,660	3,660		2,871 6	υψ	,200	3,329	2,969	6,431	3,462	1,213	2,299	1,086	2,572	9,711	7,138	14,333	35,914	21,580
5,491 3,421 2,638 6,901 4,263	3,421 2,638 6,901 4,263	2,638 6,901 4,263	6,901 4,263	4,263		2,871	-	6,710	3,838	2,969	7,188	4,219	1,213	2,602	1,389	2,572	10,868	8,296	14,333	39,759	25,426
3,650 2,638 7,079 4,441	3,650 2,638 7,079 4,441	2,638 7,079 4,441	7,079 4,441	4,441		2,871		6,778 6 700	3,906	2,969	7,528	4,559	1,213	2,904	1,691	2,572	11,505	8,932 ⁻	14,333	41,514	27,180
5,732 3,662 2,538 7,100 4,462 5,737 3,662 2,638 7,100 4,462	3,662 2,538 1,100 4,462 3,662 2,538 7,100 4,462	2,538 7,100 4,462 2,638 7,100 4,467	7 100 4,462	4,462		2,871		6,798 6,798	3 977	2,969 2,969	7 566	4 597	512,1	3.025	1,812	21 6,2	11 574	9 002	14,333	41,755	27,462
3,662 2,638 7,100 4,462	3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,132 5,002 2,038 1,100 4,402 5,733 3,667 2,638 7,100 4,467	3,662 2,638 7,100 4,462 3,662 2,638 7,100 4,462	2,638 7,100 4,462 2,638 7,100 4,462	7 100 4,462	4,462		2,8/1		6,798 6,798	126,5	2,969	7 566	4 597	1,213	3.025	1,812	216,2	11.574	200.6	14.333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798 / 708	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,132 5,002 2,038 1,100 4,402 5,722 3,262 2,038 7,100 4,402	5,132 5,002 2,038 1,100 4,402 5,722 3,262 2,038 7,100 4,402	2,038 7,100 4,452 2,238 7,100 4,452	7,100 4,462	4,462		1/8/7		6,198 6 700	176,5	2,909	00C'I	190,4	C12,1	2,075	1 817	7/ 5/7	4/ C,11	0,002	14,232	267,14 705	204,12
5,732 $3,662$ $2,638$ $7,100$ $4,462$	5,732 $3,662$ $2,638$ $7,100$ $4,462$	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	(12,1	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871	-	6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5.732 3.662 2.638 7.100 4.462	5.732 3.662 2.638 7.100 4.462	2,038 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11.574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
2,638 7,100	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798 6,708	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5.732 3.662 2.638 7.100 4.462	5.732 3.662 2.638 7.100 4.462	2,638 7,100 4,462	7,100 4,462	4,402		2,871		0,798 6,798	3,927	2,969	7,566	4.597	1,213	3,025	1,812	2,572	11.574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798 6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,132 5,002 2,036 1,100 4,402 5,737 3,652 7,638 7,100 4,462	5,132 5,002 2,036 1,100 4,402 5,737 3,652 7,638 7,100 4,462	2,056 1,100 4,402 7,638 7,100 A,462	7 100 4,402	4,402		2,671		0,708 6 708	176,6	2,909 2 060	00C'I	160,4	C12,1 1 2 1 2	020°C	1 812	21 0,2	4/C,11 11 574	200,6	14 333	41,795	204,12
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
5,732 3,662 2,638 7,100 4,462	5,732 3,662 2,638 7,100 4,462	2,638 7,100 4,462	7,100 4,462	4,462		2,871		6,798 708	3,927	2,969	7,566	4,597	1,213	3,025	1,812	2,572	11,574	9,002	14,333	41,795	27,462
2,122 2,002 2,000 1,100 4,402 5 727 2,500 7,100 4,402	2,122 2,002 2,000 1,100 4,402 5 727 2,500 7,100 4,402	2,030 1,100 4,402 2,630 7,100 4,462	7 100 4,402	4,402		1/0/7		0,170 6 702	172,0	2,205	2566	1 507	1 213	170'r	1,012	410,4	11 574	200,5	14 333	41 705	204,12
200,5 2,030 1,100 4,402		2,030 /,100 4,402	7,100 4,402	4,402		1/0/7		0,190	176,0	404'7	00C'I	1 507	C12,1	1015 1015	710'1	710,2	#/C'TI	700'6	14 225	41 705	204,12
2,132 3,002 2,036 1,100 4,402	2,132 3,002 2,036 1,100 4,402	2,030 /,100 4,402	/,100 4,402	4,402		2,0/1		0,190	3,741	40,40	000.1	4,071	1,412	C20,C	1,012	710'7	+/C'11	2005	14,000	41,130	704,12

Table E2-15 Economic Benefit Stream of Proposed Project

			;		Fina	Financial Cost									Ecol	Economic Cost							
	Ĕ	Total		F/C					L/C				F/C					L/C					
Description	USD	Equivalent	Material E	Material Equipment Labor	,abor	Total	Material Equipment Labor	uipment		Labor	Total	Material E.	Material Equipment Labor		Total	Material Equipment	upmeni	Labor	Labor '	Total	Construction Conversion Factor	Conversion	Factor
		Riel						Ú	Common 5	Skilled							Ú	Common 5	Skilled		Total Cost	ţ	Factors
												/A	/B								Financial E	Economic	
	000,	Million							Ú	Conversion Factor	Factor	0.81	0.73	1.00		0.94	0.85	0:30	0.61				
 Preparatory Works 		725	190	274	0	464	66	39	52	130	261	154	200	0	354	37	33	16	80	166	725	519	0.72
2 Direct Cost		36,961	669'6	13,956	0	23,655	1,996	1,996	2,661	6,653	13,306	7,856	10,188	0	18,044	1,876	1,697	804	4,058	8,435	36,961	26,479	0.72
 Head works & related structures 	3,123	12,826	3,366	4,843	¢	8,209	693	693	923	2,309	4,617	2,726	3,536	0	6,262	651	589	279	1,408	2,927	12,826	9,189	0.72
2 Main & secondary system	4,838	19,870	5,214	7,503	0	12,717	1,073	1,073	1,431	3,577	7,153	4,223	5,477	0	9,700	1,009	912	432	2,182	4,535	19,870	14,235	0.72
3 On-farm development	862	3,540	929	1,337	0	2,266	191	161	255	637	1,274	753	976	0	1,728	180	163	ĹĹ	389	808	3,540	2,536	0.72
4 Miscellaneous works		725	190	274	0	464	39	39	52	130	261	154	200	0	354	37	33	16	80	166	725	519	0.72
3. Contractor's Expenses		5,798	1,521	2,189	0	3,711	313	313	417	1,044	2,087	354	413	0	767	98	80	14	138	329	5,798	1,096	0.19
Total			21,109	30,376	0	51,484	4,344	4,344	5,792	14,480	28,960	16,219	20,990	0	37,209	3,887	3,507	1,638	8,334	17,365	43,483	28,095	0.65
4. Physical Contingencies			2,111	3,038	0	5,148	434	434	579	1,448	2,896	1,622	2,099	0	3,721	389	351	164	833	1,737	8,044	5,457	0.68
GRAND TOTAL			23,219	33,413	0	56,633	4,778	4,778	6,371	15,928	31,856	17,841	23,089	0	40,930	4,276	3,857	1,802	9,167	19,102	51,528	33,552	0.65

Equipment and Materials

Total

Material ?quipment Labor Common

Major repairing cost

0.37

0.63

Labor Skilled 0.00 0.50 0.19

0.00 0.00 0.20 0.07

0.58 0.37 0.15 0.06

0.42 0.26 0.15 0.06

F/C

Share Share L/C 2,370.4 577.2

 Conversion Factor
 0.725
 Economic Cost (MR)

 Financial Cost (000\$)
 796
 Economic Cost (T\$)

Total

Labor Skilled 0.50

Material 3quipment Labor

Annual O&M cost

	Financial	Conversion Economic	Economic	
		Factor	%	
	%			
Overhead cost and miscellaneous	16.70	0.10	1.67	
Company Tax /1	2.00	1.00	2.00	
Minimum Tax /2	1.00	1.00	1.00	
Profit	10.00	0.10	1.00	
	29.70		5.67	
		Factor for Materials	0.94	
		Factor for Equipment	0.85	
/1 ; 20% of the Profit				
/2;1% of Tumover				
/A ; Excluding the following transfer payment		/B; Exclu	/B; Excluding the following transfer payment	ing transfer pay
Import tariff	7.0 %		Import tariff	15.0 %
Company tax	1.4 %	o	Company tax	1.4 %
Minimum tax	1.0 %	W	Minimum tax	1.0 %
VAT	10.0 %		VAT	10.0 %

41.5

 Conversion
 0.634 Director
 Economic Cost (MR)

 Financial Cost ('000\$)
 16
 Economic Cost (T\$)

1.00

0.20 0.20 Common

0.15 0.15

Share 0.15 0.15

I/C

																					U	(Unit : Riels; Million)	Million)
					Financ	Financial Cost									Ecor	Economic Cost							
I	Total			F/C					L/C				F/C					L/C					-
Description	USD Equi	valent M	faterial Equi	Equivalent Material Equipmen Labor		Total	Material Equipmen		Labor L	Labor 7	Total	Material Equipmen Labor	uipmen I	Labor	Total	Material Equipmen	uipmen	Labor	Labor	Total	Construction Conversion Factor	Conversion	Factor
	R	Riel						Ŭ	Common S	Skilled							Ū	Common	Skilled		Total Cost	ost	Factors
												/A	/B								Financial I	Economic	
		Million							ŭ	Conversion Factor	actor	0.81	0.73	1.00		0.94	0.85	0.30	0.61				
1. Preparatory Works		354	74	138	0	213	21	21	28	11	142	60	101	0	161	20	18	6	43	6	354	251	0.71
2 Direct Cost	15	18,068	3,794 7	7,046	0 1(10,841	1,084	1,084	1,445	3,614	7,227	3,073	5,144	0	8,217	1,019	922	437	2,204	4,582	18,068	12,799	0.71
1 Head works & related structures	48	197	41	77	0	118	12	12	16	39	79	34	56	0	6	11	10	s	24	50	197	140	0.71
2 Main & secondary system	3,382 13	13,890	2,917 5	5,417	3 0	8,334	833	833	1,111	2,778	5,556	2,363	3,954	0	6,317	783	708	336	1,695	3,522	13,890	9,839	0.71
3 On-farm development	883 3	3,626	762 1	1,414	0	2,176	218	218	290	725	1,451	617	1,033	0	1,649	205	185	88	442	920	3,626	2,569	0.71
4 Miscellaneous works		354	74	138	0	213	21	21	28	11	142	60	101	0	161	20	18	6	43	06	354	251	0.71
3. Contractor's Expenses	. 1	2,834	595 1	1,105	0	1,700	170	170	227	567	1,134	138	209	0	347	53	44	٢	75	179	2,834	526	0.19
Total			8,258 15	15,336	0 23	23,594	2,359	2,359	3,146	7,865	15,730	6,346	10,597	0	16,943	2,111	1,905	890	4,527	9,432	21,256	13,576	0.64
4. Physical Contingencies			826 1	1,534	0	2,359	236	236	315	787	1,573	635	1,060	0	1,694	211	161	68	453	943	3,932	2,638	0.67
GRAND TOTAL			9,084 16	16,870	0	25,954	2,595	2,595	3,461	8,651	17,303	6,980	11,657	0	18,637	2,322	2,095	619	4,979	10,376	25,189	16,214	0.64

ET - 20

Equipment and Materials				
	Financial	Conversion Economic	Economic	
		Factor	%	
	%			
Overhead cost and miscellaneous	16.70	0.10	1.67	
Company Tax /1	2.00	1.00	2.00	
Minimum Tax /2	1.00	1.00	1.00	
Profit	10.00	0.10	1.00	
	29.70		5.67	
		Factor for Materials	0.94	
		Factor for Equipment	0.85	
/1 ; 20% of the Profit				
/2;1% of Turnover				
/A ; Excluding the following transfer payment		/B; Exclu	ding the follow	/B; Excluding the following transfer payment
Import tariff	7.0 %	[Import tarifi	15.0 %
Company tax	1.4 %	Ŭ	Company tax	1.4 %
Minimum tax	1.0 %	W	Minimum tax	1.0 %

		Material iquipment	quipment	Labor	Labor	Total
			-	Common	Skilled	
Sh	Share	0.35	0.65	0.00	00.0	
F/C		0.21	0.38	0.00	0.00	0.59
Sh	Share	0.15	0.15	0.20	0.50	
L/C		0.06	0.06	0.08	0.21	0.41
Conversion Factor	- Hone	actor	0 707	0 707 Economic Cost (MR)	ost (MR)	
inancial	Cos	Financial Cost ('000\$)	343	343 Economic Cost (TS)	Cost (TS)	242.5

Annual O&M cost	l cost				
	Material iquipment	quipment	Labor	Labor	Total
			Common	Skilled	
Share	0.15	0.15	0.20	0.50	
L/C	0.15	0.15	0.20	0.50	1.00
Conversion Factor	actor	0.634	0.634 Economic Cost (MR)	Cost (MR)	17.9
Financial Cost ('000\$)	st ('000\$)	7	7 Economic Cost (T\$)	Cost (TS)	4.3

10.0 %

VAT

10.0 %

VAT

Total Total Fr Total T	Image:						Financial Cost	ost								Ec	Economic Cost							
	increase		To	tal		F/C				L/C				F/C					L/C					
	$ \begin{array}{ $	Description		Equivalent	Material Equ	upmen Labor		Materi	al Equipme	ni Labor	Labor	Total	Material 1	Equipment	Labor	Total	Material Eq	uipment	Labor	Labor	Total	Construction	Conversion	Factor
Vol Milian Conversion Flactor 0.8 0.7 0.8 0.7 0.9 0.8 0.9 0.9 0.8 0.9	Vol Million Conversion Fractor A B A B A B A B A B A B A B A B A B A B A B A B A B </th <th></th> <th></th> <th>Riel</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Commor</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>0</th> <th>ommon</th> <th>Skilled</th> <th></th> <th>Total Cc</th> <th>ost</th> <th>Factors</th>			Riel						Commor								0	ommon	Skilled		Total Cc	ost	Factors
Works 436 173 115 0 288 27 14 148 140 81 0 224 15 94 436 313 whok k related structures 2,790 11,439 8,873 0 14,681 1,134 1,513 3,753 2,264 1,134 1,134 1,513 3,753 2,204 4,753 2,307 4,753 2,2244 1,439 8,353 whok k related structures 2,790 1,1439 4,373 3,675 2,208 1,1432 0 1,1439 4,773 4,793 2,2244 1,439 8,353 scondary system 1,493 6,132 2,248 1,014 0 2,143 1,1439 8,353 4,477 1,432 1,433 8,373 4,477 1,433 8,375 4,477 1,433 8,313 0 2,146 2,136 4,477 2,997 4,477 3,436 3,475 development 1,027 4,218 1,03 3,143 2,21	Works 436 173 115 0 288 27 378 736 713 438 539 457 530 477 436 318 vick s talked structures 2,790 11,499 4,38 3025 0 14,681 1,134 1,132 2,136 4,17 2,967 1,136 2,4 2,4 2,4 2,4 2,4 2,4 3,3 3,3 secondray sprem 1,027 4,137 8,187 2,146 1,33		000,	Million							Conversio	on Factor	/A 0.81	/B 0.73	1.00		0.94	0.85	0:30	0.61			conomic	
1 22:244 8,800 5,873 0 1,435 4,367 7,35 4,387 0 1,422 1,060 664 457 2,307 4,795 2,2344 16,11 ofs k related structures 2,790 1,459 4,538 3,025 0 7,663 3,675 2,086 3,675 2,086 3,675 2,086 3,675 2,086 3,675 2,096 4,67 2,367 4,795 2,196 66 497 2,66 4,77 2,69 3,675 2,086 3,675 2,086 3,675 2,086 3,675 2,086 3,675 2,08 3,19 4,17 1,042 1,885 1,470 1,148 2,17 1,149 2,12 3,13 4,17 1,042 1,885 1,470 1,813 2,17 1,149 2,12 1,14 1,148 1,473 8,19 0 2,16 2,12 4,178 3,035 neous works 1,232 1,332 1,473 8,43 0 2,16	32244 880 5873 0 1468 1134 1134 1513 3732 7503 7135 4281 0 1472 1066 964 457 2307 4795 23244 1617 olds krededertructure 1,493 4,538 3025 0 7,463 384 386 3,655 2,208 0 3,19 246 6,19 6,132 4,470 11,490 8,355 secondary system 1,027 4,18 1,03 3,13 4,17 1,042 2,065 1,18 2,46 6,13 4,47 1,139 8,355 secondary system 1,027 4,18 1,06 6,13 246 215 217 1,18 1,13 2,13 2,149 1,353 4,470 1,439 8,335 development 1,027 4,318 1,32 2,16 1,32 2,46 2,96 1,43 2,66 2,66 1,47 2,66 1,47 2,66 1,47 2,66 2,4	Preparatory Works		436	173								140	84	0	224	21	19	6	45	94	436	318	0.73
2/790 11,439 4,538 302 0 7,633 584 749 1,886 3,675 2,208 0 5,884 549 497 256 1,188 2,470 1,1490 8,333 system 1,403 6,132 2,438 150 1,471 1,042 2,085 1,967 1,182 0 3,149 2470 1,149 8,333 system 1,037 4,118 10 2,166 132 2,149 2,470 1,149 8,333 system 1,037 4,118 10 2,434 1,383 813 0 2,146 2,47 10,42 2,470 11,439 8,333 system 1,037 4,13 1,042 2,085 1,367 1,383 817 1,470 8,333 817 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 1,470 <td>of the structures 2.790 1,459 4.53 3.02 0 7.503 584 586 5.66 5.86 5.6 1.88 2.470 11,49 8.333 system 1,403 6,122 2.428 1,619 0 4,047 313 313 417 1,042 2.085 1,967 1,182 0 3,16 266 1,56 6,35 1,323 6,132 4,70 1,493 4,70 are 436 1,13 0 2,469 1,13 1,14 1,01 1,14</td> <td> Direct Cost</td> <td></td> <td>22,244</td> <td>8,809</td> <td>5,873 (</td> <td>) 14,681</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>7,135</td> <td>4,287</td> <td>0</td> <td>11,422</td> <td>1,066</td> <td>964</td> <td>457</td> <td>2,307</td> <td>4,795</td> <td>22,244</td> <td>16,217</td> <td>0.73</td>	of the structures 2.790 1,459 4.53 3.02 0 7.503 584 586 5.66 5.86 5.6 1.88 2.470 11,49 8.333 system 1,403 6,122 2.428 1,619 0 4,047 313 313 417 1,042 2.085 1,967 1,182 0 3,16 266 1,56 6,35 1,323 6,132 4,70 1,493 4,70 are 436 1,13 0 2,469 1,13 1,14 1,01 1,14	Direct Cost		22,244	8,809	5,873 () 14,681						7,135	4,287	0	11,422	1,066	964	457	2,307	4,795	22,244	16,217	0.73
1,433 6,132 2,428 1,619 0 4,047 313 417 1,042 2,085 1,967 1,182 0 3,149 294 266 1,322 6,132 4,770 ant 1,027 4,218 1,670 1,114 0 2,784 215 287 717 1,434 1,333 813 0 2,166 202 6,37 909 4,218 3,075 ant 1,027 4,218 1,114 0 2,784 215 287 717 1,434 1,333 813 0 2,166 202 6,132 6,132 6,132 6,132 6,132 6,132 6,132 6,136 3,075 ant 3,469 1,78 1,91 1,8 231 1,4 0 22,469 2,303 1,4 1<4	ystem 1,405 6,12 2,428 1,610 1,114 0 2,784 2,19 1,92 6,19 1,610 1,114 0 2,784 2,19 1,93 813 0 2,166 202 183 87 4,77 909 4,178 303 and 1,027 4,118 10 2,115 215 215 217 1,134 1,353 813 0 2,166 202 183 87 4,77 909 4,218 3,053 as 3,459 1,382 921 174 1,473 843 1 0 2,166 202 183 4,73 849 4,36 3,363 as 3,459 1,382 921 1,473 8,823 1 1 1 2 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	 Head works & related structures 		11,459	4,538	3,025 (0 7,56						3,675	2,208	0	5,884	549	497	236	1,188	2,470	11,459	8,353	0.73
1027 4,218 1,670 1,114 0 2,784 215 287 717 1,434 1,353 813 0 2166 202 183 87 437 909 4,218 3,075 35 436 113 115 0 288 22 30 74 148 140 84 0 2166 202 183 87 436 436 3,075 3,450 1,382 20 1,38 321 174 0 224 23 3,185 3,185 3,489 436 3,195 3,489 3,195 2,469 3,292 8,230 16,461 14,731 8,832 0 2,356 1,993 497 9,870 26,170 17,217 1,917 1,278 0 3,193 2,469 3,292 8,23 1,646 1,473 883 0 2,356 1,919 474 987 64,173 1,731 8,737 9,870 26,170 1,731<	ant 1,027 4,218 1,670 1,114 0 2,784 215 215 217 1,434 1,353 813 0 2,166 202 183 87 437 909 4,218 3,075 s 346 173 115 0 2,88 22 30 1,46 1,48 1,40 84 0 2,166 20 83 94 436 315 s 3,489 1,382 921 174 10 24 2,409 3,203 15,461 14731 8,832 56 46 7 9,87 63 343 19,17 19,17 1,278 0 3,193 2,469 3,493 3,293 1,4731 8,832 6 2,356 1,4737 9,870 1,7117 19,17 1,917 1,278 0 3,193 8,332 1,646 1,473 8,833 0 2,356 2,309 1,937 9,719 7,410 1,7217	2 Main & secondary system		6,132	2,428	1,619 (9 4,04						1,967	1,182	0	3,149	294	266	126	636	1,322	6,132	4,470	0.73
436 173 115 0 288 22 30 74 148 140 84 0 224 21 19 9 45 94 436 318 3,489 1,382 921 0 2,303 178 178 178 178 178 3,489 1,382 921 1,4731 8,832 0 40 45 3,489 683 19,172 12,781 0 3,1953 2,469 3,292 8,230 16,461 14,731 8,832 0 2,3563 2,309 1,993 9,31 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 2469 3,292 8,233 1,646 1,4731 8,832 0 2,356 1,933 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 247 329 823 1,646 1,473 883 0 2,356 221 199	as 436 173 115 0 288 22 30 74 148 140 84 0 224 21 19 9 45 94 436 318 3,489 1,382 921 0 2,303 1,78 178 178 178 178 178 186 3,195 3,292 8,230 16,461 14,731 8,832 0 2,3563 2,309 1,993 9,817 3,489 17317 1,917 1,278 0 3,1953 2,469 2,469 3,292 8,230 16,461 14,731 8,832 0 2,3563 2,309 1,993 9,870 26,170 17,217 1,917 1,278 0 3,196 1,473 883 0 2,3563 2,209 1,993 9,870 26,170 17,217 17,317 1,917 1,278 0 3,191 2,793 2,193 1,913 8,13 0 2,3560 2,19	3 On-farm development	1,027	4,218	1,670	1,114 (0 2,78.						1,353	813	0	2,166	202	183	87	437	606	4,218	3,075	0.73
3,489 1,382 921 0 2,303 1,18 178 231 1,18 321 174 0 405 56 46 87 3,489 683 19,172 12,781 0 31,953 2,469 3,292 8,230 16,461 14,731 8,832 0 2,3563 2,209 1,993 931 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 2,47 329 823 1,4,731 8,832 0 2,3563 2,209 1,993 931 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 247 329 823 1,473 883 0 2,356 21 199 937 4,741 3,741 3,345 21,089 14,059 0 35,149 2,716 3,613 16,204 9,715 0 2,430 2,141 10,413 34,650 2,430 2,431 1,6141	3,489 1,382 921 0 2,303 178 178 231 131 174 0 405 56 46 87 3,489 683 19,172 12,781 0 31,953 2,469 2,320 8,230 16,461 14,731 8,832 2 2,030 19,97 9,93 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 2,47 3,292 8,230 16,461 1,4,731 8,832 2 2,209 1,993 931 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 247 3,292 8,23 0 2,3563 2,309 1993 4,737 9,870 26,170 17,217 1,917 1,278 0 3,193 1,646 1,473 883 0 2,356 2,41 987 4,841 3,343 21,089 14,059 0 3,514 9,15 1,615	4 Miscellaneous works		436	173								140	84	0	224	21	61	Ø,	45	94	436	318	0.73
19,172 12,781 0 31,953 2,469 2,469 3,292 8,230 16,461 14,731 8,832 0 23,563 2,209 1,993 931 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 247 329 823 1,646 1,473 883 0 2,356 221 199 93 474 987 4,841 3,345 21,089 14,059 0 35,149 2,716 3,621 9,053 18,107 16,204 9,715 0 25,920 2,430 1,024 5,211 10,857 31,011 20,560	19.172 12,781 0 31,953 2,469 2,469 3,292 8,230 16,461 14,731 8,832 0 23,563 2,209 1,993 931 4,737 9,870 26,170 17,217 1,917 1,278 0 3,195 247 329 823 1,646 1,473 883 0 2,356 221 199 93 4,74 987 4,841 3,343 21,089 14,059 0 35,149 2,716 3,621 9,053 18,107 16,204 9,715 0 2,192 1,024 5,211 10,857 31,011 20,560	3. Contractor's Expenses		3,489	1,382								321	174	0	495	56	46	80	78	187	3,489	683	0.20
1,917 1,278 0 3,195 247 247 329 823 1,646 1,473 883 0 2,356 221 199 93 474 987 4,841 3,345 21,089 14,059 0 35,149 2,716 2,716 3,621 9,053 18,107 16,204 9,715 0 2,5920 2,430 2,192 1,024 5,211 10,857 31,011 20,560	1,917 1,278 0 3,195 247 247 329 823 1,473 883 0 2,356 221 199 93 4,74 987 4,841 3,343 21,089 14,059 0 35,149 2,716 3,621 9,053 18,107 16,204 9,715 0 2,920 2,192 1,024 5,211 10,857 31,011 20,560	Total							તં				14,731	8,832	0	23,563	2,209	1,993	931	4,737	9,870	26,170	17,217	0.66
21,089 14,059 0 35,149 2,716 2,716 3,621 9,053 18,107 16,204 9,715 0 2,5920 2,430 2,192 1,024 5,211 10,857 31,011 20,560	21,089 14,059 0 35,149 2,716 2,716 3,621 9,053 18,107 16,204 9,715 0 25,920 2,430 2,192 1,024 5,211 10,857 31,011 20,560	1. Physical Contingencies			1,917								1,473	883	0	2,356	221	199	63	474	786	4,841	3,343	0.69
	Equipment and Materials	GRAND TOTAL											16,204	9,715	0	25,920	2,430	2,192	1,024	5,211	10,857	31,011	20,560	0.66

	Financial	Conversion Economic	Economic							
		Factor	%		Major repairing cost	g cost				
	%					Material 3q	Material Squipment Labor	Labor	Labor	Total
Overhead cost and miscellaneous	16.70	0.10	1.67				С	Common	Skilled	
Company Tax /1	2.00	1.00	2.00		Share	0.69	0.31	0.00	0.00	
Minimum Tax //2	1.00	1.00	1.00		F/C	0.48	0.21	0.00	0.00	0.69
Profit	10.00	0.10	1.00		Share	0.15	0.15	0.20	0.50	
	29.70		5.67		T/C	0.05	0.05	0.06	0.16	0.31
	Fac	Factor for Materials	0.94							
	Fac	Factor for Equipment	0.85		Conversion Factor	ictor	0.747 E	0.747 Economic Cost (MR)	ost (MR)	1,314.0
/1 ; 20% of the Profit					Financial Cost (000\$)	(\$000)	428 E	428 Economic Cost (T\$)	tost (TS)	319.9
/2 ;1% of Tumover										
					Annual O&M cost	cost				
/A; Excluding the following transfer payment		/B; Exclu	ding the follow	/B ; Excluding the following transfer payment		Material 3q	Material Squipment Labor	Labor	Labor	Total
Import taniff	7.0 %		Import tarifí	15.0 %			0	Common	Skilled	
Company tax	1.4 %	0	Company tax	1.4 %	Share	0.15	0.15	0.20	0.50	
Minimum tax	1.0 %	M	Minimum tax	1.0 %	L/C	0.15	0.15	0.20	0.50	1.00
VAT	10.0 %		VAT	10.0 %						
					Conversion Factor	actor	0.634 E	0.634 Economic Cost (MR)	ost (MR)	22.3
					Financial Cost ('000\$)	t ('000\$)	0 H	9 Economic Cost (TS)	Cost (TS)	5.4

			Τ	Table E2-19 Breakdown of	-19	Breakd	lown of	Econ	omic (Cost fi	Economic Cost for Wat Loung Rehabilitation Sub-project	Loung	Rehat	oilitati	on Sul	o-proje	ct				C	(Unit : Riels; Million)	Million)
					Financ	Financial Cost									Econo.	Economic Cost							
	Total	tal		F/C				head	L/C				F/C				L	L/C					
Description	USD	Equivalent	Material Ec	Material Equipment Labor		Total	Material Equipment Labor	pment La		Labor T	Total Mi	Material Equipment Labor	pment La		Total M	Material Equipment Labor	pmeni La		Labor To	Total	Construction Conversion Factor	conversion l	actor
1		Riel						Coi	Common Sk	Skilled							Con	Common Ski	Skilled		Total Cost		Factors
	uvu,	Million							Č	Conversion Factor	otor	/A 0.81	/B 0.73	00 1		10.0	0.85	UE U	0.61	Ľ,	Financial Ec	Economic	
	200	TEORETAT							5	I HOTOTAA	Iona	10-0	2.0	20.1					5				
1. Preparatory Works		507	108	201	0	309	30	30	40	66	198	88	147	0	234	28	25	12	60	125	507	360	0.71
															ŝ		100			000		010 01	E
2 Direct Cost		25,843	716,6	10,247	0	15,764	210,1	1,512	910'7	1 6FU,C	10°0 / A	4,409	/,480	0	646,11	1,421	(77)	600	3,U/4 (065.0	CP8,C2	200,01	0./1
 Head works & related structures 	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	# 0	#DIV/0
2 Main & secondary system	5,025	20,638	4,406	8,183	0 1	12,589	1,207	1,207	1,610	4,024	8,049	3,569	5,974	0	9,543	1,135 1	1,026	487 2	2,455	5,103	20,638	14,645	0.71
3 On-farm development	1,144	4,698	1,003	1,863	0	2,866	275	275	366	916	1,832	813	1,360	0	2,172	258	234	111	559	1,162	4,698	3,334	0.71
4 Miscellaneous works		507	108	201	0	309	30	30	40	66	198	88	147	0	234	28	25	12	60	125	507	360	0.71
3. Contractor's Expenses		4,054	865	1,607	0	2,473	237	237	316	790	1,581	201	304	0	505	74	61	10	104	249	4,054	754	0.19
Total			12,009	22,302	6 0	34,310	3,290	3,290	4,387 1	10,968 2	21,936	9,227 1	15,410	0 5	24,637	2,945 2	2,656 1	1,241 6	6,313 1.	13,154	30,403	19,452	0.64
4. Physical Contingencies			1,201	2,230	0	3,431	329	329	439	1,097	2,194	923	1,541	0	2,464	295	266	124	631	1,315	5,625	3,779	0.67
GRAND TOTAL			13,209	24,532	0	37,741	3,619	3,619	4,826 1	12,065	24,130	10,150 1	16,951	0 2.	27,101	3,239 2	2,922	1,365 (6,944 1.	14,469	36,028	23,232	0.64

	Financial	Conversion Economic	Economic	
		Factor	%	
	%			
Overhead cost and miscellaneous	16.70	0.10	1.67	
Company Tax /1	2.00	1.00	2.00	
Minimum Tax /2	1.00	1.00	1.00	
Profit	10.00	0.10	1.00	
	29.70		5.67	
		Factor for Materials	0.94	
		Factor for Equipment	0.85	
/1 ; 20% of the Profit				
/2 ; 1% of Turnover				
(A ; Excluding the following transfer payment		/B; Exclue	ding the follow	/B , Excluding the following transfer payment
Import tariff	7.0 %	I	Import tariff	15.0 %
Company tax	1.4 %	Ŭ	Company tax	1.4 %
Minimum tax	1.0 %	M	Minimum tax	1.0 %
WAT	10.0 %		VAT	10.0 %

Major repairing cost	rg cost				
	Material 3quipment	uipment	Labor	Labor	Total
			Common	Skilled	
Share	0.35	0.65	0.00	0.00	
F/C	0.21	0.39	0.00	0.00	0.60
Share	0.15	0.15	0.20	0.50	
L/C	0.06	0.06	0.08	0.20	0.40
Conversion Factor	actor	0.708	0.708 Economic Cost (MR)	ost (MR)	1,461.1
Financial Cost ('000\$)	tt ('000\$)	503	Economic Cost (T\$)	Cost (TS)	355.8
Annual O&M cost	l cost				
	Material 3quipment	luipment	Labor	Labor	Total
			Common	Skilled	
Share	0.15	0.15	0.20	0.50	

			1
0.50		Cost (MR)	: Cost (T\$)
0.20		Economic	10 Economic Cost (T\$)
0.15		0.634	10
0.15		actor	t ('000\$)
L/C		Conversion F	Financial Cost ('000\$)
	0.15 0.15	0.15 0.15 0.20	0.15 0.15 0.20 retsion Factor 0.634 Economic Cos

26.2 6.4

1.00

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					Finan	Financial Cost									Э Ш	Economic Cost							
	Total			F/C					L/C				F/C					L/C					
Description	USD Equivalent		aterial Equi	Material Equipmen Labor		Total	Material Equipmen	uipmen:	Labor	Labor	Total	Material Equipmen Labor	luipmen'	Labor	Total	Material Equipmen Labor	duipmen	Labor	Labor	Total	Construction Conversion Factor	n Conversi	on Factor
	Riel	ž.						C	Common S	Skilled								Common	Skilled		Total Cost	Cost	Factors
												/A	æ								Financial	Economic	1
	'000 Million	ion							ŭ	Conversion Factor	Factor	0.81	0.73	1.00		0,94	0.85	0.30	0.61				
 Preparatory Works 		276	71	94	0	166	17	17	22	55	110	58	69	0	127	16	14	-	34	70	276	197	0.71
2 Direct Cost	14,0	14,080	3,633 4	4,815	0	8,448	845	845	1,126	2,816	5,632	2,942	3,515	0	6,457	794	718	341	1,718	3,571	14,080	10,028	0.71
I Head works & related structures	1,478 6,0	6,070		2,076	0	3,642	364	364	486	1,214	2,428	1,269	1,516	0	2,784	342	310	147	741	1,539	6,070	4,323	0.71
2 Main & secondary system	1,400 5,7	5,750	1,483 1	996	0	3,450	345	345	460	1,150	2,300	1,202	1,436	0	2,637	324	293	139	702	1,458	5,750	4,095	0.71
3 On-farm development		1,984	512	678	0	1,190	119	119	159	397	793	415	495	0	016	112	101	48	242	503	1,984	1,413	0.71
4 Miscellaneous works	. 4	276	71	94	0	166	17	11	22	55	110	58	69	0	127	16	14	2	34	70	276	197	0.71
3. Contractor's Expenses	2,	2,209	570	755	0	1,325	133	133	177	442	883	133	143	0	275	42	34	6	58	139	2,209	414	0.19
Total			7,906 10	10,480	0	18,386	1,839	1,839	2,452	6,129	12,258	6,075	7,242	0	13,317	1,646	1,484	693	3,528	7,351	16,564	10,639	0.64
4. Physical Contingencies			161	1,048	0	1,839	184	184	245	613	1,226	608	724	0	1,332	165	148	69	353	735	3,064	2,067	0.67
GRAND TOTAL			8,697 11	11,528	0	20,225	2,023	2,023	2,697	6,742	13,483	6,682	7,966	0	14,648	1,810	1,633	763	3,880	8,086	19,629	12,706	0.65

 Table E2-20
 Breakdown of Economic Cost for Wat Chre Rehabilitation Sub-project

	Financial	Conversion Economic	Economic					
		Factor	%		Major repairing cost	s cost		
	%				¢.	Material iquipment Labor	uipment	Labo
Overhead cost and miscellaneous	16.70	0.10	1.67					Common
Company Tax /1	2.00	1.00	2.00		Share	0.44	0.56	0.00
Minimum Tax /2	1.00	1.00	1.00		F/C	0.26	0.34	0.00
Profit	10.00	0.10	1.00		Share	0.15	0.15	0.20
	29.70		5.67		L/C	0.06	0.06	0.08
		Factor for Materials	0.94					
		Factor for Equipment	0.85		Conversion Factor	1	0.712 Economic	Economi
/1 ; 20% of the Profit					Financial Cost ('000\$)	(\$000.)	288 Economic	conomi
/2 ; 1% of Turnover								
					Annual O&M cost	cost		
/A ; Excluding the following transfer payment		/B; Exclı	Iding the follow	/B; Excluding the following transfer payment	E .et	Material squipment Labor	uipment	Labc
Import tariff	7.0 %		fmport tarifi	15.0 %				Commor
Company tax	1.4 %	C	Company tax	1.4 %	Share	0.15	0.15	0.20
Minimum tax	1.0 %	M	Minimum tax	1.0 %	L/C	0.15	0.15	0.20
VAT	10.0 %		VAT	10.0 %				
					Conversion Factor		0.634 Economic	Econom

mic Cost (MR) 841.6 mic Cost (TS) 204.9
 bor
 Labor

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 Skilled

 00
 0.00

 00
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 20
 0.50

 08
 0.20

Total

0.60 0.40

> Conversion Factor
> 0.634
> Economic Cost (MR)
>
>
> Financial Cost ('000\$)
> 6
> Economic Cost (T\$)
> abor Labor mon Skilled .20 0.50 .20 0.50

15.0 3.6

1.00

Total

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 Table E2-21
 Breakdown of Economic Cost for Lum Hach rehabilitation Sub-project

Total Total Fric LC Fric Fric <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>Financ</th><th>Financial Cost</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Ecc</th><th>Economic Cost</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>							Financ	Financial Cost									Ecc	Economic Cost							
USD Equivalent Labor Table Labor Common Solid			Ţ	otal		F/C					L/C				F/C					L/C					
Nut All B All All B All All B All	Not Not <th>Description</th> <th></th> <th>Equivalent</th> <th>•</th> <th>lupmen L</th> <th></th> <th>' </th> <th>Material Eq.</th> <th>uipmen J</th> <th></th> <th></th> <th>i İ</th> <th>Material Ec</th> <th>Juipmen.</th> <th>Labor</th> <th>Total</th> <th>Material E</th> <th>quipmen.</th> <th></th> <th>Labor Skilled</th> <th>Total</th> <th>Construction Total (</th> <th>1 Conversio</th> <th>n Factor Factors</th>	Description		Equivalent	•	lupmen L		' 	Material Eq.	uipmen J			i İ	Material Ec	Juipmen.	Labor	Total	Material E	quipmen.		Labor Skilled	Total	Construction Total (1 Conversio	n Factor Factors
	I I		000,	Million							C	Inversion	Factor	/A 0.81	/B 0.73	1.00		0.94			0.61		1	Economic	
	1040 293 373 0 666 56 75 187 374 277 272 0 59 53 48 231 114 237 1040 sted atmenues 4391 5001 0 33947 2864 3819 9548 19095 13878 0 25977 2603 2435 114 237 1040 system 6,383 5,011 10,305 1085 1,085 1,085 1,085 1,085 1,085 1,095 2,099 13878 0 2,397 2,093 2435 1,304 23041 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043 3 3,043<																								
	3:3043 14,97 19,011 0 3:3,47 2,864 2,819 9,548 19,095 15,793 0 2,597 2,693 1,154 5,824 1,2106 5;3,043 3 system 6,383 5,617 7,199 0 1,236 1,085 1,446 3,616 7,231 4,582 5,556 0 9,337 1,020 922 437 2,006 4,584 2,006 4,584 2,006 4,584 2,007 4,583 5,701 1,000 22 437 2,035 0 1,203 571 2,878 5,933 2,6,215 7,39 2,6,37 1,000 22 4,31 2,01 1,000 2,933 2,6,215 1,131 1,000 2,105 4,343 2,216 4,383 3,5,215 1 tent 1,040 293 314 2,317 2,177 2,197 2,197 2,106 4,383 5,201 1,040 2,33 2,6,215 1 2,33 2,526 <th< th=""><th>1. Preparatory Works</th><th></th><th>1,040</th><th>293</th><th>373</th><th>0</th><th>666</th><th>56</th><th>56</th><th>75</th><th>187</th><th>374</th><th>237</th><th>272</th><th>0</th><th>509</th><th>53</th><th>48</th><th>23</th><th>114</th><th>237</th><th>1,040</th><th>747</th><th>0.72</th></th<>	1. Preparatory Works		1,040	293	373	0	666	56	56	75	187	374	237	272	0	509	53	48	23	114	237	1,040	747	0.72
	ted structures 4,891 20,087 7,199 0 1,285 5,701 1,020 922 4,37 2,206 4,584 20,087 1 system 6,383 26,215 7,382 9,395 0 1,416 1,846 3,616 7,231 4,582 5,256 0 9,837 1,020 922 437 2,206 4,584 20,087 1 system 6,383 5,010 1,605 2,043 0 6,657 16 1,416 1,887 4,719 9,437 5,980 6,839 10 1,203 571 2,873 2,6215 11 system 1,388 5,701 1,605 2,043 0 666 56 75 187 374 227 0 1,416	2. Direct Cost		53,043		19,011		33,947	2,864	2,864	3,819	9,548	19,095	12,099	13,878	O	25,977	2,693	2,435	1,154	5,824	12,106	53,043	38,082	0.72
system 6.383 26,215 7,382 9,395 0 14,16 1,416 1,026 2,022 1,300 1,491 0 2,792 289 262 1,24 626 risk 8,320 2,343 2,982 6,594 6,734 6,734 8,312 2,0730 1,491 0 2,172 289 262 124 626 risk 8,320 2,343 2,982 6,234 6,214 8,312 20,780 4,1561 27,92 289 263 149 193 s 32,510	system 6,383 26,215 7,382 9,395 0 1,416 1,87 4,719 9,437 5,980 6,859 0 1,2838 1,203 571 2,878 5,983 26,215 1 tent 1,388 5,701 1,665 2,043 0 3,648 308 308 308 410 1,026 2,032 1,300 1,491 0 2,792 289 262 1,301 5,701 tent 1,940 293 3,13 0 5,136 1,491 0 2,792 289 262 1,301 5,701 test 8,320 545 563 6,43 8,312 2,035 449 449 599 5,45 563 1,11 115 19 194 237 1,040 test 3,2510 4,136 0 7,498 2,993 5,613 6,2492 1,616 1,831 2,932 5,613 6,2403 473 8,320 stat 3,2511 4,136 0 7,386 2,331 1,1960 2,4921 1,1,	1 Head works & related structures		20,087	5,657	7,199		12,856	1,085	1,085	1,446	3,616	7,231	4,582	5,256	0	9,837	1,020	922	437	2,206	4,584	20,087	14,422	0.72
tent 1,388 5,701 1,605 2,043 0 3,648 308 308 410 1,026 2,052 1,300 1,491 0 2,792 289 262 124 626 iks 1,040 293 373 0 666 56 56 75 187 374 237 272 0 5,99 53 48 23 114 8,320 2,343 2,982 0 5,395 449 599 1,498 2,995 563 0 1,108 141 115 19 198 8,320 2,343 2,982 0 7,386 6,234 8,312 20,780 41,561 24,980 28,591 10 115 19 198 32,510 41,376 0 7,386 6,234 8,312 20,780 41,561 24,980 28,591 0 1,496 19 19 19 19 19 19 19 32,51	tent 1,388 5,701 1,605 2,043 0 3,648 308 410 1,026 2,022 1,301 6,772 289 262 124 626 1,301 5,701 iks 1,040 293 373 0 666 56 56 75 187 374 272 0 5,99 53 48 23 114 237 1,040 iks 8,320 2,343 2,982 649 449 599 1,498 2495 563 0 1,108 14 237 1,040 iks 3 2,351 41,376 0 7,386 6,234 6,312 2,0780 24,980 28,591 0 1,196 24,921 62,403 4 iks 3 3,2510 41,376 0 7,386 6,234 8,312 20,780 28,591 0 5,370 5,351 11,960 24,921 62,403 4 3 3,320	2 Main & secondary system	6,383		7,382	9,395		16,778	1,416	1,416	1,887	4,719	9,437	5,980	6,859	0	12,838	1,331	1,203	571	2,878	5,983	26,215	18,821	0.72
Income 1,040 293 373 0 666 56 56 78 137 272 0 509 53 48 23 114 8,320 2,343 2,982 0 5,325 449 449 599 1,498 2,995 545 563 0 1,108 141 115 19 198 8,320 2,343 2,982 0 7,386 6,234 6,312 20,780 41,561 24,980 28,591 0 1,108 19 198 3 3,2510 41,376 0 7,386 6,234 8,312 20,780 41,561 24,980 28,591 0 1,196 19,960 s 3,2510 41,38 0 7,389 6,234 8,312 20,780 28,591 0 5,370 5,932 2,351 11,960 s 3,2511 4,318 0 7,389 6,314 2,358 45,717 27,478 31,450	Isolution 1040 293 373 0 666 56 56 187 374 277 0 509 53 48 23 114 237 1040 8,320 2,343 2,982 6,49 449 599 1,498 2,995 545 563 0 1,108 14 115 19 198 473 8,320 8,320 2,343 2,325 449 449 599 1,498 28,591 0 1,108 14 115 19 1960 24,921 62,403 4 3 3,251 41,376 0 7,386 6,234 6,312 20,780 4,1561 2,498 2,859 5,032 2,351 11,960 2,493 6,2403 4 3 3,5761 4,138 0 7,498 2,859 4,517 2,748 31,450 5,357 5,356 13,560 2,492 1,548 1,548 3 3,5,761 4,	3 On-farm development	1,388		1,605	2,043		3,648	308	308	410	1,026	2,052	1,300	1,491	0	2,792	289	262	124	626	1,301	5,701	4,093	0.72
8,320 2,343 2,982 0 5,45 563 0 1,108 141 115 19 198 32,510 41,376 0 73,886 6,234 6,234 6,234 8,312 20,780 41,561 24,980 28,591 0 5,579 5,032 2,351 11,960 s 32,510 41,386 6,234 6,234 6,234 8,312 20,780 41,561 24,980 28,591 0 5,379 5,032 2,351 11,960 s 3,251 4,138 0 7,389 6,23 831 2,078 4,156 2,498 2,859 0 5,357 5,58 11,960 s 35,761 4,514 0 81,274 6,857 9,143 22,858 45,717 27,478 31,450 0 5,357 5,586 13,156 35,761 45,514 0 81,274 6,857 9,143 22,878 45,717 27,478 31,450 0	8,320 2,343 2,982 0 5,355 545 563 0 1,108 141 115 19 198 473 8,320 s 32,510 41,376 0 7,386 6,234 6,234 6,234 8,312 20,780 24,980 28,591 0 5,579 5,032 2,351 11,960 24,921 62,403 4 s 3,251 4,138 0 7,386 6,234 6,23 8,31 2,078 28,591 0 5,579 5,032 2,351 16,960 24,921 62,403 4 s 3,251 4,138 0 7,389 623 623 831 2,078 2,859 0 5,357 5,353 1,1960 24,921 6,2403 4 s 35,761 45,514 0 7,498 2,859 0 5,357 5,356 1,1960 2,493 1,545 1,545 1,545 1,545 2,348 4,5,14 4,547 2,448 4,517 2,448 1,450 0 5,356 1,3,56 2,413 <t< td=""><td>4 Miscellaneous works</td><td></td><td>1,040</td><td>293</td><td>373</td><td>0</td><td>666</td><td>56</td><td>56</td><td>75</td><td>187</td><td>374</td><td>237</td><td>272</td><td>0</td><td>509</td><td>53</td><td>48</td><td>23</td><td>114</td><td>237</td><td>1,040</td><td>747</td><td>0.72</td></t<>	4 Miscellaneous works		1,040	293	373	0	666	56	56	75	187	374	237	272	0	509	53	48	23	114	237	1,040	747	0.72
32,510 41,376 0 73,886 6,234 8,312 20,780 41,561 24,980 28,591 0 5,579 5,032 2,351 11,960 3,251 4,138 0 7,389 623 623 831 2,078 4,156 2,4980 28,591 0 5,357 5,032 2,351 11,960 3,571 4,138 0 7,389 623 623 831 2,078 4,156 2,498 2,859 0 5,357 5,353 1,1960 35,761 43,514 0 81,274 6,857 6,857 9,143 22,858 45,717 27,478 31,450 0 5,535 2,586 13,156	32,510 41,376 0 73,886 6,234 6,234 6,212 20,780 41,561 24,980 28,591 0 5,579 5,032 2,351 11,960 24,921 62,403 4 3,251 4,138 0 7,389 623 623 831 2,078 4,156 2,498 2,859 0 5,357 5,353 1,196 2,492 11,545 35,761 45,514 0 81,274 6,857 9,143 22,858 45,717 27,478 31,450 0 5,535 2,586 13,156 27,413 73,948 1 terials	3. Contractor's Expenses		8,320	2,343	2,982		5,325	449	449	599	1,498	2,995	545	563	0	1,108	141	115	61	861	473	8,320	1,581	0.19
3,251 4,138 0 7,389 623 623 831 2,078 4,156 2,498 2,859 0 5,357 558 503 235 1,196 35,761 45,514 0 81,274 6,857 9,143 22,858 45,717 27,478 31,450 0 58,927 6,136 5,535 2,586 13,156	3,251 4,138 0 7,389 623 623 831 2,078 4,156 2,498 2,859 0 5,357 558 503 235 1,196 2,492 11,545 35,761 45,514 0 81,274 6,857 9,143 22,858 45,717 27,478 31,450 0 58,927 6,136 5,535 2,586 13,156 27,413 73,948 t	Total				41,376		73,886	6,234	6,234			41,561		28,591	0	53,570	5,579	5,032	2,351	11,960	24,921	62,403	40,409	0.65
35,761 45,514 0 81,274 6,857 9,143 22,858 45,717 27,478 31,450 0 58,927 6,136 5,535 2,586 13,156	35,761 45,514 0 81,274 6,857 9,143 22,858 45,717 27,478 31,450 0 58,927 6,136 5,535 2,586 13,156 27,413 73,948	4. Physical Contingencies			3,251	4,138		7,389	623	623	831	2,078	4,156	2,498	2,859	0	5,357	558	503	235	1,196	2,492	11,545	7,849	0.68
	Equipment and Materials	GRAND TOTAL				45,514		81,274	6,857	6,857			45,717		31,450	0	58,927	6,136	5,535	2,586	13,156	27,413	73,948	48,258	0.65

												ransfer payment	15.0 %	1.4 %	1.0 %	10.0 %
Economic	%		1.67	2.00	1.00	1.00	5.67	0.94	0.85			/B; Excluding the following transfer payment	Import tarifi 15	Company tax 1	Minimum tax 1	VAT 10
Conversion Economic	Factor		0.10	1.00	1.00	0.10		Factor for Materials	Factor for Equipment			/B; Exclud	I	Coi	Mir	
Financial		%	16.70	2.00	1.00	10.00	29.70	Fact	Fact				7.0 %	1.4 %	1.0 %	% 0.01
			Overhead cost and miscellaneous	Company Tax /1	Minimum Tax /2	Profit				/1 ; 20% of the Profit	/2 ;1% of Turnover	/A ; Excluding the following transfer payment	Import tariff	Company tax	Minimum tax	VAT

	Material squipment	quipment	Labor	Labor	Total
			Common	Skilled	
Share	0.45	0.55	0.00	0.00	
	0.28	0.35	0.00	0.00	0.63
Share	0.15	0.15	0.20	0.50	
	0.06	0.06	0.07	0.19	0.37
Conversion Factor	actor	0.727	0.727 Economic Cost (MR)	Cost (MR)	3.366.2
ial Cos	Financial Cost ('000\$)	1,127	1,127 Economic Cost (T\$)	Cost (T\$)	819.6

Annual O&M cost	f cost				
	Material iquipment	quipment	Labor	Labor	Total
			Common	Skilled	
Share	0.15	0.15	0.20	0.50	
L/C	0.15	0.15	0.20	0.50	1.00
Conversion Factor	actor	0.634	0.634 Economic Cost (MR)	Oost (MR)	58.7
Financial Cost ('000\$)	st ('000\$)	23	23 Economic Cost (T\$)	Cost (T\$)	14.3

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Million)	Total Initial Cost	4,255 17,117 79,071 60,200 11,514 1,499 284 173,940					
(Unit : Riels; Million)	g Service Economic Cost	4,255 6,240 9,928 5,389 1,702 567 284 284 284					
ע	Consulting Service Annual Economic Progress Cost	0.15 0.22 0.35 0.19 0.06 0.02 0.01					
	Puysical Contingency (10%)	0 989 6,286 4,983 892 85 85 85 13,235					
	Total Investment Cost	0 9,888 62,857 49,827 8,920 847 0					
	Supporting ProgramTotalPuysicalAnnualEconomicInvestmentContingencyProgressCostCost(10%)	73 8 590 590 590 443 2,951					
	Supportin Annual Progress	0.25 0.20 0.20 0.20 0.15					
	Annual Direct Cost	0 9,150 62,267 49,237 8,330 404 0 129,389	27 99 169 181		6,983 3,366	6,983 3,366	6,983 3,366
	Lum Hach nual Direct gress Cost	18,184 20,205 1,616 404	2 8 8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		3,366	3,366	3,366
	Lum Annual Progress	0.45 0.50 0.01	0.45 0.95 0.99 1.00				
,	Wat Chre ual Direct ress Cost	6,383	9 21		842	842	842
	Wat Annual Progress	0.6	0.6				
	Wat Loung unal Direct gress Cost	10,699 7,781 973	14 25		1,461	1,461	1,461
	Wat] Annual Progress	0.55 0.40 0.05	0.55 0.95 1.00				
	Damnak Ampil umual Direct ogress Cost	4,304 11,191 1,205 517 517	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		1,314	1,314	1,314
	Damnal Amual Progress	0.25 0.65 0.07 0.03	0.25 0.90 0.97 1.00				
	Por Canal wal Direct ress Cost	2,036 8,146 2,987 407	3 3 11 18		966	966	966
	Por (Annual Progress	COST 0.15 0.03 0.03	0.15 0.75 0.97 1.00	ST			
	Kom Direct Cost	5TMENT C 2,810 14,048 10,676 562	4 4 1 4 1 4 2 5 4 4 1 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2	IRING CO	2,370	2,370	2,370
	Riam Kom Annual Dire Progress Co	1. INITIAL INVESTMENT COST 2010 2011 2012 2013 0.50 14,048 0.38 10,676 0.2 2015 0.38 10,676 0.2 2015 2016 2017 2018 2017 2018 2019	COST 0.10 0.60 0.98 1.00	1 3. MAJOR REPAIRING COST 			
	ltem & Year	1. INITI 2010 2011 2013 2013 2014 2015 2015 2016 2018 2018 2019	2. O&M COST 2010 2011 2013 0.60 2013 0.60 2014 0.98 2014 0.98 2016 2016 2016 2017 2018 2019	3. MAJ	2025 2026 -	2035 2036 -	2045 2046

Table E2-22 Economic Cost Flow of Proposed Project

Table E2-23 Economic Evaluation of Proposed Project

NormalDirect Construction Cost: As estimatedIrrigation Water Supply: As scheduledTarget Yield: As scheduled

EIRR :	12.8%]	Net Present Val	ue (Riel Million)	Benefit	Cost	B/C Ratio
citiki.	12.070		(8	% discount rate)	229,181	141,526	1.62
		J	(<u>o</u>	⁷⁶ discount rate)	229,101	141,520	1.02
							(Uni	t : Riel Million)
Year	1	Γ	Econom	ic Cost		Economic		Net
in	Year	Initial	Annual	Major				Cash
Order	I Cai	Investment	O&M	Repairing	Total	Irrigation	Total	Flow
1	2010	4,255	00011	Repuiring	4,255		0	-4,255
2	2011	17,117			17,117		0	-17,117
3	2012	79,071	27		79,098	682	682	-78,416
4	2013	60,199	99		60,298	6,290	6,290	-54,008
5	2014	11,514	169		11,683	12,852	12,852	1,169
6	2015	1,499	181		1,680	17,369	17,369	15,689
7	2016	284	182		466	21,580	21,580	21,114
8	2017		182		182	25,426	25,426	25,244
9	2018		182		182	27,180	27,180	26,998
10	2019		182		182	27,450	27,450	27,268
11	2020		182		182	27,462	27,462	27,280
12	2021		182		182	27,462	27,462	27,280
13	2022		182		182	27,462	27,462	27,280
14	2023		182		182	27,462	27,462	27,280
15	2024		182		182	27,462	27,462	27,280
16	2025		182	6,983	7,165	27,462	27,462	20,297
17	2026		182	3,366	3,548	27,462	27,462	23,914
18	2027		182		182	27,462	27,462	27,280
19	2028		182		182	27,462	27,462	27,280
20	2029		182		182	27,462	27,462	27,280
21	2030		182		182	27,462	27,462	27,280
22	2031		182		182	27,462	27,462	27,280
23	2032		182		182	27,462	27,462	27,280
24	2033		182		182	27,462	27,462	27,280
25	2034		182		182	27,462	27,462	27,280
26	2035		182	6,983	7,165	27,462	27,462	20,297
27	2036		182	3,366	3,548	27,462	27,462	23,914
28	2037		182		182	27,462	27,462	27,280
29	2038		182		182	27,462	27,462	27,280
30	2039		182		182	27,462	27,462	27,280
31	2040		182		182	27,462	27,462	27,280
32	2041		182		182	27,462	27,462	27,280 27,280
33	2042		182		182	27,462	27,462 27,462	27,280
34	2043		182		182 182	27,462 27,462	27,462	27,280
35	2044		182	(002			27,462	20,297
36	2045		182	6,983	7,165	27,462	27,462 27,462	20,297
37	2046		182	3,366	3,548 182	27,462 27,462	27,462	23,914
38	2047		182		182	27,462	27,462	27,280
39	2048		182		182	27,462	27,462	27,280
40	2049		182 182		182	27,462	27,402	27,280
41	2050		182		182	27,462	27,462	27,280
42	2051 2052		182		182	27,462	27,402	27,280
43			182		182	27,462	27,462	27,280
44	2053		182		182	27,402	27,462	27,280
45	2054	1	182	6,983	7,165	27,462	27,462	20,297
46 47	2055		182	3,366	3,548	27,462	27,462	23,914
47	2056		182	3,300	182	27,462	27,462	27,280
48	2057 2058		182	i	182	27,462	27,462	27,280
49 50	2058		182		182	27,462	27,462	27,280
	2039		102		102	27,402	27,402	21,200

Table E2-24 Sensitivity Analysis of Proposed Project (1/4)

CASE 1 Direct Construction Cost : 10% up Irrigation Water Supply : As scheduled Target Yield : As scheduled

Year Economic Cost Economic Be in Year Initial Annual Major Total Irrigation Order Investment O&M Repairing 4,255 4,255 4,255 2 2011 18,205 18,205 682 682 3 2012 85,985 30 86,015 682 4 2013 65,680 109 65,789 6,290 5 2014 12,496 186 12,682 12,852	enefit Total 0 0 682 6,290 12,852	1.49 it : Riel Million) Net Cash Flow -4,255 -18,205
Year in Order Initial Investment Annual O&M Major Repairing Total Irrigation 1 2010 4,255 6,290 5 2014 12,496 186 12,682 12,852 <t< td=""><td>(Un enefit Total 0 0 682 6,290 12,852</td><td>Net Cash Flow -4,255 -18,205</td></t<>	(Un enefit Total 0 0 682 6,290 12,852	Net Cash Flow -4,255 -18,205
Intial Annual Major Total Irrigation Order Investment O&M Repairing Total Irrigation 1 2010 4,255 4,255 18,205 18,205 2 2011 18,205 18,205 682 682 3 2012 85,985 30 86,015 682 4 2013 65,680 109 65,789 6,290 5 2014 12,496 186 12,682 12,852	enefit Total 0 0 682 6,290 12,852	Net Cash Flow -4,255 -18,205
Intial Annual Major Total Irrigation Order Investment O&M Repairing Total Irrigation 1 2010 4,255 4,255 18,205 18,205 18,205 3 2012 85,985 30 86,015 682 622 4 2013 65,680 109 65,789 6,290 12,852 5 2014 12,496 186 12,682 12,852 12,852	enefit Total 0 0 682 6,290 12,852	Net Cash Flow -4,255 -18,205
in Year Initial Annual Major Repairing Total Irrigation 0rder Investment 0&M Repairing 4,255 18,205 1 2010 4,255 18,205 18,205 18,205 3 2012 85,985 30 86,015 682 4 2013 65,680 109 65,789 6,290 5 2014 12,496 186 12,682 12,852	0 0 682 6,290 12,852	Flow -4,255 -18,205
Order Investment O&M Repairing Total Infigation 1 2010 4,255 4,255 4,255 18,205 18,205 18,205 18,205 4,255 18,205 18,205 18,205 18,205 18,205 18,205 18,205 18,205 18,205 18,205 18,205 18,205 18,205 12,205 12,205 12,205 12,405	0 0 682 6,290 12,852	-4,255 -18,205
1 2010 4,255 4,255 2 2011 18,205 18,205 3 2012 85,985 30 86,015 682 4 2013 65,680 109 65,789 6,290 5 2014 12,496 186 12,682 12,852	0 682 6,290 12,852	-18,205
3 2012 85,985 30 86,015 682 4 2013 65,680 109 65,789 6,290 5 2014 12,496 186 12,682 12,852	682 6,290 12,852	
3 2012 85,985 30 86,015 682 4 2013 65,680 109 65,789 6,290 5 2014 12,496 186 12,682 12,852	6,290 12,852	
5 2014 12,496 186 12,682 12,852	12,852	-85,333
		-59,499
	1 7 0 1 0	171
6 2015 1,592 199 1,791 17,369	17,369	15,577 21,096
7 2016 284 200 484 21,580 25 426	21,580	25,226
8 2017 200 200 25,426 9 2018 200 200 27,180	25,426 27,180	26,980
	27,180	20,980
	27,462	27,262
	27,462	27,262
	27,462	27,262
13 2022 200 2/462 14 2023 200 200 27,462	27,462	27,262
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	27,462	27,262
16 2025 200 7,681 7,882 27,462	27,462	19,580
17 2026 200 3,703 3,903 27,462	27,462	23,559
18 2027 200 27,462	27,462	27,262
19 2028 200 27,462	27,462	27,262
20 2029 200 200 27,462	27,462	27,262
21 2030 200 27,462	27,462	27,262
22 2031 200 27,462	27,462	27,262
23 2032 200 200 27,462	27,462	27,262
24 2033 200 200 27,462	27,462	27,262
25 2034 200 27,462	27,462	27,262 19,580
26 2035 200 7,681 7,882 27,462	27,462	23,559
27 2036 200 3,703 3,903 27,462 28 2037 200 200 27,462	27,462 27,462	27,262
20 2051	27,462	27,262
	27,462	27,262
50 2007	27,462	27,262
31 2040 200 200 27,462 32 2041 200 200 27,462	27,462	27,262
$\begin{bmatrix} 32 \\ 33 \\ 2042 \end{bmatrix} = \begin{bmatrix} 200 \\ 200 \\ 200 \end{bmatrix} = \begin{bmatrix} 200 \\ 200 \\ 200 \\ 200 \end{bmatrix} = \begin{bmatrix} 27, 462 \\ 200 \\ 27, 462 \end{bmatrix}$	27,462	27,262
$\begin{bmatrix} 35 \\ 34 \\ 2043 \end{bmatrix} = \begin{bmatrix} 206 \\ 200 \end{bmatrix} = \begin{bmatrix} 206 \\ 200 \end{bmatrix} = \begin{bmatrix} 207 \\ 200 \end{bmatrix} = \begin{bmatrix} 27,462 \\ 200 \end{bmatrix}$	27,462	27,262
34 2043 35 2044 200 200 200 27,462	27,462	27,262
36 2045 200 7,681 7,882 27,462	27,462	19,580
37 2046 200 3,703 3,903 27,462	27,462	23,559
38 2047 200 27,462	27,462	27,262
39 2048 200 200 27,462	27,462	27,262
40 2049 200 200 27,462	27,462	27,262
41 2050 200 27,462	27,462	27,262
42 2051 200 27,462	27,462	27,262
43 2052 200 200 27,462	27,462	27,262 27,262
44 2053 200 200 27,462 45 2054 200 200 27,462	27,462 27,462	27,262
	27,462 27,462	19,580
	27,462 27,462	23,559
	27,462	27,262
	27,462	27,262
49 2058 200 200 27,462 50 2059 200 200 27,462	27,462	27,262

Table E2-24 Sensitivity Analysis of Proposed Project (2/4)

CASE 2 Direct Construction Cost : As estimated Irrigation Water Supply : One year delay Target Yield

: As scheduled

EIRR :	11.6%		Net Present Val	ue (Riel Million)	Benefit	Cost	B/C Ratio
			(8	% discount rate)	211,661	141,504	1.50
		1	<u>_</u>	2	/ Caliboo and Tallo			
							(Un	it : Riel Million
Year			Econom	ic Cost		Economi	c Benefit	Net
in	Year	Initial	Annual	Major	Total	Irrigation	Total	Cash
Order		Investment	O&M	Repairing		inigation		Flow
1	2010	4,255			4,255		0	-4,255
2	2011	17,117			17,117		0	-17,117
3	2012	79,071			79,071		0	-79,071
4	2013	60,199	99		60,298	682	682	-59,616
5	2014	11,514	169		11,683	6,290	6,290	-5,393
6	2015	1,499	181		1,680	12,852	12,852	11,172
7	2016	284	182		466	17,369	17,369	16,903
8	2017		182		182	21,580	21,580	21,398
9	2018		182		182	25,426	25,426	25,244
10	2019		182		182	27,180	27,180	26,998
11	2020		182		182	27,450	27,450	27,268
12	2021		182		182	27,462	27,462	27,280
13	2022		182		182	27,462	27,462	27,280
14	2023		182		182	27,462	27,462	27,280
15	2024		182		182	27,462	27,462	27,280
16	2025		182	6,983	7,165	27,462	27,462	20,297
17	2026		182	3,366	3,548	27,462	27,462	23,914
18	2027		182		182	27,462	27,462	27,280
19	2028		182		182	27,462	27,462	27,280
20	2029		182		182	27,462	27,462	27,280
21	2030		182		182	27,462	27,462	27,280
22	2031		182		182	27,462	27,462	27,280
23	2032		182		182	27,462	27,462	27,280
24	2033		182		182	27,462	27,462	27,280
25	2034		182		182	27,462	27,462	27,280
26	2035		182	6,983	7,165	27,462	27,462	20,297
27	2036		182	3,366	3,548	27,462	27,462	23,914
28	2037		182	,	182	27,462	27,462	27,280
29	2038		182		182	27,462	27,462	27,280
30	2039		182		182	27,462	27,462	27,280
31	2040		182		182	27,462	27,462	27,280
32	2041		182		182	27,462	27,462	27,280
33	2042		182		182	27,462	27,462	27,280
34	2043		182		182	27,462	27,462	27,280
35	2044		182		182	27,462	27,462	27,280
36	2045		182	6,983	7,165	27,462	27,462	20,297
37	2046		182	3,366	3,548	27,462	27,462	23,914
38	2047		182	,	182	27,462	27,462	27,280
39	2047		182		182	27,462	27,462	27,280
40	2040		182		182	27,462	27,462	27,280
40	2050		182		182	27,462	27,462	27,280
42	2050		182		182	27,462	27,462	27,280
42	2051		182		182	27,462	27,462	27,280
43	2052		182		182	27,462	27,462	27,280
44 45	2053		182		182	27,462	27,462	27,280
45 46	2034		182	6,983	7,165	27,462	27,462	20,297
	2055 2056		182	3,366	3,548	27,462	27,462	23,914
47	2056		182	5,500	182	27,462	27,462	27,280
48			182		182	27,462	27,462	27,280
49 50	2058 2059		182		182	27,462	27,462	27,280

Table E2-24 Sensitivity Analysis of Proposed Project (3/4)

CASE 3 Direct Construction Cost : As estimated Irrigation Water Supply : As scheduled Target Yield : 10% down

EIRR :	10.3%		Net Present Val	ue (Riel Million)	Benefit	Cost	B/C Ratio
			(<u>8</u>	% discount rate)	182,329	141,504	1.29
L		1					(1)	it : Riel Million)
Year			Econom	ic Cost		Economi	c Benefit	Net
in	Year	Initial	Annual	Major				Cash
Order	i cui	Investment	O&M	Repairing	Total	Irrigation	Total	Flow
1	2010	4,255			4,255		0	-4,255
2	2011	17,117			17,117		0	-17,117
3	2012	79,071			79,071	433	433	-78,638
4	2013	60,199	99		60,298	4,387	4,387	-55,911
5	2014	11,514	169		11,683 1,680	9,701 13,278	9,701 13,278	-1,982 11,598
6	2015	1,499 284	181 182		466	16,941	16,941	16,475
7	2016	284	182		182	20,288	20,288	20,106
8 9	2017 2018		182		182	21,812	21,812	21,630
10	2018		182		182	22,046	22,046	21,864
11	2019		182		182	22,056	22,056	21,874
12	2020		182		182	22,056	22,056	21,874
13	2022		182		182	22,056	22,056	21,874
14	2023		182		182	22,056	22,056	21,874
15	2024		182		182	22,056	22,056	21,874
16	2025		182	6,983	7,165	22,056	22,056	14,891
17	2026		182	3,366	3,548	22,056	22,056	18,508
18	2027		182		182	22,056	22,056	21,874
19	2028		182		182	22,056	22,056	21,874
20	2029		182		182	22,056	22,056	21,874
21	2030		182		182	22,056	22,056	21,874 21,874
22	2031		182		182	22,056 22,056	22,056 22,056	21,874
23	2032		182 182		182 182	22,056	22,056	21,874
24	2033		182		182	22,056	22,050	21,874
25 26	2034		182	6,983	7,165	22,056	22,056	14,891
26 27	2035 2036		182	3,366	3,548	22,050	22,056	18,508
27	2030		182	5,500	182	22,056	22,056	21,874
29	2038		182		182	22,056	22,056	21,874
30	2039		182		182	22,056	22,056	21,874
31	2040		182		182	22,056	22,056	21,874
32	2041		182		182	22,056	22,056	21,874
33	2042		182		182	22,056	22,056	21,874
34	2043		182		182	22,056	22,056	21,874
35	2044		182		182	22,056	22,056	21,874
36	2045		182	6,983	7,165	22,056	22,056	14,891 18,508
37	2046		182	3,366	3,548	22,056 22,056	22,056 22,056	18,508
38	2047		182		182 182	22,056	22,056	21,874
39	2048		182 182		182	22,056	22,056	21,874
40	2049		182		182	22,056	22,056	21,874
41 42	2050 2051		182		182	22,056	22,050	21,874
42 43	2051		182		182	22,056	22,056	21,874
43	2052		182		182	22,056	22,056	21,874
45	2053		182		182	22,056	22,056	21,874
46	2055		182	6,983	7,165	22,056	22,056	14,891
47	2056		182	3,366	3,548	22,056	22,056	18,508
48	2057		182		182	22,056	22,056	21,874
49	2058		182		182	22,056	22,056	21,874
50	2059		182		182	22,056	22,056	21,874

Table E2-24 Sensitivity Analysis of Proposed Project (4/4)

CASE 3 Direct Construction Cost : 10% up Irrigation Water Supply : As scheduled Target Yield : 10% down

EIRR :	9,5%		Net Present Val	ue (Riel Million)	Benefit	Cost	B/C Ratio
	/ •		(% discount rate)	182,329	153,398	1.19
			(<u>0</u>	76 discount rate/	182,323	155,576	1.17
							(Un	it : Riel Million
Year			Econom			Economi	c Benefit	Net
in	Year	Initial	Annual	Major	Total	Irrigation	Total	Cash
Order		Investment	O&M	Repairing		migution		Flow
1	2010	4,255			4,255		0	-4,255 -18,205
2	2011	18,205	20		18,205	433	433	-18,203
3	2012	85,985	30 109		86,015 65,789	433 4,387	433 4,387	-61,402
4 5	2013 2014	65,680 12,496	186		12,682	9,701	9,701	-2,981
6	2014	1,592	199		1,791	13,278	13,278	11,487
7	2015	284	200		484	16,941	16,941	16,457
8	2010	204	200		200	20,288	20,288	20,088
9	2018		200		200	21,812	21,812	21,612
10	2019		200		200	22,046	22,046	21,846
11	2020		200		200	22,056	22,056	21,856
12	2021		200		200	22,056	22,056	21,856
13	2022		200		200	22,056	22,056	21,856
14	2023		200		200	22,056	22,056	21,856
15	2024		200		200	22,056	22,056	21,856
16	2025		200	7,681	7,882	22,056	22,056	14,174
17	2026		200	3,703	3,903	22,056	22,056	18,153
18	2027		200		200	22,056	22,056	21,856
19	2028		200		200	22,056	22,056	21,856
20	2029		200		200	22,056	22,056	21,856 21,856
21	2030		200		200 200	22,056	22,056 22,056	21,856
22	2031		200		200	22,056 22,056	22,056	21,856
23	2032		200 200		200	22,030	22,056	21,856
24 25	2033		200		200	22,056	22,056	21,856
25 26	2034 2035		200	7,681	7,882	22,050	22,050	14,174
20 27	2035		200	3,703	3,903	22,056	22,056	18,153
28	2030		200	5,705	200	22,056	22,056	21,856
20	2038		200		200	22,056	22,056	21,856
30	2039		200		200	22,056	22,056	21,856
31	2040		200		200	22,056	22,056	21,856
32	2041		200		200	22,056	22,056	21,856
33	2042		200		200	22,056	22,056	21,856
34	2043		200		200	22,056	22,056	21,856
35	2044		200		200	22,056	22,056	21,856
36	2045		200	7,681	7,882	22,056	22,056	14,174
37	2046		200	3,703	3,903	22,056	22,056	18,153
38	2047		200		200	22,056	22,056	21,856
39	2048		200		200	22,056	22,056	21,856 21,856
40	2049		200		200	22,056	22,056	21,856
41	2050		200		200	22,056 22,056	22,056 22,056	21,856
42	2051		200 200		200 200	22,056	22,056	21,856
43 44	2052 2053		200		200	22,056	22,056	21,856
44 45	2053		200		200	22,050	22,050	21,856
45 46	2054 2055		200	7,681	7,882	22,056	22,050	14,174
40 47	2055		200	3,703	3,903	22,050	22,050	18,153
47	2050		200	5,705	200	22,056	22,056	21,856
40 49	2058		200		200	22,056	22,056	21,856
50	2059		200		200	22,056	22,056	21,856