

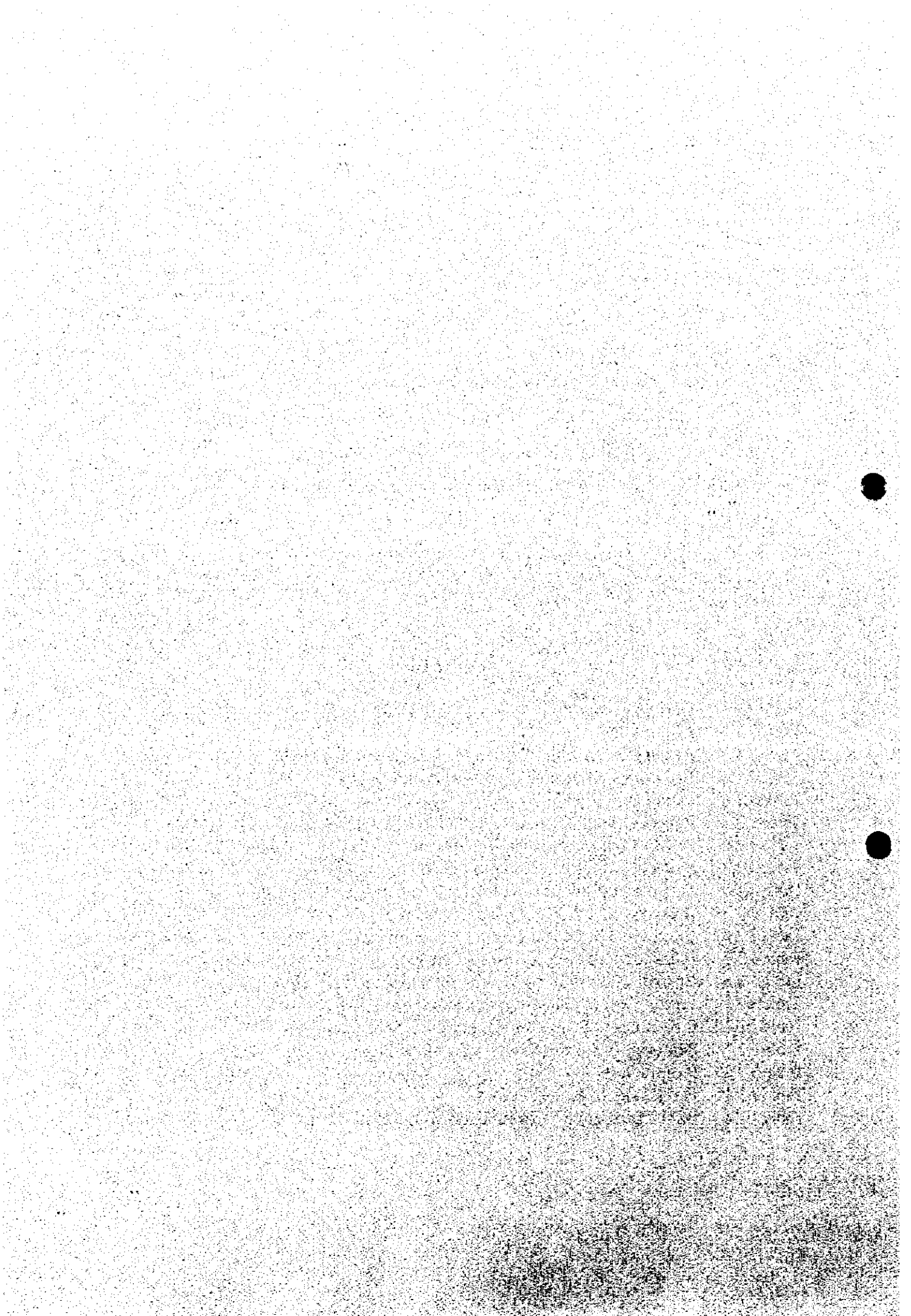
J : COST ESTIMATE

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J : COST ESTIMATE

J.1 Base of Cost Estimate

J.1.1 Condition of Contract for Construction

The construction works is to be carried out by the contractor(s) on contract basis with the Project Executing Agency. The contractor(s) shall be responsible for procurement of machinery, equipment and materials to be used for construction works and the cost of machinery and equipment shall be included in the depreciation cost.

J.1.2 Basis of Cost Estimate

(1) Unit Costs and Prices

The unit prices of wages, materials, equipment and machinery are estimated based on the current price prevailing in Côte d'Ivoire. They are shown in Table J.1.1 to J.1.5.

(2) Demarcation of Foreign Currency Portion and Local Currency Portion

Each component of the construction works is divided into foreign currency portion and local currency portion; the former price is estimated based on CIF at port of Abidjan as of February 1999 and the latter is on the market price at the proposed project site of the country.

(3) Expenses and Benefit

The expenses and benefit of contractor(s) shall be 20 % of direct construction costs.

(4) Consulting Services

The costs of detailed design and construction supervision shall be estimated at 10 % of the sum of construction costs.

(5) Physical Contingency

The physical contingency shall be 10 % of the total investment cost.

(6) Foreign exchange rate

The foreign exchange rates applied for this estimate are US\$1.00 = ¥120.35, and FF. 1.00 = F.CFA 100.00 = ¥19.56 as of April 30, 1999. Therefore, F.CFA 1.00 is equivalent to ¥0.20.

J.2 Costs of Irrigation Development Programs in the Master Plan

J.1.1 Alternatives of Cité Agricole Area Paddy Development Scheme

(1) Alternatives of Water Intake for Cite Agricole Paddy Development

The following alternatives are considered for the methods of intake of irrigation water:

	Alternatives	Canal Length	Intake Level Required	Protection of Right Bank	O&M
Pump Irrigation	Repair of Existing Pumps operated by Electricity			No influence	- High electricity tariff
Gravity Irrigation	Weir at Section 33 (1.5km south of Cpt. Colonel)	8.1km	EL.9.2m	Less upsurge during normal water stage and less influence	- High rise of weir (H=5m) - Movable weir - Many drainage crossing conduits required - Long canal
	San-Pédro Grand Canal From Former Industrial Water Intake on the Dam	18.2km	EL.11.3m (EL.17.5m)	No influence	- Long canal with 3 irrigation areas. - Close coordination with CIE

Considering the influence of the up surge of headworks to the right bank classified forest area and previous failure of the irrigation system, it is possible to say that there are comparable. Three (3) alternative intake plans to be considered;

Alternative 1: Rehabilitation of existing pumps to be operated by electricity,

Alternative 2: Weir construction at south of Cpt. Colonel, and

Alternative 3: Rehabilitation of existing intake of San-Pédro dam and Grand Canal from the San-Pédro dam.

(2) Costs for Alternative 1 : Pump rehabilitation

Based on the prerequisite and methods mentioned in J.1.1, the Project cost is estimated as shown below and Table J.2.1 and J.2.5.

(3) Costs for Alternative 2 : Headworks at Cpt. Colonel

The Project cost is estimated as shown below and Table J.2.2 and J.2.4.

(4) Costs for Alternative 3 : Grand Canal from San-Pédro Dam

The Project cost is estimated as shown below and Table J.2.3 and J.2.5.

(5) Comparison of Alternatives

Three alternatives for Rehabilitation of San-Pédro Paddy Development were compared. The values of financial and economical corresponding alternatives are as follows:

Item	1. Pump Rehabilitation	2. Installation of Water Intake	3. Grand Canal
EIRR	18.1 %	10.1 %	11.3 %
Construction Cost	F.CFA 3,529 mil.	F.CFA 6,704 mil.	F.CFA 6,358 mil
O.M Cost and Replacement Cost	F.CFA 169,000	F.CFA 107,000	F.CFA 98,000

From the above, as the construction cost of Alternative 1 with F.CFA 3,529 mil. (where the rehabilitation cost of the pump: F.CFA 140 mil.) is the lowest, its EIRR of 18.1 % is the highest

among the three (3) alternatives. For Alternative 2, as its construction cost of F.CFA 6,704 mil. is the highest, its EIRR of 10.1 % is found to be low. For Alternative 3, despite its long distance of Grand Canal for water conveyance, the construction is not so complexed, resulting in a rather low construction cost of F.CFA 6,358 mil. and an EIRR of 11.3 %. From the national economic viewpoint for the project implementation, Alternative 1 (pump rehabilitation) is the best opportunity for investment.

After the completion of the project facilities, for the realization of facility management by the farmers themselves, the low charge on operation and maintenance costs on the farmers will be the most important issue for a "sustainable project management". From the above table, with Alternative 1, operation and maintenance costs will be F.CFA 169,000, or about 1.7 times those of Alternative 3 as F.CFA 98,000. For making no pressure on the farmers' living conditions as well as for improving their living standards, Alternative 3 is considered as the best one.

It is impossible to realize a sustainable development and to contribute to the improvement of the farmers' living standards, if its farming plan is considered vulnerable to the change of the external conditions, even though the project shows a good economic return from the national economic viewpoint. The heavy burden of operation and maintenance costs is considered as one of the reasons why the San-Pédro Paddy Irrigation Project was failed although the pumping units were replaced by the external assistance. It is necessary to mitigate such burden of the farmers as much as possible in order to make the project bearable to the changes of external conditions such as fluctuation of rice price due to the change of future economic situations.

Considering the above contexts, the San-Pédro Paddy Project Area has been selected as the priority area for the further feasibility study, and the irrigation water for the area will be taken at the existing intake on the San-Pédro dam providing a new conveyance canal (Grand Canal) of 18.2 km for conveying the irrigation water (Alternative 3).

J.2.2 Total Irrigation and Drainage Development Program

Through the Grand Canal, the irrigable potential area of Fahé, Cpt. Colonel and Cité Agricole will be irrigated with a total irrigation area of 975 ha. The cost for the total irrigation development in the Study Area is estimated as shown in Table J.2.4 and J.2.8.

J.2.3 Prioritization of Irrigation and Drainage Development Schemes

From the evaluation of the priority projects, the lowland paddy development program is selected as the most effective and urgently required to implement. Then herein, the priority project areas of the paddy development for the feasibility study in the Study are considered among the following areas: And their construction costs excluding costs for Grand Canal are estimated as follows (Table J.2.3, J.2.9 and J.2.10):

	Irrigable Area	Beneficiaries	Construction Cost	EIRR
San-Pédro Paddy Project Area	575 ha	384	F.CFA 2,152 million	15.0 %
Fahé Area	300 ha	200	F.CFA 1,543 million	13.2 %
Cpt. Colonel Area	90 ha	60	F.CFA 1,083 million	6.4 %

Through the comparison of these three (3) areas based on the socio-economic circumstances, etc. for project implementation, the highest priority project site for the feasibility study has been selected accordingly.

The San-Pédro Paddy Development Area has a high IRR of 22.4 % and a highest beneficiary population of 383 families. As this area has been equipped with irrigation facilities, the rehabilitation of these facilities will offer high impacts to the project. Besides, as the farmers presently living in this area have experiences on paddy cultivation, the effectiveness from extension of farming techniques, therefore, can be expected. From these viewpoints and based on socio-economic conditions, the area of San-Pédro Paddy Development Project is evaluated as the most suitable site for priority project.

Considering the above contexts, the San-Pédro Paddy Development Project area has been selected as the priority area for the further feasibility study, and the irrigation water for the area will be taken at the existing intake on the San-Pédro dam providing a new conveyance canal (Grand Canal) of 18.2 km for conveying the irrigation water (Alternative 3). It is necessary to study on the possibility to include other programs proposed as the components of the master plan as well as the elements for the necessary irrigation facilities, reinforcement of farmers' organization and possibility of step-wise implementation of the project. Especially, it is necessary to propose the measures required for farmers' organization and agricultural extension to be considered in such step-wise implementation.

J.3 Cost Estimate of San-Pédro Paddy Project

J.3.1 Work Volume of the Project

As the result of development plan and design of irrigation and drainage in the Project Area, the scale of the irrigation and drainage facilities are summarized in Table J.3.1, and work volume of them are shown in Table J.3.4.

J.3.2 Project Cost

Based on the bill of quantity and unit cost mentioned in J.1, the project cost were estimated, and they are shown in Table J.3.2 and J.3.3. Also the annual operation and maintenance costs is estimated based on the facility repair costs and office and operators' expenses and costs for system operation as shown in Table J.3.2.

Table J.1.1 Unit Wages

(unite:F.CFA)

Designation	Description	Unite	Local Currency	Tax	Total	Remarques
Chef de chantier	General Foreman	jour	7.920	220	8.140	
Chef d'equipe	Foreman	jour	5.610	220	5.830	
Ouvrier de coffrage	Carpenter	jour	3.300	220	3.520	
Ferrailleur	Bar Bender	jour	3.300	220	3.520	
Soudeur	Welder	jour	3.740	220	3.960	
Aide-soudeur	Welder Helper	jour	3.080	220	3.300	
Ouvrier de beton	Concrete Worker	jour	3.300	220	3.520	
Plombier	Pulmber	jour	3.300	220	3.520	
Macon	Mayson	jour	3.740	220	3.960	
Ouvrier non qualifie	Common Labor	jour	3.300	220	3.520	
Ouvrier qualifie	Skilled Labor	jour	3.740	220	3.960	
Monteur	Rigger	jour	3.300	220	3.520	
Operateur pour gros engin	Operator Heavy	jour	3.740	220	3.960	
Operateur pour engin normal	Operator Normal	jour	3.630	220	3.850	
Chauffeur pour gros camion	Driver Heavy	jour	3.520	220	3.740	
Chauffeur	Driver Light	jour	3.520	220	3.740	
Electricien	Electrician	jour	3.740	220	3.960	
Mecanicien	Mechanic	jour	3.740	220	3.960	
Manoeuvre	Helper	jour	1.980	220	2.200	

Note: including social insurance etc.

Source: JICA Study Team, San-Pedro, February 1999

Table J.1.2 List of Material Cost

(unit: F.CFA)

Designation	Description	Specification	Unite	Local Currency	Foreign Currency	Tax	Total	Remarques
Ciment	Cement	Portland TYPE-I	kg		44	5	49	
Additif	Aditivo	AE	lit		1,622	178	1,800	
Tuyau de beton	Concrete Pipe	D300mm(12")	m	5,749	8,623	2,874	17,246	
Tuyau de beton	Concrete Pipe	D400mm(16")	m	7,618	11,472	3,824	22,914	
Tuyau de beton	Concrete Pipe	D500mm(20")	m	10,710	16,065	5,355	32,130	
Tuyau de beton	Concrete Pipe	D600mm(24")	m	13,748	20,622	6,874	41,244	
Tuyau de beton	Concrete Pipe	D700mm(28")	m	0	0	0		
Tuyau de beton	Concrete Pipe	D800mm(32")	m	20,435	30,653	10,218	61,306	
Tuyau de beton	Concrete Pipe	D900mm(32")	m	0	0	0		
Tuyau de beton	Concrete Pipe	D1000mm(40")	m	30,216	45,324	15,108	90,648	
Tuyau de beton	Concrete Pipe	D1100mm(44")	m	0	0	0		
Tuyau de beton	Concrete Pipe	D1200mm(48")	m	41,848	62,772	20,924	125,544	
Sable de riviere	River Sand	0-5mm	m3	5,500		1,100	6,600	
Gravier de riviere	River Gravel	5-25mm	m3	7,750		1,550	9,300	
Gravier de riviere	River Gravel	5-40mm	m3	7,750		1,550	9,300	
Crushed Stone	Crashed Stone	5-25mm	m3	6,400		1,280	7,680	
Mochlon	Rubble Stone	100~200mm	m3	6,000		1,200	7,200	
Brick	Brick	200*400*150m	pc	263		53	315	
Parpaing	Concrete Block		pc		393	39	432	
Fer a beton Tors	Deformed Bar	D10-D13	tonne		330,000	36,300	366,300	
Fer a beton Tors	Deformed Bar	D16-D22	tonne		354,000	38,940	392,940	
Ligature	Tie Wire(for RE BAR)	GA 16#	kg		730	80	810	
Contre-plaque	Ply Wood	1200*2400 t=12	m2	4,500		900	5,400	
Bois	Timber & Plank	50*50mm	m3	180,000		36,000	216,000	
Bois	Timber & Plank	100*100mm	m3	180,000		36,000	216,000	
Clou	Nail	50mm	kg	825		165	990	
Clou	Nail	75mm	kg	825		165	990	
Clou a beton	Concrete Nail	75mm	kg	1,800		360	2,160	
Profile en H	H-Shaped Steel	100-150mm	tonne		453,941	49,933	503,874	
Profile en H	H-Shaped Steel	200-300mm	tonne		453,941	49,933	503,874	
Profile en L	L-Shaped Steel	100*50*5	tonne		497,173	54,689	551,862	
Tole d'acier	Steel Plate	1219*2438*4.5	tonne		518,789	57,067	575,856	
Fil de fer barbele	Barbed Wire		m		65	7	72	
Gabion metallique	Wirenet for Gabion		m2		2,432	268	2,700	
Water stop pour l'etanche	Water Stop	largeur=150mm	m		4,054	446	4,500	
Tole galvanisee	Galvanized Sheet	1219*2438	unite		9,730	1,070	10,800	
Tutau de PVC	PVC Pipe	D=50mm	m		675	135	810	
Tutau de PVC	PVC Pipe	D=75mm	m		1,125	225	1,350	
Tutau de PVC	PVC Pipe	D=100mm	m		1,500	300	1,800	
Tutau de PVC	PVC Pipe	D=150mm	m		3,225	645	3,870	
Tutau de PVC	PVC Pipe	D=200mm	m		4,425	885	5,310	
Tutau de PVC	PVC Pipe	D=300mm	m		11,625	2,325	13,950	
Tutau de PVC	PVC Pipe	D=350mm	m				N/A	
Tutau de PVC	PVC Pipe	D=400mm	m		17,250	3,450	20,700	
Tutau de PVC	PVC Pipe	D=450mm	m				N/A	
Tutau de PVC	PVC Pipe	D=500mm	m		26,700	5,340	32,040	
Oxygene	Oxygen	Bottle Deposit	month	1,275		255	1,530	
Oxygene	Oxygen	Gas	kg	1,950		390	2,340	
Acetylene	Athetilane	Bottle Deposit	month	1,275		255	1,530	
Acetylene	Athetilane	Gas	kg	4,425		885	5,310	
Essence	Gasoline		lit		313	62	375	
Kerosene	Kelosine		lit		130	26	156	
Gasoil	Diesel		lit		208	41	249	
Huile pour moteur	Engine Oil		lit		900	180	1,080	
Barquette de soudure	Welding Lod	B-10	kg		3,975	795	4,770	
Gas du petrole liquifle	LPG Gas		100 lbr				N/A	
Tutau en acier	Steel Pipe	D=50mm	m		2,100	420	2,520	

Table J.1.2 List of Material Cost

(unite F.CFA)

Designation	Description	Specification	Unite	Local Currency	Foreign Currency	Tax	Total	Remarques
Tutau en acier	Steel Pipe	D=100mm	m		5,550	1,110	6,660	
Tutau en acier	Steel Pipe	D=150mm	m		10,125	2,025	12,150	
Tutau en acier	Steel Pipe	D=200mm	m		16,275	3,255	19,530	
Tutau en acier	Steel Pipe	D=300mm	m		29,550	5,910	35,460	
Tutau en acier	Steel Pipe	D=400mm	m		41,925	8,385	50,310	
Tutau en acier	Steel Pipe	D=500mm	m		61,350	12,270	73,620	
Tutau en acier	Steel Pipe	D=600mm	m		87,300	17,460	104,760	
Tutau en fonte	Cast Iron Pipe	D=400mm	m		53,475	10,695	64,170	
Tutau en fonte	Cast Iron Pipe	D=500mm	m		69,600	13,920	83,520	
Tutau en fonte	Cast Iron Pipe	D=600mm	m		91,875	18,375	110,250	
Tutau en fonte	Cast Iron Pipe	D=700mm	m		119,925	23,985	143,910	
Tuyau annele en acier	Corrugated Steel Pipe	D=200mm	m		19,125	3,825	22,950	
Tuyau annele en acier	Corrugated Steel Pipe	D=300mm	m		38,325	7,665	45,990	
Tuyau annele en acier	Corrugated Steel Pipe	D=400mm	m		58,425	11,685	70,110	
Tuyau annele en acier	Corrugated Steel Pipe	D=500mm	m		83,250	16,650	99,900	
Tuyau annele en acier	Corrugated Steel Pipe	D=600mm	m		112,425	22,485	134,910	
Tuyau annele en acier	Corrugated Steel Pipe	D=1000mm	m		212,100	42,420	254,520	
Tuyau annele en acier	Corrugated Steel Pipe	D=1100mm	m		241,425	48,285	289,710	
Tuyau annele en acier	Corrugated Steel Pipe	D=1200mm	m		269,250	53,850	323,100	
Tuyau annele en acier	Corrugated Steel Pipe	D=1300mm	m		301,350	60,270	361,620	
Tuyau annele en acier	Corrugated Steel Pipe	D=1400mm	m		331,425	66,285	397,710	
Tuyau annele en acier	Corrugated Steel Pipe	D=1500mm	m		362,475	72,495	434,970	
Soupape a papilion	Butterfly Valve	D=400mm	serie		1,299,675	259,935	1,559,610	
Soupape a papilion	Butterfly Valve	D=500mm	serie		1,899,525	379,905	2,279,430	
Soupape a papilion	Butterfly Valve	D=600mm	serie		2,399,400	479,880	2,879,280	
Irrigation Gate	Irrigation Gate	0.3x0.4	serie		31,500	6,300	37,800	
Irrigation Gate	Irrigation Gate	0.5x0.5	serie		39,750	7,950	47,700	
Irrigation Gate	Irrigation Gate	0.6x0.5	serie		42,000	8,400	50,400	
Irrigation Gate	Irrigation Gate	0.8x0.5	serie		47,250	9,450	56,700	

Source: JICA Study Team, San-Pedro, February 1999

Table J.1.3 Rental Costs of Construction Equipment and Machinery

(Unit: F.CFA)

Designation	Description	Specification	Unit	Local Currency	Foreign Currency	Tax	Total	Remarques
Pelle mecanique a godet retourne	Backhoe	0.35m ³ class	heure		18,378	2,022	20,400	
Pelle mecanique a godet retourne	Backhoe	0.7m ³	heure		29,405	3,235	32,640	
Pelle mecanique a godet retourne	Backhoe	1.0m ³	heure		33,694	3,706	37,400	
Grue sur chenilles	Crawler Crane	20ton class	heure		27,117	2,983	30,100	
Grue sur chenilles	Crawler Crane	30ton	heure		40,721	4,479	45,200	
Grue automobile	Truck Crane	5ton	heure		12,973	1,427	14,400	
Grue automobile	Truck Crane	10-15ton	heure		25,946	2,854	28,800	
Grue automobile	Truck Crane	20ton	heure		26,081	2,869	28,950	
Chargeur sur pneu	Wheel Loader	2.1-2.3m ³ class	heure		14,703	1,617	16,320	
Bulldozer	Bulldozer	11ton	heure		21,405	2,355	23,760	
Bulldozer	Bulldozer	21ton	heure		24,432	2,688	27,120	
Camion a benne basculante	Dump Truck	6ton	heure		10,360	1,140	11,500	
Camion a benne basculante	Dump Truck	11ton	heure		11,676	1,284	12,960	
Pick up	Pick up	1ton	heure		2,378	262	2,640	
Camion	Cargo Truck	11ton	heure		13,514	1,486	15,000	
Camion a grue	Truck Crane	10ton	heure		19,955	2,195	22,150	
Camion a grue	Truck Crane	4ton	heure		13,874	1,526	15,400	
Camion externe	Water Tank Lorry	10kl	heure		3,027	333	3,360	
Camion remorque	Trailer Truck	30ton	heure		17,730	1,950	19,680	
Centrale a beton	Batching Plant	0.5m ³ /batch	heure		39,550	4,350	43,900	
Betonniere sur camion	Truck Mixer Car	3.0m ³	heure		10,090	1,110	11,200	
Pompe a beton sur camion	Concrete Pump Car	20m ³ /hour	heure		12,162	1,338	13,500	
Concasseur a pierre	Crushing Plant	10m ³ /hour	heure		22,613	2,487	25,100	
Classificateur des pierres concassees	Classifical Plant	20m ³ /hour	heure		31,622	3,478	35,100	
Betonniere	Pot Mixer	0.1m ³	heure		1,802	198	2,000	
Betonniere	Pot Mixer	0.2m ³	heure		1,117	123	1,240	
Groupe electrogene	Generator	5kva	jour		811	89	900	
Groupe electrogene	Generator	35kva	jour		2,523	277	2,800	
Groupe electrogene	Generator	125kva	jour		31,081	3,419	34,500	
Groupe electrogene	Generator	150kva	jour		36,937	4,063	41,000	
Pompe immergee	Submergible Pump	D75mm	jour		2,703	297	3,000	
Pompe immergee	Submergible Pump	D100mm	jour		4,054	446	4,500	
Pompe immergee de sable	Submergible Sand Pump	D75mm	jour		4,054	446	4,500	
Pompe immergee de sable	Submergible Sand Pump	D100mm	jour		4,955	545	5,500	
Soudeuse	Welder	300A	jour		1,351	149	1,500	
Machine a cintrer	Re-Bar Bending Machine	D32mm	heure		2,252	248	2,500	
Chaille fer a beton	Re-Bar Cutting Machine	D32mm	heure		2,252	248	2,500	
Niveleuse	Motor Grader	G1D 37	heure		21,622	2,378	24,000	
Rouleau vibrant	Vibration Roller	0.8-1.1ton	heure		2,865	315	3,180	
Rouleau pneumatique	Tire Roller	8-16ton	heure		15,829	1,741	17,570	
Compacteur a plaque	Compactor	60-100kg	jour		1,838	202	2,040	
Dame	Compactor	1ton	heure		2,865	315	3,180	
Compresseur a air	Compressor	5m ³	heure		1,514	166	1,680	
Chargeur sur chenille	Tractor Shovel	2.2m ³ class	heure		18,946	2,084	21,030	
Brise beton	Concrete Breaker	20kg class	jour		1,297	143	1,440	
Gros brise beton	Giant Breaker	1,300kg class	jour		6,396	704	7,100	
Vibrateur a beton	Concrete Vibrator		heure		1,036	114	1,150	

Source: JICA Study Team, San-Pedro, February 1999

Table J.1.4 Construction Machine Operation Costs

Code	Description	Specification	Unit	Local Currency	Foreign Currency	Tax	Total	Remarks
501	Bulldozer	15ton	hr	1,047	25,453	3,214	29,714	29,714
502	Bulldozer	21ton	hr	1,047	30,375	3,921	35,343	35,343
503	Backhoe	0.7m3	hr	1,047	33,052	4,015	38,114	38,114
504	Tamper	60-100kg	day	0	3,550	541	4,091	4,091
505	Vibration Roller	0.8-1.1ton	hr	748	3,031	392	4,171	4,171
506	Dump Truck	10ton	hr	581	14,463	1,869	16,913	16,913
507	Pot Mixer	0.5m3	hr	0	39,550	4,350	43,900	43,900
508	Generator	35kva	day	0	9,226	1,599	10,825	10,825
509	Truck Crane	4.8-4.9ton	hr	1,047	14,219	1,734	17,000	17,000
510	Truck Crane	10-15ton	hr	935	27,716	3,258	31,909	31,909
511	Motor Grader	3.1m	hr	1,047	23,560	2,822	27,429	27,429
512	Tire Roller	8-20ton	hr	726	18,104	2,234	21,064	21,064
513	Water Tank Lorry	5500-6500L	hr	726	4,837	734	6,297	6,297
514	Bulldozer	3ton	hr	1,047	22,554	2,643	26,244	26,244
515	Submersible Pump	D100mm, 10m	day		4,054	446	4,500	

Unit:F.CFA

Source: JICA Study Team, San-Pedro, February 1999

Table J.1.5 List of Unit Prices

Unit F CFA

No.	Description	Specification	Unit	Local Currency	Foreign Currency	Tax	Total	Remarks
101	Bush Cutting	Cutter machine	m2	5	3	1	9	9
102	Surface soil removing	Bulldozer 21 ton	m3	20	583	76	679	679
103	Stumping and Stumps exclusion	Bulldozer	ha	12,103	351,135	45,326	408,565	408,564
104	Spreading	Bulldozer 21 ton	m3	7	189	24	220	220
105	Clearing		m2	13	235	31	279	279
106	Land Grading	Bulldozer 21 ton	ha	7,000	189,000	24,000	220,000	220,000
107	Excavation	Labor	m3	2,970	0	198	3,168	3,168
108	Excavation	Bulldozer 21 ton	m3	15	434	57	506	506
109	Excavation	Backhoe 0.7 m3	m3	21	661	80	762	762
110	Backfill	Labor	m3	1,480	96	111	1,687	1,687
111	Backfill	Bulldozer 15 ton	m3	225	1,320	174	1,719	1,719
112	Backfill	Back hoe 0.7 m3	m3	500	1,545	217	2,262	2,262
113	Embankment	Labor	m3	1,055	96	81	1,232	1,232
114	Compaction	Compactor	m3	99	107	22	228	228
115	Banking	Bulldozer 21 ton	m3	12	339	44	395	395
116	Slope Finishing	Labor	m2	564	0	36	600	600
117	Slope Finishing	Machine	m2	248	1,058	142	1,448	1,448
118	Removal of Surplus Soil	Dump Truck 10ton, 2km	m3	36	927	120	1,083	1,083
								0
201	Reinforced Concrete	ck=240 kgf/cm2	m3	15,442	21,588	4,895	41,925	41,925
202	Reinforced Concrete	ck=210 kgf/cm2	m3	18,770	21,306	5,142	45,218	45,218
203	Plain Concrete	ck=180 kgf/cm2	m3	16,141	18,404	4,645	39,190	39,190
204	Concrete	ck=240 kgf/cm2	m3	12,579	21,165	4,642	38,386	38,386
205	Concrete	ck=210 kgf/cm2	m3	12,613	20,100	4,529	37,242	37,242
206	Concrete	ck=180 kgf/cm2	m3	12,836	17,696	4,300	34,832	34,832
207	Reinforcing Bar	13mm	ton	54,933	339,900	40,957	435,790	435,790
208	Reinforcing Bar	16-25mm	ton	46,341	364,620	43,056	454,018	454,018
209	Wooden Form	Canal Work	m2	3,393	0	220	3,613	3,613
210	Wooden Form	Small Structure	m2	3,524	0	231	3,755	3,755
211	Base Gravel	Labor, t=20cm	m3	9,325	4,610	2,195	16,130	16,130
212	Sand Bed		m3	7,683	96	1,328	9,107	9,107
								0
301	Concrete Pipe	D=300mm	m	7,354	10,807	3,234	21,395	21,395
302	Concrete Pipe	D=600mm	m	15,858	24,262	7,436	47,556	47,556
303	Concrete Pipe	D=1,000mm	m	33,607	50,420	15,924	99,951	99,951
304	Wet Masonry		m2	15,382	4,102	1,977	21,461	21,461
305	Mortar	1:3	m3	8,191	23,320	3,952	35,463	35,463
306	Wire Cylinder		m3	9,667	28,304	4,594	42,565	42,565
307	Sluice Gate (Metal)	0.3m x 0.4m	Unit	10,469	41,738	8,155	60,362	60,362
308	Sluice Gate (Metal)	0.5m x 0.5m	Unit	15,987	53,400	10,552	79,939	79,939
309	Sluice Gate (Metal)	0.6m x 0.5m	Unit	17,450	77,199	13,554	108,203	108,203
310	Sluice Gate (Metal)	0.8m x 0.5m	Unit	19,777	88,824	15,485	124,086	124,086
								0
401	Grading for Road	without soil dressing	m2	16	165	20	201	201
402	Subgrade Course		m2	205	140	31	376	376
403	Gravel Pavement	t=15cm	m2	1,039	75	213	1,327	1,327
404	Farm Land Consolidation	Bulldozer 16 ton	ha	193,367	1,447,944	190,516	1,831,827	1,831,827
405	Timbering		kuum3	1,226	1,076	203	2,505	2,505
406	Scaffolding		kakem2	1,170	0	74	1,244	1,244
407	Water Stop		m	76	430	53	559	559
408	Expansion Joint		m2	644	6,999	1,443	9,086	9,086
409	Sheet Pile	Type II, L=6.0m	sheet	4,905	0	321	5,226	5,226
410	Farm Land Preparation	Bulldozer 15 ton	ha	50,791	753,409	96,454	900,654	900,654
411	Wire Net	for concrete lining	m2	308	1,903	229	2,440	2,440
601	Clear reclamation		ha	51,576	1,496,305	193,153	1,741,034	
602	Soil Dressing for Road		m3	57	1,588	200	1,845	
603	Grading for Road	with soil dressing	m2	19	224	28	271	
604	Butterfly Valve	D=600mm	set	17,874	2,421,283	483,565	2,922,722	2,922,722
605	Steel Pipe	D=600mm	m	2,242	90,183	18,013	110,438	
606	Pump Operation	D100mm, 10m	day	2,244	13,280	2,177	17,701	
607	Installation and demerion of pump		nos.	14,456	34,979	5,058	54,492	

Source: JICA Study Team, San-Pedro, February 1999

Table J.2.1 Project Cost Alternative 1 : Pump Rehabilitation

I. Investment Costs

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation and Drainage Facilities	754,388	1,618,334	2,372,722	300,888	2,673,610
Preparatory Work	165,919	41,480	207,399	25,693	233,092
Irrigation Facilities	314,724	621,548	936,272	119,505	1,055,777
Drainage Facilities	54,487	158,409	212,896	26,686	239,582
Farm Land Preparation	47,256	573,617	620,873	75,205	696,078
Farm Road Works	39,204	71,105	110,309	14,874	125,183
Flood Protection Dike	7,078	59,328	66,406	7,874	74,280
Pump Rehabilitation	52,654	74,580	127,234	12,784	140,018
Project Office	73,066	18,267	91,333	18,267	109,600
Detailed Design and Supervision	24,306	218,749	243,055	24,306	267,361
Consulting Services	24,306	218,749	243,055	24,306	267,361
Project Administration and Supporting Services	194,444	48,611	243,055	24,306	267,361
Project Executing Unit	194,444	48,611	243,055	24,306	267,361
Sub-Total	973,138	1,885,694	2,858,832	349,500	3,208,332
Contingencies	97,314	188,569	285,883	34,950	320,833
I Grand-total	1,070,452	2,074,263	3,144,715	384,450	3,529,165

II. Operation and Maintenance Cost

Unit: 1,000 F.CFA/year

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation Facilities	4,721	9,324	14,045	1,792	15,837
Drainage Facilities	818	2,376	3,194	400	3,594
Road	588	1,067	1,655	223	1,878
Flood Protection Dike	106	890	996	118	1,114
P.S Operation	11,046	16,568	27,614	5,523	33,137
P.S Maintenance	2,965	26,680	29,645	2,964	32,609
II Total	20,244	56,905	77,149	11,020	88,169

III Replacement Cost (Life span 25 years)

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Drainage Gate, etc.	22,400	100,800	123,200	16,800	140,000
Pump	0	262,500	262,500	26,250	288,750
III Total	22,400	363,300	385,700	4,3050	428,750

Table J.2.2 Project Cost Alternative 2 : Headworks at Cpt. Colonel

I. Investment Costs

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation and Drainage Facilities	1,448,157	3,088,279	4,536,436	543,011	5,079,447
Preparatory Work	323,098	80,775	403,873	47,704	451,577
Irrigation Facilities	314,724	621,548	936,272	119,505	1,055,777
Drainage Facilities	54,487	158,409	212,896	26,686	239,582
Farm Land Preparation	47,256	573,617	620,873	75,205	696,078
Farm Road Works	39,204	71,105	110,309	14,874	125,183
Flood Protection Dike	7,078	59,328	66,406	7,874	74,280
Grand Canal	303,261	430,146	733,407	83,050	816,457
Inspection Road Works	49,628	35,531	85,159	13,963	99,122
Headworks	233,855	1,039,553	1,273,408	135,883	1,409,291
Temporary Works					
Project Office	73,066	18,267	91,333	18,267	109,600
Compensation Fees	2,500	0	2,500	0	2,500
Detailed Design and Supervision	46,154	415,387	461,541	46,154	507,695
Consulting Services	46,154	415,387	461,541	46,154	507,695
Project Administration and Supporting Services	369,233	92,308	461,541	46,154	507,695
Project Executing Unit	369,233	92,308	461,541	46,154	507,695
Sub-Total	1,863,544	3,595,974	5,459,518	635,319	6,094,837
Contingencies	186,354	359,597	545,951	63,531	609,482
I Grand-total	2,049,898	3,955,571	6,005,469	698,850	6,704,319

II Operation and maintenance costs for irrigation and drainage facilities

Unit: 1,000 F.CFA/year

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation Facilities	4,721	9,324	14,045	1,792	15,837
Drainage Facilities	818	2,376	3,194	400	3,594
Road	588	1,067	1,655	223	1,878
Flood Protection Dike	106	890	996	118	1,114
Grand Canal	4,549	6,452	11,001	1,246	12,247
Inspection Road	745	533	1,278	209	1,487
Head Works	2,252	12,770	15,022	1,618	16,640
II Total	13,779	33,412	47,191	5,606	52,797

III Replacement Cost (Headworks Facilities:

Life span 10years, Gate: Life span 25 years)

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Drainage Gate, etc.	22,400	100,800	123,200	16,800	140,000
Head Works Facilities	0	13,600	13,600	1,400	15,000
III Total	22,400	114,400	136,800	18,200	155,000

Table J.2.3 Project Cost Alternative 3 : Grand Canal

I. Investment Costs

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation and Drainage Facilities	1,613,371	2,672,660	4,286,031	531,340	4,817,371
Preparatory Work	304,887	76,222	381,109	46,643	427,752
Irrigation Facilities	314,724	621,548	936,272	119,505	1,055,777
Drainage Facilities	54,487	158,409	212,896	26,686	239,582
Farm Land Preparation	47,256	573,617	620,873	75,205	696,078
Farm Road Works	39,204	71,105	110,309	14,874	125,183
Flood Protection Dike	7,078	59,328	66,406	7,874	74,280
Grand Canal	653,241	978,176	1,631,417	185,830	1,817,247
Inspection Road Works	103,667	39,432	143,099	25,013	168,112
Intake Facilities	10,691	42,702	53,393	7,272	60,665
Temporary Works	2,570	33,854	36,424	4,171	40,595
Project Office	73,066	18,267	91,333	18,267	109,600
Compensation Fees	2,500	0	2,500	0	2,500
Detailed Design and Supervision	43,772	393,943	437,715	43,772	481,487
Consulting Services	43,772	393,943	437,715	43,772	481,487
Project Administration and Supporting Services	350,172	87,543	437,715	43,772	481,487
Project Executing Unit	350,172	87,543	437,715	43,772	481,487
Sub-Total	2,007,315	3,154,146	5,161,461	618,884	5,780,345
Contingencies	200,732	315,415	516,147	61,888	578,035
I Grand-total	2,208,047	3,469,561	5,677,608	680,772	6,358,380

II. Operation and Maintenance Cost

Unit: 1,000 F.CFA/year

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation Facilities	4,721	9,324	14,045	1,792	15,837
Drainage Facilities	818	2,376	3,194	400	3,594
Road	588	1,067	1,655	223	1,878
Flood Protection Dike	106	890	996	118	1,114
Grand Canal	9,799	14,673	24,472	2,787	27,259
Inspection Road	1,555	592	2,147	375	2,522
Intake Facilities	160	641	801	109	910
II Total	17,747	29,563	47,310	5,804	53,114

III Replacement Cost (Life span 25 years)

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Drainage Gate, etc.	22,400	100,800	123,200	16,800	140,000
Intake Gate, etc.	4,840	27,410	32,250	4,760	37,010
III Total	27,240	128,210	155,450	21,560	177,010

Table J.2.4 Project Cost for Total Irrigation Development Project

I. Investment Costs

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation and Drainage Facilities	1,990,983	3,955,952	5,946,935	724,410	6,671,345
Preparatory Work	425,680	106,420	532,100	64,195	596,295
Irrigation Facilities	314,724	621,548	936,272	119,505	1,055,777
Drainage Facilities	54,487	158,409	212,896	26,686	239,582
Farm Land Preparation	47,256	573,617	620,873	75,205	696,078
Farm Road Works	39,204	71,105	110,309	14,874	125,183
Flood Protection Dike	7,078	59,328	66,406	7,874	74,280
Grand Canal	653,241	978,176	1,631,417	185,830	1,817,247
Inspection Road Works	103,667	39,432	143,099	25,013	168,112
Intake Facilities	10,691	42,702	53,393	7,272	60,665
Temporary Works	2,570	33,854	36,424	4,171	40,595
Colonel Area	59,007	288,700	347,707	40,431	388,138
Fahe Area	197,812	964,394	1,162,206	135,087	1,297,293
Project Office	73,066	18,267	91,333	18,267	109,600
Compensation Fees	2,500	0	2,500	0	2,500
Detailed Design and Supervision	60,626	545,633	606,259	60,626	666,885
Consulting Services	60,626	545,633	606,259	60,626	666,885
Project Administration and Supporting Services	485,007	121,252	606,259	60,626	666,885
Project Executing Unit	485,007	121,252	606,259	60,626	666,885
Sub-Total	2,536,616	4,622,837	7,159,453	845,662	8,005,115
Contingencies	253,662	462,284	715,946	84,566	800,512
I Grand-total	2,790,278	5,085,121	7,875,399	930,228	8,805,627

II Operation and maintenance costs for irrigation and drainage facilities

Unit: 1,000 F.CFA/year

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation Facilities	4,721	9,324	14,045	1,792	15,837
Drainage Facilities	818	2,376	3,194	400	3,594
Road	588	1,067	1,655	223	1,878
Flood Protection Dike	106	890	996	118	1,114
Colonel Area	519	1,968	2,487	292	2,779
Fahe Area	1,746	6,592	8,338	979	9,317
Grand Canal	9,799	14,673	24,472	2,787	27,259
Inspection Road	1,555	592	2,147	375	2,522
Intake Facilities	160	641	801	109	910
II Total	20,012	38,123	58,135	7,075	65,210

III Replacement Cost

(Life span 10years, Gate: Life span 25 years)

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Drainage Gate, etc.	22,400	100,800	123,200	16,800	140,000
Intake Gate, etc.	4,840	27,410	32,250	4,760	37,010
III Total	27,240	128,210	155,450	21,560	177,010

Table J.2.5 Breakdown of Project Cost for Iterative 1 (1/3)
(M/P-R) (with tax)

IF.CFA= 0.20
Unit:F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
1-1	Irrigation and Drainage Facilities										
1.	Preparatory Work	10%	1	L.S.			165,919,000	41,480,000	25,693,000	233,092,000	
A. Cite Agricole Area											
2.	Irrigation Facilities										
2.1	Primary Canal	5.7km	1	L.S.			184,940,000	376,151,000	71,281,000	632,372,000	
2.2	Secondary Canal	7.5km	1	L.S.			129,784,000	245,397,000	48,224,000	423,405,000	
	Sub-total						314,724,000	621,548,000	119,505,000	1,055,777,000	
3.	Drainage Facilities										
3.1	Primary Drainage Canal	3.4km	1	L.S.			24,743,000	77,492,000	13,127,000	115,362,000	
3.2	Secondary Drainage Canal	10.4km	1	L.S.			29,744,000	80,917,000	13,559,000	124,220,000	
	Sub-total						54,487,000	158,409,000	26,686,000	239,582,000	
4.	Farm Land Preparation	575ha	1	L.S.			47,256,000	573,617,000	75,205,000	696,078,000	
5.	Road Works										
5.1	Primary Road		1	L.S.			8,049,000	2,827,000	1,892,000	12,768,000	
5.2	Secondary Road		1	L.S.			859,000	10,050,000	1,270,000	12,179,000	
5.3	Flood Protection Gate		1	L.S.			30,296,000	58,228,000	11,712,000	100,236,000	
	Sub-total						39,204,000	71,105,000	14,874,000	125,183,000	
6.	Flood Protection Dike		1	L.S.			7,078,000	59,323,000	7,874,000	74,280,000	
	Sub-total (A-Construction Cost)						462,749,000	1,484,007,000	244,144,000	2,190,900,000	4438,180,000

Table J.2.5 Breakdown of Project Cost for Iterative 1 (2/3)

Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Total		Cost		Tax	Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Local Currency	Foreign Currency			
B. Grand Canal													
B-1.	Grand Canal-A	8.1km	1	L.S.								0	
B-2.	Grand Canal-B1	5.6km	1	L.S.								0	
B-3.	Grand Canal-B2	3.7km	1	L.S.								0	
B-4.	Grand Canal-C	0.8km	1	L.S.								0	
	Sub-total	8.1km					0	0	0	0		0	¥0
C. Inspection Road													
C-1.	Inspection Road-A	8.6km	1	L.S.								0	
C-2.	Inspection Road-B1	5.6km	1	L.S.								0	
C-3.	Inspection Road-B2	3.7km	1	L.S.								0	
C-4.	Inspection Road-C	0.3km	1	L.S.								0	
	Sub-total	8.6km					0	0	0	0		0	¥0
D.1	Pump Rehabilitation	incl. Elec. Line	1	L.S.					52,654,000	74,580,000	12,784,000	140,018,000	¥28,004,000
D.2	Temporary Works	Intake Facility	1	L.S.								0	¥0
	Total (A,B,C,D Construction Cost)								515,403,000	1,558,587,000	256,928,000	2,330,918,000	
E-1.	Project Office		1	L.S.					73,066,000	18,267,000	18,267,000	109,600,000	
	Total (Construction Cost)								754,388,000	1,618,534,000	300,888,000	2,673,610,000	¥534,722,000

Table J.2.6 Breakdown of Project Cost for Alternative 2 (1/3)
(with tax) Grand Canal 8.1km

1 F.CFA = 0.20
Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
J-1	Irrigation and Drainage Facilities										
1.	Preparatory Work	10%	1	L.S.			325,098,000	80,775,000	47,704,000	451,577,000	
A. Cite Agricole Area											
2.	Irrigation Facilities										
2.1	Primary Canal	5.7km	1	L.S.			184,940,000	376,151,000	71,281,000	632,372,000	
2.2	Secondary Canal	7.5km	1	L.S.			129,784,000	245,397,000	48,224,000	423,405,000	
	Sub-total						314,724,000	621,548,000	119,505,000	1,055,777,000	
3.	Drainage Facilities										
3.1	Primary Drainage Canal	3.4km	1	L.S.			24,743,000	77,492,000	13,127,000	115,362,000	
3.2	Secondary Drainage Canal	10.4km	1	L.S.			29,744,000	80,917,000	13,559,000	124,220,000	
	Sub-total						54,487,000	158,409,000	26,686,000	239,582,000	
4.	Farm Land Preparation	575ha	1	L.S.			47,256,000	573,617,000	75,205,000	696,078,000	
5.	Road Works										
5.1	Primary Road		1	L.S.			8,049,000	2,827,000	1,892,000	12,768,000	
5.2	Secondary Road		1	L.S.			859,000	10,050,000	1,270,000	12,179,000	
5.3	Flood Protection Gate		1	L.S.			30,296,000	58,228,000	11,712,000	100,236,000	
	Sub-total						39,204,000	71,105,000	14,874,000	125,185,000	
6.	Flood Protection Dike		1	L.S.			7,078,000	59,328,000	7,874,000	74,280,000	
	Sub-total (A-Construction Cost)						462,749,000	1,484,007,000	244,144,000	2,190,900,000	¥438,180,000

Table J.2.6 Breakdown of Project Cost for Alternative 2 (2/3)

Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
B. Grand Canal											
B-1.	Grand Canal-A	8.1km	1	L.S.			303,261,000	430,146,000	83,050,000	816,457,000	
B-2.	Grand Canal-B1	5.6km	1	L.S.						0	
B-3.	Grand Canal-B2	3.7km	1	L.S.						0	
B-4.	Grand Canal-C	0.8km	1	L.S.						0	
	Sub-total	8.1km					303,261,000	430,146,000	83,050,000	816,457,000	¥163,291,000
C. Inspection Road											
C-1.	Inspection Road-A	8.6km	1	L.S.			49,628,000	35,531,000	13,963,000	99,122,000	
C-2.	Inspection Road-B1	5.6km	1	L.S.						0	
C-3.	Inspection Road-B2	3.7km	1	L.S.						0	
C-4.	Inspection Road-C	0.3km	1	L.S.						0	
	Sub-total	8.6km					49,628,000	35,531,000	13,963,000	99,122,000	¥19,824,000
D. Head Works											
D.1	Head Works	H=3m	1	L.S.			233,855,000	1,039,553,000	155,883,000	1,409,291,000	¥281,858,000
D.2	Temporary Works	Intake Facilitie	1	L.S.						0	¥0
	Total (A,B,C,D Construction Cost)						1,049,493,000	2,989,237,000	477,040,000	4,515,770,000	
E-1. Project Office											
E-1.	Project Office		1	L.S.			73,066,000	18,267,000	18,267,000	109,600,000	
	Total (Construction Cost)						1,445,657,000	3,088,279,000	543,011,000	5,076,947,000	¥1,015,389,000

Table J.2.6 Breakdown of Project Cost for Alternative 2 (3/3)

Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
I-2	Post-Harvest Facilities		1	L.S.							
I-3	New Settlement Area		1	L.S.							
I-4	Village Water Supply		1	L.S.							
I-5	Village Public Facilities		1	L.S.							
	Total of Construction Works						1,445,657,000	3,038,279,000	543,011,000	5,076,947,000	
I-6	Consulting Service	10%	1	L.S.			46,154,000	415,387,000	46,154,000	507,695,000	
I-7	Supporting Services		1	L.S.							
I-8	Administration Cost	10%	1	L.S.			369,233,000	92,308,000	46,154,000	507,695,000	
I-9	Compensation of Tree Crop	5ha	1	L.S.			2,500,000			2,500,000	
	Total (I-1 - I-9)						1,863,544,000	3,595,974,000	635,319,000	6,094,837,000	
I-10	Physical Contingency	10%	1	L.S.			186,354,000	559,597,000	63,531,000	609,482,000	
	Grand Total (Project Cost)						2,049,898,000	3,955,571,000	698,850,000	6,704,319,000	¥1,340,864,000
							31%	59%	10%		
							34%	66%			
							L + P =	6,005,469,000	6,704,319,000		

Table J.2.7 Breakdown of Project Area for Alternative 3 (1/3)
(with tax) Grand Canal 18.2km

1F.CFA= 0.20
Unit:F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost		Total	Tax	Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency				
1-1	Irrigation and Drainage Facilities											
1.	Preparatory Work	10%	1	L.S.			304,887,000	76,222,000		46,643,000	427,752,000	
A. Cite Agricole Area												
2.	Irrigation Facilities											
2.1	Primary Canal	5.7km	1	L.S.			184,940,000	376,151,000		71,281,000	632,372,000	
2.2	Secondary Canal	7.5km	1	L.S.			129,784,000	245,397,000		48,224,000	423,405,000	
	Sub-total						314,724,000	621,548,000		119,505,000	1,055,777,000	
3.	Drainage Facilities											
3.1	Primary Drainage Canal	3.4km	1	L.S.			24,743,000	77,492,000		15,127,000	115,362,000	
3.2	Secondary Drainage Canal	10.4km	1	L.S.			29,744,000	80,917,000		15,559,000	124,220,000	
	Sub-total						54,487,000	158,409,000		26,686,000	259,582,000	
4.	Farm Land Preparation											
							47,256,000	573,617,000		75,205,000	696,078,000	
5.	Road Works											
5.1	Primary Road		1	L.S.			8,049,000	2,827,000		1,892,000	12,768,000	
5.2	Secondary Road		1	L.S.			859,000	10,050,000		1,270,000	12,179,000	
5.3	Flood Protection Gate		1	L.S.			30,296,000	58,228,000		11,712,000	100,236,000	
	Sub-total						39,204,000	71,105,000		14,874,000	125,183,000	
6.	Flood Protection Dike											
							7,078,000	59,328,000		7,874,000	74,280,000	
	Sub-total (A-Construction Cost)						462,749,000	1,484,007,000		244,144,000	2,190,900,000	¥438,180,000

Table J.2.7 Breakdown of Project Area for Alternative 3 (2/3)

Unit:F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
B. Grand Canal											
B-1.	Grand Canal-A	8.1km	1	L.S.			303,261,000	430,146,000	83,050,000	816,457,000	
B-2.	Grand Canal-B1	5.6km	1	L.S.			233,655,000	359,627,000	67,787,000	661,067,000	
B-3.	Grand Canal-B2	3.7km	1	L.S.			91,581,000	150,948,000	28,146,000	270,675,000	
B-4.	Grand Canal-C	0.8km	1	L.S.			24,746,000	37,455,000	6,847,000	69,048,000	
	Sub-total	18.2km					653,241,000	978,176,000	185,830,000	1,817,247,000	¥363,449,000
C. Inspection Road											
C-1.	Inspection Road-A	8.6km	1	L.S.			49,628,000	35,531,000	13,963,000	99,122,000	
C-2.	Inspection Road-B1	5.6km	1	L.S.			31,593,000	2,280,000	6,460,000	40,333,000	
C-3.	Inspection Road-B2	3.7km	1	L.S.			20,763,000	1,499,000	4,246,000	26,508,000	
C-4.	Inspection Road-C	0.3km	1	L.S.			1,683,000	122,000	344,000	2,149,000	
	Sub-total	18.2km					103,667,000	39,432,000	25,013,000	168,112,000	¥33,622,000
D. Intake Facilities											
D.1	Intake Facilities		1	L.S.			10,691,000	42,702,000	7,272,000	60,665,000	¥12,133,000
D.2	Temporary Works	Intake Facility	1	L.S.			2,570,000	33,854,000	4,171,000	40,595,000	¥8,119,000
	Total (A,B,C,D Construction Cost)						1,232,918,000	2,578,171,000	466,430,000	4,277,519,000	
E. Project Office											
E-1.	Project Office		1	L.S.			73,066,000	18,267,000	18,267,000	109,600,000	
	Total (Construction Cost)						1,610,871,000	2,672,660,000	531,340,000	4,814,871,000	¥962,974,000

Table J.2.8 Breakdown of Total Irrigation Development in the Study Area (1/5)

(with tax) Grand Canal 18.2km 1F.CFA= 0.20 Unit:F.CFA

No.	Description	Specification	Q'ty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
1-1	Irrigation and Drainage Facilities										
1.	Preparatory Work	10%	1	L.S.			425,680,000	106,420,000	64,195,000	596,295,000	
A. Cite Agricole Area											
2.	Irrigation Facilities										
2.1	Primary Canal	5.7km	1	L.S.			184,940,000	376,151,000	71,281,000	632,372,000	
2.2	Secondary Canal	7.5km	1	L.S.			129,784,000	245,397,000	48,224,000	423,405,000	
	Sub-total						314,724,000	621,548,000	119,505,000	1,055,777,000	
3.	Drainage Facilities										
3.1	Primary Drainage Canal	3.4km	1	L.S.			24,743,000	77,492,000	13,127,000	115,362,000	
3.2	Secondary Drainage Canal	10.4km	1	L.S.			29,744,000	80,917,000	13,559,000	124,220,000	
	Sub-total						54,487,000	158,409,000	26,686,000	239,582,000	
4.	Farm Land Preparation	575ha	1	L.S.			47,256,000	573,617,000	75,205,000	696,078,000	
5.	Road Works										
5.1	Primary Road		1	L.S.			8,049,000	2,827,000	1,892,000	12,768,000	
5.2	Secondary Road		1	L.S.			859,000	10,050,000	1,270,000	12,179,000	
5.3	Flood Protection Gate		1	L.S.			30,296,000	58,228,000	11,712,000	100,236,000	
	Sub-total						39,204,000	71,105,000	14,874,000	125,183,000	
6.	Flood Protection Dike		1	L.S.			7,078,000	59,328,000	7,874,000	74,280,000	
	Sub-total (A-Construction Cost)						462,749,000	1,484,007,000	244,144,000	2,190,900,000	8438,180,000

Table J.2.8 Breakdown of Total Irrigation Development in the Study Area (2/5)

Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost		Total	Remarks	
					Local Currency	Foreign Currency	Local Currency	Foreign Currency			Tax
B. Grand Canal											
B-1.	Grand Canal-A	8.1km	1	L.S.			303,261,000	430,146,000	83,050,000	816,457,000	
B-2.	Grand Canal-B1	5.6km	1	L.S.			233,653,000	359,627,000	67,787,000	661,067,000	
B-3.	Grand Canal-B2	3.7km	1	L.S.			91,581,000	150,948,000	28,146,000	270,675,000	
B-4.	Grand Canal-C	0.8km	1	L.S.			24,746,000	37,455,000	6,347,000	69,048,000	
	Sub-total	18.2km					653,241,000	978,176,000	185,830,000	1,817,247,000	¥363,449,000
C. Inspection Road											
C-1.	Inspection Road-A	8.6km	1	L.S.			49,628,000	35,531,000	13,963,000	99,122,000	
C-2.	Inspection Road-B1	5.6km	1	L.S.			31,593,000	2,280,000	6,460,000	40,333,000	
C-3.	Inspection Road-B2	3.7km	1	L.S.			20,763,000	1,499,000	4,246,000	26,508,000	
C-4.	Inspection Road-C	0.3km	1	L.S.			1,683,000	122,000	344,000	2,149,000	
	Sub-total	18.2km					103,667,000	39,432,000	25,013,000	168,112,000	¥33,622,000
D. Intake Facilities											
D.1	Intake Facilities		1	L.S.			10,691,000	42,702,000	7,272,000	60,665,000	¥12,133,000
D.2	Temporary Works	Intake Facility	1	L.S.			2,570,000	33,854,000	4,171,000	40,595,000	¥8,119,000
	Sub-total						13,261,000	76,556,000	11,443,000	101,260,000	

Table J.2.8 Breakdown of Total Irrigation Development in the Study Area (3/5)

Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
E. Colonel Area											
E-1. Irrigation Facilities											
	Primary Canal	1.8km	1	L.S.			29,448,000	28,090,000	6,255,000	63,793,000	
	Secondary Canal	1.8km	1	L.S.			678,000	1,112,000	182,000	1,972,000	
	Tertiary Canal	5.4km	1	L.S.			3,538,000	1,102,000	378,000	5,018,000	
	Other Facilities	Gate	1	L.S.			512,000	1,929,000	378,000	2,819,000	
	Sub-total						34,176,000	32,253,000	7,193,000	73,602,000	
E-2. Drainage Facilities											
	Primary Drainage Canal	2.3km	1	L.S.			1,836,000	51,435,000	6,507,000	59,778,000	
	Secondary Drainage Canal	3.6km	1	L.S.			1,469,000	41,148,000	5,206,000	47,823,000	
	Sub-total						3,305,000	92,583,000	11,713,000	107,601,000	
E-3. Farm Land Consolidation											
	Road Works	90ha	1	L.S.			20,884,000	156,378,000	20,576,000	197,838,000	
E-4. Road Works											
	Primary Road	4.5km	1	L.S.			518,000	6,053,000	765,000	7,336,000	
	Secondary Road	1.8km	1	L.S.			124,000	1,453,000	184,000	1,761,000	
	Sub-total						642,000	7,506,000	949,000	9,097,000	
	Sub-total (E-Construction Cost)						59,007,000	288,700,000	40,431,000	388,158,000	

Table J.2.8 Breakdown of Total Irrigation Development in the Study Area (4/5)

Unit: F.CFA

No.	Description	Specification	Q'ty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
F-1.	Irrigation Facilities										
	Primary Canal	6.0km	1	L.S.			98,182,000	93,659,000	20,857,000	212,698,000	
	Secondary Canal	6.0km	1	L.S.			3,362,000	5,743,000	920,000	10,025,000	
	Tertiary Canal	18.0km	1	L.S.			11,795,000	3,675,000	1,259,000	16,729,000	
	Other Facilities	Gate	1	L.S.			1,706,000	6,450,000	1,261,000	9,397,000	
	Sub-total						115,045,000	109,507,000	24,297,000	248,849,000	
F-2.	Drainage Facilities										
	Primary Drainage Canal	7.5km	1	L.S.			6,120,000	171,450,000	21,690,000	199,260,000	
	Secondary Drainage Canal	12.0km	1	L.S.			4,896,000	137,160,000	17,352,000	159,408,000	
	Sub-total						11,016,000	308,610,000	39,042,000	358,668,000	
F-3.	Farm Land Consolidation	300ha	1	L.S.			69,612,000	521,260,000	68,586,000	659,458,000	
F-4.	Road Works										
	Primary Road	15.0km	1	L.S.			1,725,000	20,175,000	2,550,000	24,450,000	
	Secondary Road	6.0km	1	L.S.			414,000	4,342,000	612,000	5,868,000	
	Sub-total						2,139,000	25,017,000	3,162,000	30,318,000	
	Sub-total (F-Construction Cost)						197,812,000	964,394,000	135,087,000	1,297,293,000	
	Total (A-F Construction Cost)						1,489,737,000	3,851,265,000	641,948,000	5,962,950,000	
G-1.	Project Office		1	L.S.			73,066,000	18,267,000	18,267,000	109,600,000	
	Total (Construction Cost)						1,988,483,000	3,955,952,000	724,410,000	6,668,845,000	#1,333,769,000

Table J.2.8 Breakdown of Total Irrigation Development in the Study Area (5/5)

Unit:F,CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
I-2	Post-Harvest Facilities		1	L.S.							
I-3	New Settlement Area		1	L.S.							
I-4	Village Water Supply		1	L.S.							
I-5	Village Public Facilities		1	L.S.							
	Total of Construction Works						1,988,483,000	3,955,952,000	724,410,000	6,668,845,000	
I-6	Consulting Service	10%	1	L.S.			60,626,000	545,633,000	60,626,000	666,885,000	
I-7	Supporting Services		1	L.S.							
I-8	Administration Cost	10%	1	L.S.			485,007,000	121,252,000	60,626,000	666,885,000	
I-9	Compensation of Tree Crop	5ha	1	L.S.			2,500,000			2,500,000	
	Total (I-1 - I-9)						2,536,616,000	4,622,857,000	845,662,000	8,005,115,000	
I-10	Physical Contingency	10%	1	L.S.			253,662,000	462,284,000	84,566,000	800,512,000	
	Grand Total (Project Cost)						2,790,278,000	5,085,121,000	930,228,000	8,805,627,000	¥1,761,125,000
							52%	58%	11%		
							35%	65%			
							L + F =	7,875,399,000	8,805,627,000		

Table J.2.9 Project Cost for Fahé Irrigaion Development Scheme

I. Investment Costs

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation and Drainage Facilities	415,741	1,122,462	1,538,203	190,622	1,728,825
Preparatory Work	102,673	25,668	128,341	18,634	146,975
Grand Canal	24,746	37,455	62,201	6,847	69,048
Inspection Road Works	1,683	122	1,805	344	2,149
Intake Facilities	10,691	42,702	53,393	7,272	60,665
Temporary Works	2,570	33,854	36,424	4,171	40,595
Fahe Area	197,812	964,394	1,162,206	135,087	1,297,293
Project Office	73,066	18,267	91,333	18,267	109,600
Compensation Fees	2,500	0	2,500	0	2,500
Detailed Design and Supervision	15,694	141,245	156,939	15,694	172,633
Consulting Services	15,694	141,245	156,939	15,694	172,633
Project Administration and Supporting Services	125,551	31,388	156,939	15,694	172,633
Project Executing Unit	125,551	31,388	156,939	15,694	172,633
Sub-Total	556,986	1,295,095	1,852,081	222,010	2,074,091
Contingencies	55,699	129,509	185,208	22,201	207,409
I Grand-total	612,685	1,424,604	2,037,289	244,211	2,281,500

II Operation and maintenance costs for irrigation and drainage facilities

Unit: 1,000 F.CFA/year

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Fahe Area	1,746	6,592	8,338	979	9,317
Grand Canal	371	562	933	103	1,036
Inspection Road	25	2	27	5	32
Intake Facilities	160	641	801	109	910
II-1 Total	2,302	7,797	10,099	1,196	11,295

III Replacement Cost (Life span 10years, Gate: Life span 25 years)

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Intake Gate, etc.	4,840	27,410	32,250	4,760	37,010
III Total	4,840	27,410	32,250	4,760	37,010

Table J.2.10 Project Cost of Cpt. Colonel Area

I. Investment Costs

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Irrigation and Drainage Facilities	663,331	963,324	1,626,655	200,541	1,827,196
Preparatory Work	111,478	27,870	139,348	16,570	155,918
Grand Canal	349,980	548,030	898,010	102,780	1,000,790
Inspection Road Works	54,039	3,901	57,940	11,050	68,990
Intake Facilities	10,691	42,702	53,393	7,272	60,665
Temporary Works	2,570	33,854	36,424	4,171	40,595
Colonel Area	59,007	288,700	347,707	40,431	388,138
Project Office	73,066	18,267	91,333	18,267	109,600
Compensation Fees	2,500	0	2,500	0	2,500
Detailed Design and Supervision	16,611	149,498	166,109	16,611	182,720
Consulting Services	16,611	149,498	166,109	16,611	182,720
Project Administration and Supporting Services	132,887	33,222	166,109	16,611	182,720
Project Executing Unit	132,887	33,222	166,109	16,611	182,720
Sub-Total	812,829	1,146,044	1,958,873	233,763	2,192,636
Contingencies	81,283	114,604	195,887	23,376	219,263
I Grand-total	894,112	1,260,648	2,154,760	257,139	2,411,899

II. Operation and Maintenance Cost

Unit: 1,000 F.CFA/year

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Colonel Area	519	1,968	2,487	292	2,779
Grand Canal	5,250	8,220	13,470	1,542	15,012
Inspection Road	810	59	869	166	1,035
Intake Facilities	160	641	801	109	910
II-1 Total	6,739	10,888	17,627	2,109	19,736

III Replacement Cost (Life span 25 years)

Unit: 1,000 F.CFA

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Intake Gate, etc.	4,840	27,410	32,250	4,760	37,010
III Total	4,840	27,410	32,250	4,760	37,010

Table J.3.1 Irrigation and Drainage Facilities for Priority Project Area

Description	Specification	Unit	Grand Canal	Primary Canal			Secondary Canal					Grand Total		
				Primary Canal	West Primary Canal	East Primary Canal	West Secondary Canal	Central Secondary Canal	East Secondary Canal	South Secondary Canal	North Secondary Canal		Total	
														Total
Canal Length		m	18,200	1,400	2,800	1,500	5,700	1,700	2,000	1,300	1,400	1,100	7,500	31,400
Intake Works		nos	1.0											1.0
Canal Lining	Concrete	m	18,200	1,400	2,800	1,500	5,700	1,700	2,000	1,300	1,400	1,100	7,500	31,400
Related Structure														
Diversion		nos	3.0	7.0	10.0	6.0	23.0	5.0	3.0	3.0	3.0	2.0	16.0	42.0
Spilway		nos	3.0	1.0	4.0	2.0	7.0	2.0	1.0	2.0	1.0	1.0	7.0	17.0
Cross Drain	Box Culvert	nos	13.0	1.0	3.0	3.0	4.0	1.0	1.0	2.0	1.0	1.0	7.0	17.0
Cross Drain	Pipe Culvert	nos	16.0	3.0	3.0	3.0	6.0	1.0	2.0	2.0	1.0	1.0	7.0	29.0
Siphon		nos	8.0											8.0

2. Drainage Canal and Structure

Description	Specification	Unit	Primary Drainage Canal	Secondary Drainage			Grand Total	
				West Secondary Drainage	Central Secondary Drainage	North Secondary Drainage		Total
Canal Length		m	3,400	2,600	1,700	4,800	13,650	
Related Structure								
Cross Drain	Sluice Gate	nos	1.0				1.0	
Cross Drain	Box Culvert	nos		2.0	2.0	3.0	7.0	

3. Project Road

Description	Specification	Unit	Primary Road	Secondary Road	Inspection Road	Others	Total	Description	Specification	Unit	1 Block (24 ha)	Quantity (1.0 ha)	Total (574.5 ha)
Road Length		m	22,500	21,100	3,100	4.0	46,700	Land Reclamation		ha	24.0	1.0	574.5
Flood Control Dike		nos						Tertiary Canal	With Road	m	840.4	35.0	20,117
Related Structure		nos						Irrigation Ditch		m	1,239.2	51.6	29,663
Cross Drain		nos	2.0	2.0			4.0	Drainage Ditch		m	1,394.1	58.1	33,371
Cross Drain	Flap Gate	nos	1.0	3.0		4.0	8.0	Tertiary Drainage		m	840.4	35.0	20,117

4. Farm Land Reclamation

Description	Specification	Unit	1 Block (24 ha)	Quantity (1.0 ha)	Total (574.5 ha)
Land Reclamation		ha	24.0	1.0	574.5
Tertiary Canal	With Road	m	840.4	35.0	20,117
Irrigation Ditch		m	1,239.2	51.6	29,663
Drainage Ditch		m	1,394.1	58.1	33,371
Tertiary Drainage		m	840.4	35.0	20,117

Table J.3.2 Project Costs

I. Investment Costs

(Unit: 1,000 F.CFA)

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
I-1 Irrigation and Drainage Facilities	1,613,371	2,672,660	4,286,031	531,340	4,817,371
Preparatory Works	304,887	76,222	381,109	46,643	427,752
Irrigation Facilities	314,724	621,548	936,272	119,505	1,055,777
Drainage Facilities	54,487	158,409	212,896	26,686	239,582
Farm Land Preparation	47,256	573,617	620,873	75,205	696,078
Farm Road Works	39,204	71,105	110,309	14,874	125,183
Flood Protection Dike	7,078	59,328	66,406	7,874	74,280
Grand Canal	653,241	978,176	1,631,417	185,830	1,817,247
Inspection Roads	103,667	39,432	143,099	25,013	168,112
Intake Facilities	10,691	42,702	53,393	7,272	60,665
Temporary Works	2,570	33,854	36,424	4,171	40,595
Project Office	73,066	18,267	91,333	18,267	109,600
Compensation Fees	2,500	0	2,500	0	2,500
I-2 Post-harvest Facilities	59,076	84,433	143,509	15,208	158,717
Store House	45,818	68,727	114,545	11,455	126,000
Dry Yard	11,622	13,251	24,873	3,344	28,217
Office	1,636	2,455	4,091	409	4,500
I-3 Land Development for New Settlement Area	35,742	16,002	51,744	8,820	60,654
Land Grading	294	7,938	8,232	1,008	9,240
Road Works	35,448	8,064	43,512	7,812	51,324
I-4 Village Water Supply	7,157	15,598	22,755	2,420	25,175
Existing Housing Area	1,973	7,822	9,795	980	10,775
New Housing Area	5,184	7,776	12,960	1,440	14,400
I-5 Village Public Facilities	22,000	33,000	55,000	5,500	60,500
Primary School	20,909	31,364	52,273	5,227	57,500
Dispensary	1,091	1,636	2,727	273	3,000
I-6 Detailed Design and Supervision	46,544	418,895	465,439	46,544	511,983
Consulting Services	46,544	418,895	465,439	46,544	511,983
I-7 Project Administration and Supporting Services	373,759	95,370	469,129	47,234	516,363
Project Executing Unit	372,641	93,160	465,801	46,580	512,381
Extension Services	118	0	118	12	130
Training	1,000	2,210	3,210	642	3,852
Total	2,157,649	3,335,958	5,493,607	657,066	6,150,673
<i>Physical contingencies</i>	<i>215,765</i>	<i>333,596</i>	<i>549,361</i>	<i>65,706</i>	<i>615,067</i>
Grand Total	2,373,414	3,669,554	6,042,968	722,772	6,765,740

II. Annual Operation and Maintenance Costs for Irrigation and Drainage Facilities

(Unit: 1,000 F.CFA)

Item	Local Currency	Foreign Currency	Non Taxed Amount	Taxes	Total
Maintenance Cost (1% of direct cost)	11,831	19,707	31,538	3,871	35,408
Operation Expenses	32,612	850	33,462	1,631	35,092
Office Administration (Chief+4Admi.)	12,600	0	12,600	630	13,230
Gate Operator (5 operators)	8,640	0	8,640	432	9,072
Transportation (motor cycles & pick up)	5,000	0	5,000	250	5,250
Tools etc.(20% of labour costs)	4,248	850	5,098	212	5,310
Others Expenses (10% of Labour costs)	2,124	0	2,124	106	2,230
Total	44,443	20,557	65,000	5,501	70,501

Table J.3.3 Breakdown of Rehabilitation of San-Pédro Paddy Development Project (1/3)

Unit:F.CFA = 0.20

No.	Description	Specification	Qty	Unit	Unit Price		Cost			Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency	Tax		
1-1	Irrigation and Drainage Facilities										
1.	Preparatory Work	10%	1	L.S.			304,887,000	76,222,000	46,643,000	427,752,000	
A. Cite Agricole Area											
2.	Irrigation Facilities										
2.1	Primary Canal	5.7km	1	L.S.			184,940,000	376,151,000	71,281,000	632,372,000	
2.2	Secondary Canal	7.5km	1	L.S.			129,784,000	245,397,000	48,224,000	423,405,000	
	Sub-total						314,724,000	621,548,000	119,505,000	1,055,777,000	
3.	Drainage Facilities										
3.1	Primary Drainage Canal	3.4km	1	L.S.			24,743,000	77,492,000	13,127,000	115,362,000	
3.2	Secondary Drainage Canal	10.4km	1	L.S.			29,744,000	80,917,000	13,559,000	124,220,000	
	Sub-total						54,487,000	158,409,000	26,686,000	239,582,000	
4.	Farm Land Preparation	575ha	1	L.S.			47,256,000	573,617,000	75,205,000	696,078,000	
5.	Road Works										
5.1	Primary Road		1	L.S.			8,049,000	2,827,000	1,892,000	12,768,000	
5.2	Secondary Road		1	L.S.			859,000	10,050,000	1,270,000	12,179,000	
5.3	Flood Protection Gate		1	L.S.			30,296,000	58,228,000	11,712,000	100,236,000	
	Sub-total						39,204,000	71,105,000	14,874,000	125,183,000	
6.	Flood Protection Dike		1	L.S.			7,078,000	59,328,000	7,874,000	74,280,000	
	Sub-total (A-Construction Cost)						462,749,000	1,484,007,000	244,144,000	2,190,900,000	¥438,180,000

Table J.3.3 Breakdown of Rehabilitation of San-Pédro Paddy Development Project (2/3)

Unit: F.CFA

No.	Description	Specification	Qty	Unit	Unit Price		Cost		Total	Remarks
					Local Currency	Foreign Currency	Local Currency	Foreign Currency		
B.	Grand Canal									
B-1.	Grand Canal-A	8.1km	1	L.S.			303,261,000	430,146,000	83,050,000	816,457,000
B-2.	Grand Canal-B1	5.6km	1	L.S.			233,653,000	359,627,000	67,787,000	661,067,000
B-3.	Grand Canal-B2	3.7km	1	L.S.			91,381,000	150,948,000	28,146,000	270,675,000
B-4.	Grand Canal-C	0.8km	1	L.S.			24,746,000	37,455,000	6,847,000	69,048,000
	Sub-total	18.2km					653,241,000	978,176,000	185,830,000	1,817,247,000
C.	Inspection Road									
C-1.	Inspection Road-A	8.6km	1	L.S.			49,628,000	35,531,000	13,963,000	99,122,000
C-2.	Inspection Road-B1	5.6km	1	L.S.			31,593,000	2,280,000	6,460,000	40,333,000
C-3.	Inspection Road-B2	3.7km	1	L.S.			20,763,000	1,499,000	4,246,000	26,508,000
C-4.	Inspection Road-C	0.3km	1	L.S.			1,683,000	122,000	344,000	2,149,000
	Sub-total	18.2km					103,667,000	39,432,000	25,013,000	168,112,000
D.1	Intake Facilities		1	L.S.			10,691,000	42,702,000	7,272,000	60,665,000
D.2	Temporary Works	Intake Facility	1	L.S.			2,570,000	33,854,000	4,171,000	40,595,000
	Total (A,B,C,D Construction Cost)						1,232,918,000	2,578,171,000	466,430,000	4,277,519,000
E-1.	Project Office		1	L.S.			73,066,000	18,267,000	18,267,000	109,600,000
	Total (Construction Cost)						1,610,871,000	2,672,660,000	531,340,000	4,814,871,000
										¥8,119,000
										¥363,449,000
										¥12,153,000
										¥8,119,000
										¥962,974,000

Table J.3.4 Bill of Quantity of the Project (1/8)

(1) Intake Facilities and Valve Box

Description	Specification	Calculation	Q'ty	Unit	Remarks
Intake Facilities					
Earth Work					
Excavation	Backhoe	$(17.4+11.4)/2 \times 3.0 \times 22.0$	950.4		
		$(9.4+4)/2 \times 2.7 \times 22.0$	398.0		
		$(22.6+12.6)/2 \times 5.0 \times 10.0$	880.0		
		$(10.6+4.0)/2 \times 3.3 \times 10.0$	240.9		
		Total	2,469.3	m3	
Backfill	Labor	$1.7 \times 3.1 \times (9+18+4)$	-163.4		
		Total	2,305.9	m3	
Box Culvert					
2.5x1.0					
Concrete	ck=210kg/cm2	$(1.6 \times 3.1 - 1.0 \times 2.5) \times (9+18+4)$	76.3		
		$1.0 \times 2.5 \times 0.3$	0.8		
		$2.0 \times 1.6 \times 1.0$	3.2		
		$(3.7 \times 2.2 - 3.1 \times 1.6) \times 2.0$	6.4		
		Total	86.6	m3	
Concrete	ck=180kg/cm2	$3.3 \times (9+18+4) \times 0.1$	10.2		
		$2.2 \times 1.0 \times 0.1$	0.2		
		Total	10.5	m3	
Reinforcing Bar	D16	100kg/m3	8.7	ton	
Wooden Form		$(1+1+2.5) \times (9+18+3.7)$	138.2		
		$(1.6+1.6) \times (9+18+4)$	99.2		
		$1.6 \times 3.1 + 1 \times 2.5$	7.5		
		$1.6 \times (1+1+2)$	6.4		
		$2.2 \times 2.0 \times 2$	8.8		
	Total	260.0	m2		
Water Stop			16.4	m	
Steel Pipe	D=600mm	9.5×2	19.0	m	
Intake Gate	1.5x1.5m		2.0	set	
Valve Box					
Concrete	ck=210kg/cm2	$(4.9 \times 2.6 - 2 \times 2 \times 2) \times 2.3$	10.9		
		$2 \times 2 \times 0.2$	0.8		
		Total	11.7	m3	
Concrete	ck=180kg/cm2	$5.1 \times 2.8 \times 0.1$	1.4	m3	
Reinforcing Bar	D16	80kg/cm2	0.9	ton	
Wooden Form		$2 \times 4 \times 1.8 + 2 \times 4 \times 2$	30.4		
		$(2.6 \times 2 + 4.9 \times 2) \times 2.3$	34.5		
		2×2	4.0		
	Total	68.9	m2		
Gravel	t=20cm	$5.1 \times 2.8 \times 0.2$	2.9	m3	
Butterfly Valve	D=600mm		2.0	set	

Table J.3.4 Bill of Quantity of the Project (3/8)

(3) Primary Roads for Grand Canal

1) Primary Road for GC-A

No.	Description	Specification	unit	Q'ty	Remarks
	Length	beside the canal	m	4,970	
	Length		m	3,600	
	Total Length		m	8,570	
	Bush Cutting		m2	28,800	
	Grading	3.6km	m2	21,600	
	Excavation	Bulldozer	m3	8,640	
	Banking	Bulldozer	m3	8,640	
	Gravel Pavement	W=4.5m, t=15cm	m2	38,565	
	Inspection Roads		m	3,100	

2) Primary Road for GC-B1

No.	Description	Specification	unit	Q'ty	Remarks
	Length		m	5,600	
	Gravel Pavement	W=4.5m, t=15cm	m2	25,335	

3) Primary Road for GC-B2

No.	Description	Specification	unit	Q'ty	Remarks
	Length		m	3,700	
	Gravel Pavement	W=4.5m, t=15cm	m2	16,650	

4) Primary Road for GC-C

No.	Description	Specification	unit	Q'ty	Remarks
	Length		m	300	
	Gravel Pavement	W=4.5m, t=15cm	m2	1,350	

Table J.3.4 Bill of Quantity of the Project (4/9)

Description	Specification	Unit	Primary Canal						West Primary Canal											
			PC-1 (0-400)		PC-2 (400-1400)		Grand Total	WPC-1 (0-700)		WPC-2 (700-1800)		Grand Total								
			Unit Qty	Volume	Total	Unit Qty		Volume	Total	Unit Qty	Volume		Total	Unit Qty	Volume	Total				
Primary Canal		m		400.0	400.0	1,000.0	1,000.0	1,400.0			700.0	700.0			1,100.0	1,100.0	1,000.0	1,000.0	2,800.0	
Earth Work																				
Bush Cutting	Labor	m ²	19.2	400.0	7,680.0	14.8	1,000.0	14,800.0	22,480.0	9.0	700.0	6,300.0	4.0	1,100.0	4,400.0	0.0	1,000.0	0.0	10,700.0	
Surface Stripping	30cm	m ³	5.4	400.0	2,160.0	1.8	1,000.0	1,800.0	3,960.0	2.0	700.0	1,400.0	1.0	1,100.0	1,100.0	0.0	1,000.0	0.0	2,500.0	
Excavation	Backhoe	m ³	2.5	400.0	1,000.0	2.5	1,000.0	2,500.0	3,500.0	0.0	700.0	0.0	0.0	1,100.0	0.0	1.9	1,000.0	1,900.0	1,900.0	
Embankment	L=2.0km	m ³	17.2	400.0	6,860.0	24.0	1,000.0	24,010.0	30,870.0	20.0	700.0	13,965.0	17.9	1,100.0	19,635.0	0.0	1,000.0	0.0	53,600.0	
Slope Finishing	Labor	m ²	4.7	400.0	1,880.0	12.1	1,000.0	12,100.0	13,980.0	7.9	700.0	5,530.0	10.0	1,100.0	11,000.0	0.0	1,000.0	0.0	16,530.0	
Canal Lining																				
Concrete	ck=210kg/cm ²	m ³	0.1	400.0	22.6	0.1	1,000.0	56.6	79.2	0.1	700.0	39.6	0.1	1,100.0	62.2	0.1	1,000.0	56.6	158.4	
Wooden Form		m ²	0.6	400.0	226.2	0.6	1,000.0	565.6	791.8	0.6	700.0	395.9	0.6	1,100.0	622.2	0.6	1,000.0	565.6	1,583.7	
Expansion Joint		m ²	0.1	400.0	25.1	0.1	1,000.0	62.8	88.0	0.1	700.0	44.0	0.1	1,100.0	69.1	0.1	1,000.0	62.8	176.0	
Gravel		m ³	0.0	400.0	0.0	0.0	1,000.0	0.0	0.0	0.0	700.0	0.0	0.0	1,100.0	0.0	0.0	1,000.0	0.0	0.0	
Wire Net	D10	m ²	0.6	400.0	226.2	0.6	1,000.0	565.6	791.8	0.6	700.0	395.9	0.6	1,100.0	622.2	0.6	1,000.0	565.6	1,583.7	
Related Structure																				
Diversion		nos.		3.0	3.0		4.0	4.0	7.0		1.0	1.0		3.0	3.0		6.0	6.0	10.0	
Foundation Stone	Gravel	m ³	1.8	3.0	5.4	1.8	4.0	7.2	12.6	1.8	3.0	5.4	1.8	3.0	5.4	1.8	3.0	5.4	10.8	
Embankment	Sand Material	m ³	0.5	3.0	1.5	0.5	4.0	2.0	3.5	0.5	1.0	0.5	0.5	1.0	1.5	0.5	1.0	1.5	3.0	
Concrete	ck=210kg/cm ²	m ³	9.9	3.0	29.6	9.9	4.0	39.5	69.2	9.9	1.0	9.9	9.9	3.0	29.6	9.9	6.0	59.3	98.8	
Reinforcing Bar	D13	t	0.7	3.0	2.1	0.7	4.0	2.8	4.8	0.7	1.0	0.7	0.7	3.0	2.1	0.7	6.0	4.1	6.9	
Wooden Form		m ²	62.3	3.0	187.0	62.3	4.0	249.3	436.2	62.3	1.0	62.3	62.3	3.0	187.0	62.3	6.0	373.9	623.2	
Concrete Pipe	D=400mm	m	6.0	3.0	18.0	6.0	4.0	24.0	42.0	6.0	1.0	6.0	6.0	3.0	18.0	6.0	6.0	36.0	60.0	
Spillway		nos.					1.0	1.0	1.0		2.0	2.0		1.0	1.0		1.0	1.0	4.0	
Concrete	ck=210kg/cm ²	m ³	72.0	0.0	0.0	72.0	1.0	72.0	72.0	72.0	2.0	144.0	72.0	2.0	144.0	72.0	1.0	72.0	288.0	
Reinforcing Bar	D13	t	5.0	0.0	0.0	5.0	1.0	5.0	5.0	5.0	1.0	5.0	5.0	2.0	10.1	5.0	1.0	5.0	20.2	
Cross Drain	Box culvert	nos.					1.0	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	3.0	
Excavation	Foundation	m ³	84.0	0.0	0.0	84.0	1.0	84.0	84.0	84.0	1.0	84.0	84.0	1.0	84.0	84.0	1.0	84.0	252.0	
Embankment	Sand Material	m ³	84.0	0.0	0.0	84.0	1.0	84.0	84.0	84.0	1.0	84.0	84.0	1.0	84.0	84.0	1.0	84.0	252.0	
Concrete	ck=210kg/cm ²	m ³	21.0	0.0	0.0	21.0	1.0	21.0	21.0	21.0	1.0	21.0	21.0	1.0	21.0	21.0	1.0	21.0	63.0	
Reinforcing Bar	D16	t	1.5	0.0	0.0	1.5	1.0	1.5	1.5	1.5	1.0	1.5	1.5	1.0	1.5	1.5	1.0	1.5	4.4	
Wooden Form		m ²	126.0	0.0	0.0	126.0	1.0	126.0	126.0	126.0	1.0	126.0	126.0	1.0	126.0	126.0	1.0	126.0	378.0	
Primary Road																				
Gravel Pavement	W=4.5m	m ²	4.5	400.0	1,800.0	4.5	1,000.0	4,500.0	6,300.0											
Bridge																				
Pipe Culvert	D=1000mm	set									1.0	1.0							1.0	
Pipe Culvert	D=600mm	set																	2.0	
Sub-total																				

Table J.3.4 Bill of Quantity of the Project (5/8)

(4) Irrigation Canal and Structure (2/2)																			
Description	East Primary Canal			West Secondary Canal			Central Secondary Canal			East Secondary Canal			South Secondary Canal			North Secondary Canal			
	EPC-1 (0-1500)			WSC-1 (0-1700)			CSC-1 (0-2000)			ESC-1 (0-1300)			SSC-1 (0-1400)			NSC-1 (0-1100)			
	Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total	
Primary Canal	1,500.0	1,500.0	1,700.0	1,700.0	1,700.0	2,000.0	2,000.0	2,000.0	1,300.0	1,300.0	1,300.0	1,400.0	1,400.0	1,400.0	1,100.0	1,100.0	1,100.0	1,100.0	
Earth Work																			
Bush Cutting	9.0	1,500.0	13,500.0	4.9	1,700.0	8,330.0	5.7	2,000.0	11,400.0	0.0	1,300.0	0.0	4.5	1,400.0	6,300.0	8.0	1,100.0	8,500.0	
Surface Stripping	2.5	1,500.0	3,750.0	0.8	1,700.0	1,360.0	1.1	2,000.0	2,200.0	0.0	1,300.0	0.0	0.0	1,400.0	0.0	0.0	1,100.0	0.0	
Excavation	0.0	1,500.0	0.0	0.0	1,700.0	0.0	0.0	2,000.0	0.0	0.0	1,300.0	0.0	0.0	1,400.0	0.0	4.2	1,100.0	4,620.0	
Embankment	18.8	1,500.0	28,140.0	11.9	1,700.0	20,230.0	7.9	2,000.0	15,820.0	7.0	1,300.0	9,100.0	4.1	1,400.0	5,740.0	0.0	1,100.0	0.0	
Slope Finishing	7.1	1,500.0	10,650.0	5.8	1,700.0	9,860.0	4.7	2,000.0	9,400.0	0.8	1,300.0	1,040.0	1.1	1,400.0	1,540.0	0.0	1,100.0	0.0	
Canal Lining																			
Concrete	0.1	1,500.0	84.8	0.1	1,700.0	96.2	0.1	2,000.0	113.1	0.1	1,300.0	73.5	0.1	1,400.0	79.2	0.1	1,100.0	62.2	
Wooden Form	0.6	1,500.0	848.4	0.6	1,700.0	961.5	0.6	2,000.0	1,131.2	0.6	1,300.0	735.3	0.6	1,400.0	791.8	0.6	1,100.0	622.2	
Expansion Joint	0.1	1,500.0	94.3	0.1	1,700.0	106.8	0.1	2,000.0	125.7	0.1	1,300.0	81.7	0.1	1,400.0	88.0	0.1	1,100.0	69.1	
Gravel	0.0	1,500.0	0.0	0.0	1,700.0	0.0	0.0	2,000.0	0.0	0.0	1,300.0	0.0	0.0	1,400.0	0.0	0.0	1,100.0	0.0	
Wire Net	0.6	1,500.0	848.4	0.6	1,700.0	961.5	0.6	2,000.0	1,131.2	0.6	1,300.0	735.3	0.6	1,400.0	791.8	0.6	1,100.0	622.2	
Related Structure																			
Diversion	6.0	6.0	6.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0	
Foundation Stone	1.8	6.0	10.8	1.8	5.0	9.0	1.8	3.0	5.4	1.8	3.0	5.4	1.8	3.0	5.4	0.0	0.0	0.0	
Embankment	0.5	6.0	3.0	0.5	5.0	2.5	0.5	3.0	1.5	0.5	3.0	1.5	0.5	3.0	1.5	0.0	0.0	0.0	
Concrete	9.9	6.0	59.3	9.9	5.0	49.4	9.9	3.0	29.6	9.9	3.0	29.6	9.9	3.0	29.6	9.9	2.0	19.8	
Reinforcing Bar	0.7	6.0	4.1	0.7	5.0	3.5	0.7	3.0	2.1	0.7	3.0	2.1	0.7	3.0	2.1	0.7	2.0	1.4	
Wooden Form	62.3	6.0	373.9	62.3	5.0	311.6	62.3	3.0	187.0	62.3	3.0	187.0	62.3	3.0	187.0	62.3	2.0	124.6	
Concrete Pipe	6.0	6.0	36.0	6.0	5.0	30.0	6.0	3.0	18.0	6.0	3.0	18.0	6.0	3.0	18.0	6.0	2.0	12.0	
Spillway	2.0	2.0	2.0	2.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	
Concrete	72.0	2.0	144.0	72.0	2.0	144.0	72.0	1.0	72.0	72.0	2.0	144.0	72.0	1.0	72.0	72.0	1.0	72.0	
Reinforcing Bar	5.0	2.0	10.1	5.0	2.0	10.1	5.0	1.0	5.0	5.0	2.0	10.1	5.0	1.0	5.0	5.0	1.0	5.0	
Cross Drain																			
Excavation	84.0	0.0	0.0	84.0	0.0	0.0	84.0	0.0	0.0	0.0	0.0	0.0	84.0	0.0	0.0	84.0	0.0	0.0	
Embankment	84.0	0.0	0.0	84.0	0.0	0.0	84.0	0.0	0.0	0.0	0.0	0.0	84.0	0.0	0.0	84.0	0.0	0.0	
Concrete	21.0	0.0	0.0	21.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	0.0	21.0	0.0	0.0	
Reinforcing Bar	1.5	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	
Wooden Form	126.0	0.0	0.0	126.0	0.0	0.0	126.0	0.0	0.0	0.0	0.0	0.0	126.0	0.0	0.0	126.0	0.0	0.0	
Primary Road																			
Gravel Pavement	4.5	1,500.0	6,750.0																
Bridge																			
Pipe Culvert																			
Pipe Culvert	1.0	3	3.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	
Sub-total																			

Table J.3.4 Bill of Quantity of the Project (6/8)

Description	Specification	Unit	Primary Drainage Canal						West Secondary Drainage									
			PD-1 (0-1700)			PD-2 (1700-3400)			CSD-1 (0-2600)									
			Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total							
Length		m			1,700					1,700								
Earth Work																		
Excavation	Backhoe	m ³	9.0	1,700.0	15,300.0	6.5	1,700.0	11,050.0	26,350.0	2.3	2,600.0	5,850.0						
Related Structure																		
Cross Drain	Box Culvert	Nos			1.0			1.0	2.0									
Excavation	Foundation	m ³	380.0	1.0	380.0	238.0	1.0	238.0	618.0	144.8	2.0	289.6						
Embankment	Sand Material	m ³	380.0	1.0	380.0	238.0	1.0	238.0	618.0	144.8	2.0	289.6						
Concrete	ck=210kg/cm	m ³	126.9	1.0	126.9	70.5	1.0	70.5	197.4	58.0	2.0	115.9						
Reinforcing Bar		t	11.4	1.0	11.4	6.3	1.0	6.3	17.8	5.2	2.0	10.4						
Wooden Form		m ²	491.4	1.0	491.4	327.6	1.0	327.6	819.0	219.0	2.0	437.9						
Sluice Gate	2500x3000	Nos	3.0	1.0	3.0				3.0									
Sub-total																		

Description	Specification	Unit	Central Secondary Drainage						East Secondary Drainage			North Secondary Drainage						
			CSD-1 (0-1800)			ESD-1 (0-4800)			NSD-1 (0-1150)									
			Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total	Unit Qty	Volume	Total				
Length		m			1,700						4,800							
Earth Work																		
Excavation	Backhoe	m ³	3.9	1,700.0	6,630.0	3.6	4,800.0	17,280.0	19.8	1,150.0	22,770.0							
Related Structure																		
Cross Drain	Box Culvert	Nos			2.0			3.0	1.0									
Excavation	Foundation	m ³	128.8	2.0	257.6	128.0	5.0	384.0	128.0	1.0	128.0							
Embankment	Sand Material	m ³	128.8	2.0	257.6	128.0	5.0	384.0	128.0	1.0	128.0							
Concrete	ck=210kg/cm	m ³	25.4	2.0	50.8	50.4	5.0	151.2	50.4	1.0	50.4							
Reinforcing Bar		t	2.3	2.0	4.6	4.5	3.0	13.6	4.5	1.0	4.5							
Wooden Form		m ²	118.4	2.0	236.9	156.8	3.0	470.4	156.8	1.0	156.8							
Sluice Gate	2500x3000	Nos							1.0									
Sub-total																		

Table J.3.4 Bill of Quantity of the Project (7/8)

(6) Road Length in San Pedro Paddy Project Area (Cite Agricole Area)

Road Type	Length (m)	Width (m)	Area (m ²)	Gravel	G. Area	Existing-W
Primary Road						
East Road	1,400	6.0	8,400	4.5	6,300	3.0
Secondary Road						
North-1 Road	1,500	4.0	6,000			3.0
CT-A	1,500	4.0	6,000			4.0
CT-B-2	440	4.0	1,760			4.0
CT-C-2	1,200	4.0	4,800			4.5
North-1 1 Road	300	4.0	1,200			3.0
North-2 Road	1,000	4.0	4,000			3.0
Central Road	1,100	4.0	4,400			4.5
South-1 Road	1,100	4.0	4,400			5.0
South-2 Road	1,200	4.0	4,800			3.0
Total	9,340		37,560			

Note: Other primary and secondary roads earth works Qty are included in Irrigation Canal Qty.

Length	Area	Primary C.	Grand Canal	Total
Primary Road	1,400	3,700	9,300	23,270
Secondary Road	9,340	7,500	2,800	19,640
Inspection Road			3,100	3,100

(7) Flood Protection Gate under the Road

Description	Specification	Unit	Flood Stop Gate		
			Unit Qty	Nos	Total
Cross Drain	Box Culvert	Nos			8.0
Excavation	Foundation	m ³	140.0	8.0	1,120.0
Embankment	Sand Material	m ³	140.0	8.0	1,120.0
Concrete	ck=210kg/cm	m ³	27.0	8.0	216.0
Reinforcing Bar		t	2.4	8.0	19.4
Wooden Form		m ³	155.0	8.0	1,080.0
Flap Gate	1000x1000	Nos	1.0	8.0	8.0
Sub-total					

(8) Flood Protection Dike

Description	Specification	Unit	Flood Protection Dike			
			CSD4(1)	CSD4(2)	CSD4(3)	SSD4
Length		m	170	200	150	150
Height		m	1.9	2.5	2.5	3.0
Earth Work						
Bush Cutting	Labor	m ²	2,652.0	3,600.0	2,700.0	3,000.0
Surface Stripping	30cm	m ³	1,326.0	1,800.0	1,350.0	1,500.0
Embankment	L=2.0km	m ³	4,406.0	7,200.0	5,400.0	6,825.0
Slope Finishing	Labor	m ²	1,421.2	2,200.0	1,650.0	1,980.0
Total						

Table J.3.4 Bill of Quantity of the Project (8/8)

(9) On-Farm Works

26.733 ha

Description	Specification	Unit	I Block (26.733ha)		
			Unit Q'ty	Volume	Total
Land Reclamation			1	24.0	24.0
Tertiary Canal	with Road	m		840.4	
Embankment	Backhoe	m ³	2.5	840.4	2,059.0
Turnout		Nos		4.0	
Concrete	ck=210kg/cm	m ³	1.0	4.0	3.9
Wooden Form	Labor	m ²	6.4	4.0	25.6
Concrete Pipe	D=300mm	m	6.0	4.0	24.0
Sluice Gate	300x300	Nos	1.0	4.0	4.0
Stop Gate		Nos		1.0	
Concrete		m ⁴	0.5	1.0	0.5
Wooden Form		m ²	3.2	1.0	3.2
Sluice Gate	300x300	Nos	1.0	1.0	1.0
Irrigation Ditch		m		1,239.2	
Embankment	Backhoe	m ³	2.1	1,239.2	2,614.7
Tractor Passage				80.0	
Concrete Pipe	D=300mm	m	4.0	80.0	320.0
Drainage Ditch		m		1,394.1	0.0
Excavation	Backhoe	m ³	0.5	1,394.1	697.1
Embankment	Backhoe	m ³	0.4	1,394.1	501.9
Tertiary Drainage		m		840.4	
Excavation	Backhoe	m ³	1.4	840.4	1,159.8
Embankment	Backhoe	m ³	0.3	840.4	226.9
Sub-total					

Note: Stop Gate, Irrigation Ditch, Drainage Ditch and Tertiary Drainage are done by farmers.