DELIBERASAUN N. 10/II/CAFI/2025

Conselho de Administração do Fundo das Infraestruturas – CAFI, bazeia ba artigo 10º (1) e (3) DL Nº. 25/2024, de 22 de maio, Primeira Alteração ao DL Nº.13/2016, 18 de Maio, realiza reuniaun extraordinária iha loron tersa-feira, 4 de fevereiro de 2025, e halo deliberasaun ba assunto tuir mai ne'e:

Asuntu: Pedido Aprovasaun no Autorizasaun despezas ba Projetu Estudu Viabilidade ba projetu Barajem Mota Belulic iha Munisipiu Ainaro no Barajem Mota Carau ulun iha Munisipiu Manufahi.

Proponente: Unidade de Planeamento Integrado – UPI/ MPIE.

Notas/justifikasaun:

- SGP simu karta husi Unidade de Planeamento Integrado (UPI)/MPIE ho no. ref.: 04/MPIE/UPI/SEV/I/2025, data 31 de janeiro de 2025, ho asuntu: Pedidu Ajendamentu ba reuniaun CAFI kona-ba Estudu Viabilidade ba projetu Barajem Mota Belulic iha Munisipiu Ainaro no Mota Carauulun iha Munisipiu Manufahi;

- Bazeia ba karta husi ADN, I.P. ho no. ref.: 0129/ADN, I.P./I/2025, data 27 de janeiro de 2025, ho asuntu: resultadu re-verifikasaun – Projetu (ToR) Feasibility Study for Belulic and Carau ulun River Water Recources Development Scheme Ainaro and Manufahi Municipality;

- Resultadu reverifikasaun ADN, I.P.ba projetu ba Feasibility Study for Belulic River Water Recourses Development Scheme Ainaro, Timlor-Leste ho montante $1,401,650.00 no ba projetu Feasibility Study for Carau ulun River Water Recourses Development Scheme Manufahi, Timor-Leste ho montante $1,401,650.00;

- Bazeia ba karta pedidu husi Unidade de Planeamento Integrado (UPI)/MPIE ho no. ref.: 05/MPIE/UPI/SEV/I/2025, data 31 de janeiro de 2025, ho asuntu: Pedidu fahe kodigu ba Projetu Estudu Viabilidade Barajem Carau ulun iha Munisipiu Manufahi no Belulic iha Munisipiu Ainaro;

- Nesesita aprovasaun CAFI atu inskreve no kria kodigu atividade foun ba projetu "Feasibility study for Belulic River Water Resources Development Scheme & Feasibility study for Carau ulun River Water Resources Development Scheme" iha FI – Programa 510: Funcionamento e Desenvolvimento Institucional, subprograma 51047: Apoio de Administração e Técnico ao CAFI, Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas, nudar baze atu bele regista iha sistema GRP no DBFTL;

- Bazeia ba deliberasaun nº 105/IX/CAFI 2024, data 5 de setembro de 2024 ho asuntu: Aprovasaun CAFI - Apoio ba Centraliza Estudo no Kompetensia Ekipa Estudu nian.

- Alokasaun Orsamentu FI 2025: $150,000.00, Programa 510: Funcionamento e Desenvolvimento Institucional, Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas;

- lista proposta:

No.	Naran Projeto	Rezultadu Verifikasaun ADN, I.P./ no. referensia	Alokasaun FI 2025/Kodigu Atividade
1	Feasibility Study for Belulic River Water Recourses Development Scheme Ainaro, Timlor-Leste	$1,401,650.00; ho no. ref.: 0129/ADN, I.P./I/2025, data 27 de janeiro de 2025	• Nesesita aprovasaun CAFI atu loke kodigu atividade foun iha Programa 510; • subprograma 51047: Apoio de Administração e Técnico ao CAFI; • Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas; • Alokasaun 2025=$150,000.00
2	Feasibility Study for Carau Ulun River Water Recourses Development Scheme Manufahi, Timlor-Leste	$1,401,650.00; ho no. ref.: 0129/ADN, I.P./I/2025, data 27 de janeiro de 2025	• Nesesita aprovasaun CAFI atu loke kodigu atividade foun iha Programa 510; • subprograma 51047: Apoio de Administração e Técnico ao CAFI; • Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas; • Alokasaun 2025=$150,000.00

Rekomendasaun:

1) CAFI atu aprova kustu total ba projetu nune'e mos konfirma finansiamentu despezas iha Fundo das Infraestruturas 2025, bazeia ba pedidu finansiamentu nebe hato'o husi Unidade de Planeamento Integrado (UPI)/MPIE ba projetu;

   a. Feasibility Study for Belulic River Water Recourses Development Scheme Ainaro, Timlor-Leste, Kustu estimativa ADN, I.P. ho montante $1,401,650.00;

   b. Feasibility Study for Carau Ulun River Water Recourses Development Scheme Manufahi, Timlor-Leste, Kustu estimativa ADN, I.P. ho montante $1,401,650.00;

2) CAFI sei hato'o pedidu ba S.E. Primeiro - Ministro atu aprova inskreve no kria kodigu atividade foun ba projetu "Feasibility study for Belulic River Water Resources Development Scheme & Feasibility study for Carau ulun River Water Resources Development Scheme" iha FI – Programa 510: Funcionamento e Desenvolvimento Institucional, subprograma 51047: Apoio de Administração e Técnico ao CAFI, Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas, nudar baze atu bele regista iha sistema GRP no DBFTL;

3) Desizaun kona ba abertura ka inisiasaun prosesu aprovisionamentu bazeia, Artigo 24 & 25, Decreto Lei No.43/2024, de 20 de Dezembro, regra ezekusaun OGE 2025;

4) Bazeia ba Artigo 21, DL No.13/2016, de 18 de maio, kona ba Regulamentu Fundo da Infraestrutura, determina katak aprovisionamento ba projetu sira ho finansiamentu husi FI nian sei lao tuir Regime Juridiku Aprovizionamentu em vigor;

5) Modalidade aprovizionamento bazeia ba kustu projetu no sei lao tuir Decreto-Lei No.22/2022 de 11 de Maio;

6) Projetu nain sei asume responsábilidade ba koordenasaun entre entidade relevantes ba implementasaun projetu ne'e, e ba supervizaun, monitorizasaun e akompanhamentu ba projetu ne'e iha faze implementasaun, e sei garante kualidade servisu konsultoria nian tuir espesifikasaun ne'ebe aprova ona;

Desizaun:

1. CAFI aprova kustu total ba projetu bazeia ba pedidu finansiamentu nebe hato'o husi Unidade de Planeamento Integrado (UPI)/MPIE ba projetu;

2. CAFI Sei hato'o pedidu ba SE. PM atuaprova inskreve no kria kodigu atividade foun ba projetu "Feasibility study for Belulic River Water Resources Development Scheme & Feasibility study for Carau ulun River Water Resources Development Scheme" iha FI – Programa 510: Funcionamento e Desenvolvimento Institucional, subprograma 51047: Apoio de Administração e Técnico ao CAFI, Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas, nudar baze atu bele regista iha sistema GRP no DBFTL;

3. Desizaun kona ba abertura ka inisiasaun prosesu aprovisionamentu bazeia, Artigo 24 & 25, Decreto Lei No.43/2024, de 20 de Dezembro, regra ezekusaun OGE 2025;

4. Bazeia ba Artigo 21, DL No.13/2016, de 18 de maio, kona ba Regulamentu Fundo da Infraestrutura, determina katak aprovisionamento ba projetu sira ho finansiamentu husi FI nian sei lao tuir Regime Juridiku Aprovizionamentu em vigor;

5. Modalidade aprovizionamento bazeia ba kustu projetu no sei lao tuir Decreto-Lei No.22/2022 de 11 de Maio;

6. Projetu nain sei asume responsábilidade ba koordenasaun entre entidade relevantes ba implementasaun projetu ne'e, e ba supervizaun, monitorizasaun e akompanhamentu ba projetu ne'e iha faze implementasaun, e sei garante kualidade servisu konsultoria nian tuir espesifikasaun ne'ebe aprova ona;

7. Lista aprovasaun:

No.	Naran Projeto	Kustu Estimativa (ADN, I.P.)	Alokasaun FI 2025	Orgaun Kompetênti Autoriza despezas - DL No. 23/2022, 19 de Maio
1.	Feasibility Study for Belulic River Water Recourses Development Scheme Ainaro, Timlor-Leste	$1,401,650.00; ho no. ref.: 0129/ADN, I.P./I/2025, data 27 de janeiro de 2025.	• Alokasaun 2025=$150,000.00; • Nesesita aprovasaun CAFI atu loke kodigu atividade foun iha Programa 510; • subprograma 51047: Apoio de Administração e Técnico ao CAFI; • Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas.	CAFI Konfirma no Autoriza

No.	Naran Projeto	Kustu Estimativa (ADN, I.P.)	Alokasaun FI 2025	Orgaun Kompetênti Autoriza despezas - DL No. 23/2022, 19 de Maio
2	Feasibility Study for Carau Ulun River Water Recourses Development Scheme Manufahi, Timlor-Leste	$1,401,650.00; ho no. ref.: 0129/ADN, I.P./I/2025, data 27 de janeiro de 2025.	• Alokasaun 2025=$150,000.00; • Nesesita aprovasaun CAFI atu loke kodigu atividade foun iha Programa 510; • subprograma 51047: Apoio de Administração e Técnico ao CAFI; • Kodigu atividade: 5104701 - Estudo de viabilidade para Projeto de Infraestruturas.	CAFI Konfirma no Autoriza

Aprovado husi CAFI iha loron 4 de fevereiru de 2025.

O Conselho de Administração do Fundo das Infraestruturas
O presidente,

Gastão Francisco de Sousa
Ministro do Planeamento e Investimento Estratégico

Santina José Rodrigues Ferreira Viegas Cardoso
Ministra das Finanças
(La partisipa iha reuniaun CAFI)

Miguel Marques Gonçalves Manetelu
Ministro dos Transportes e Comunicações

Samuel Marçal
Ministro das Obras Públicas

REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE
Ministério do Planeamento e Investimento Estratégico
Fundo das Infraestruturas

NOTA DE DESPAICHO

1. ORIGEM DO DOCUMENTO

Proveniência do Documento

N Ref; 04/MPIE/UPI/SEV/I/2025

Data do Documento : 31/ 1 /2025

MPIE

2. DETALHES DO DOCUMENTO

Data Entrada do Documento: 31/ 01 /2025

Enviado ao:

1. Sr/ Mauricio Borges
2. Sr/a _____
3. Sr/a _____
4. Assessores Nacionais / Internacionais

Assunto:

Pedidu Ajendamento ba Reuniaun CAFI kona-ba Estudu Viabilidade ba Projetu Barajen Mota Balulic iha Munisipiu Ainaro no Mota Carauulun iha Munisipiu Manufahi

3. INSTRUÇÃO DO DIRETOR DO SGP

Data do Despacho: 31 / 1 /2025

Para Sr/a

1. Sr/a Maria F
2. Sr/a _____
3. Sr/a _____

Despacho:

Ajenda Se Kafé

Assinatura :

Mauricio Borges

IX GOVERNO CONSTITUCIONAL

MINISTERIO DO PLANEAMENTO
E INVESTIMENTO ESTRATÉGICO
UNIDADE DE PLANEAMENTO INTEGRADO
(UPI)

Dili, 31 de Janeiro de 2025

Nú. Ref. : 04 /MPIE/UPI/SEV/I/2025

Hato'o ba : **Ex^mo. Sr. Mauricio Borges**
Diretor-Executivo do Secretariado dos Grandes Projetos

CC : 1. **Gabinete do Ministro Planeamento e Investimento Estratégico**
2. Gabinete do Ministro Agricultura, Pecuária, Pesca e Floresta

Asuntu : **Pedidu Ajendamento ba reuniaun CAFI kona-ba Estudu Viabilidade ba Projetu Barajen Mota Belulic iha Munisípiu Ainaro no Mota Carauulun iha Munisípiu Manufahi.**

Ho respeitu,

Bazeia ba ofísiu resposta husi Agência de Dezenvolvimento Nacional, I.P. ho número referénsia; 0129/ADN, I.P./I/2025 data 27 de Janeiro de 2025, ho asuntu Rezultadu re-verifikasaun ToR *Feasibility Study* ba projetu barajen Mota Belulic iha Munisípiu Ainaro no Mota Carauulun iha Munisípu Manufahi.

Konsidera ba rezultadu re-verifikasaun hosi Agência de Dezenvolvimento Nacional, I.P. nune'e Sekretariadu Estudu Viabilidade hato'o pedidu ba iha Secretariado de Grandes Projeto hodi halo ajendamentu ba iha reuniaun CAFI atu sekretaridu estudu viabilidade bele apreenta hodi hetan desizaun no aprovasaun tuir mai ba projetu rua ne'e.

Exelentíssimo Sr. Diretor-Executivo, ami aneksa kópia karta husi Agência de Dezenvolvimento Nacional, I.P. hamutuk ho rezultadu re-verifikasaun ba ita-nia referénsia.

Laiha tan asuntu seluk aprezenta, ba Señor Diretor-Executivo nia konsiderasaun ba pedidu ida ne'e ami hato'o agradese wa'in.

Melhores Cumprimentos,

Epi Orleães
Coordenadora Unidade de Planeamento Integrado – MPIE

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

Dili, 27 de Janeiro de 2025

Ref : 0129 /ADN, I.P./ I/2025

Hato'o ba : **Sra. Epi Orleaes**
Coordenadora da Unidade de Planeamento Integrado - MPIE

Assuntu : **Rezultado Re-verifikasaun – Projeto Terms of Reference (ToR) Feasibility Study for Belulic and Carau Ulun River Water Resources Development Scheme Ainaro and Manufahi Municipality**

Ho Respeito,

Bazeia ba karta pedido verifikasaun ho no ref. 03/MPIE/UPI/SEV//I/2025 ho data 15 de Janeiro de 2025, ba asuntu ne'ebe mensiona iha leten, ekipa verifikasaun Unidade Avaliação dos Projetos – ADN, I.P. hala'o ona verifikasaun ba dokumentos refere. Ho nune bele hare rezultado re-verifikasaun iha *(aneksu)*.

Ba ita bo'ot nia atensaun ami hato'o agradecimento wain no subkreve ho konsiderasaun a'as tebes.

Rui Lourenço da Costa
Diretor Executivo - ADN, I.P.

Bedik-Hun, Fatuhada
Díli – Timor-Leste
info@mpie.gov.tl
+670 3310 289

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

FORMULARIO DE DESPACHO

Data de Entrada Documentos : 15 - 01 - 25 | **Data do Documentos :** 15 - 01 - 25

Husi : MPIE - UPI

No. Ref : 03 / MPIE / UPI / SEV / 1 / 2025

Projecto :

* Feasibility Study for Caracolum River Water Resources Development Scheme, Manufahi Municipality.
* Feasibility Study for Belulic River Water Resources Development Scheme Atauro Municipality

Quantidade Documentos : 3

Anexo :

* TOR : 2
* Resultado ADN : 1

Assuntos :

Revizaun TOR

No.Tlf : –

Companhia : _

Despacho :

- ○ Unidade de Gestão Administrativa
- ⊘ Unidade de Avaliação de Projectos
- ○ Unidade de Controlo e Validação de Qualidade
- ○ Unidade de Estudos e Desenvolvimento de Competências

Solisita UAP atu atende

- ○ Adjunto
- ○ Assesor/a
- ○ Gabinete DE / Base de Dadus
- ○ Other

Data : 15.01.25

Rui Lourenço da Costa
Director Executivo ADN

MINISTÉRIO DO PLANEAMENTO
E INVESTIMENTO ESTRATÉGICO
IX GOVERNO CONSTITUCIONAL
UNIDADE DE PLANEAMENTO INTEGRADO
(UPI)

Dili, 15 de Janeiro de 2025

Nu.Ref. : 03 /MPIE/UPI/SEV/I/2025
Hato'o ba : **Ex^mo. Sr. Rui Lourenço da Costa**
Diretor -Executivo da Agência de Dezenvolvimento Nacional,I.P
CC : **Gabinete do Ministério Planeamento e Investimento Estratégico**
Gabinete do Ministério Agricultura, Pecuária, Pesca e Floresta
Secretariado dos Grandes Projetos (SGP)
Assuntu : **Revizaun Termu Referensia (ToR) ba Estudu Viabilidade Projetu DAM Karaulun iha Munisipiu Manufahi no Belulik iha Munisipiu Ainaro**

Ho respeitu,

Dahuluk hato'o ami nia apresiasaun ba kolaborasaun diak husi ADN ne'ebe mak halo ona verifikasaun ba TOR no Kustu Estimativu ba projetu DAM Karaulun no Belulik. Rezultadu verifikasaun ba kustu estimativu Estudu viabilidade nian ho referensia karta ofisial husi ADN.IP datada 20 Dezembru 2024, ho numeru referensia, **2453/ADN,IP./XII/2024**. Ekipa FS analiza fila-fali no konsidera katak proposta projetu DAM rua (multi-funsaun) refere iha komplexidade bo'ot no ho ezizensia atu bele rekruta peritu/experts internasional kualifikadu. Ho nune'e, ekipa FS halo ona revizaun no adjustamentu iha ToR hodi bele hetan re-verifikasaun husi ADN, I.P.

Adjustamentu ne'ebe mak ami halo refleta iha ToR mak hanesan tuir-mai.

- Kualifikasaun husi Peritu/Experts: Peritu sira tenke iha pelumenus Mestradu iha área relevante no esperiénsia servisu profisionál liu tinan 10 (tinan 10–15) tuir tabela Expert Qualification iha aneksu.
- Peritu/Experts Adisionál: Aumenta tan peritu/experts senior nain rua ho Espesialidade Enjiñaria – Geologist no Mechanical Engineer. Atu bele halo investigasaun ba problemas hirak relasiona ho assuntus hidro-elektrika (hidopower) nian.
- Adisaun ba Provizaun Servisu: Inklui provizaun ida ba kolesaun dadus rainfall nian iha fatin tolu ba kada projetu ka estudu.

Detalles kona-ba alterasaun hirak ne'ebe bele assessu iha aneksu.

1. Revizaun ToR projetu Karaulun no Belulik.
2. Tabela Kustu Estimativu FS ba Projetu Karaulun no Belulik.

Melhores Cumprimentos,

Epi Orleães
Coordenadora da Unidade de Planeamento Integrado - MPIE

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

COST ESTIMATE - FEASIBILITY STUDY FOR "BELULIC RIVER WATER RESOURCES DEVELOPMENT SCHEME, AINARO, TIMOR-LESTE"

NO.	DESCRIPTIONS	Unit	Total M-M	Remuneration			Per Diem		
				QTY	Avarage Monthly Rate	Amount	No. of Days (Avarage)	Daily Rate	Amount
I.	**INTERNATIONAL EXPERTS**								
1	Water resource specialist (Team Leader)	Month	8.0	1	$ 17,250.00	$ 138,000.00	240.00	$ 60.00	$ 14,400.00
2	Dam Engineer	Month	5.0	1	$ 14,825.00	$ 74,125.00	150.00	$ 60.00	$ 9,000.00
3	Senior Engineer/Geologist	Month	4.0	1	$ 14,825.00	$ 59,300.00	120.00	$ 60.00	$ 7,200.00
4	Mechanical Engineer	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
5	Hydrologist	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
6	Geotechnical Specialist/Engineer	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
7	Watershed Management specialist	Month	2.0	1	$ 12,400.00	$ 24,800.00	60.00	$ 60.00	$ 3,600.00
8	Hydropower Specialist	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
9	Electro Mechanic Engineer	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
10	Soil and Land Classification Specialist	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
11	Agriculture Specialist	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
12	Irrigation and drainage engineer	Month	2.0	1	$ 12,400.00	$ 24,800.00	60.00	$ 60.00	$ 3,600.00
13	Economist/Cost estimator	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
14	Environmental Specialist	Month	2.0	1	$ 12,400.00	$ 24,800.00	60.00	$ 60.00	$ 3,600.00
15	Social Safeguards Specialist	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
16	Value Engineering /Analyzing Specialist	Month	3.0	1	$ 10,775.00	$ 32,325.00	90.00	$ 60.00	$ 5,400.00
17	GIS Specialist	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
	Sub-total for International Experts		**52.0**	**17**		**$ 687,550.00**		**Sub-Total**	**$ 93,600.00**
II.	**NATIONAL EXPERTS**								
1	Social Consultations (Local Expert)	Month	4.0	1	$ 4,250.00	$ 17,000.00	90.00	$ 40.00	$ 3,600.00
2	Environmental Expert	Month	4.0	1	$ 4,250.00	$ 17,000.00	90.00	$ 40.00	$ 3,600.00
3	Water Engineer	Month	4.0	1	$ 4,250.00	$ 17,000.00	90.00	$ 40.00	$ 3,600.00
4	Administrative Officer	Month	8.0	1	$ 500.00	$ 4,000.00			
5	Driver	Month	8.0	2	$ 400.00	$ 6,400.00			
6	Secretary	Month	8.0	1	$ 500.00	$ 4,000.00			
7	Utilityman	Month	8.0	1	$ 200.00	$ 1,600.00			
	Sub-total for National Experts		**44.0**	**8**		**$ 67,000.00**		**Sub-Total**	**$ 10,800.00**
III.	**REIMBURSABLES EXPENSES**								
1	International Transportation	R. Trip	17.0	2	$ 1,500.00	$ 51,000.00			
2	Local Transportation (Vechicle Rent & Fuel)	Month	8.0	2	$ 1,650.00	$ 26,400.00			
3	Communications Cost	Month	8.0	20	$ 50.00	$ 8,000.00			
						Sub-Total			**$ 85,400.00**
IV.	**FACILITIES**								
1	Office Establisment	Month	8.0	1	$ 1,000.00	$ 8,000.00			
2	Office Equipment & Furniture	Ls	1.0	1	$ 10,000.00	$ 10,000.00			
3	Office Operations (Office Suplies, Software,Toner,etc)	Month	8.0	1	$ 350.00	$ 2,800.00			
						Sub-Total			**$ 20,800.00**

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

COST ESTIMATE - FEASIBILITY STUDY FOR "BELULIC RIVER WATER RESOURCES DEVELOPMENT SCHEME, AINARO, TIMOR-LESTE"

VI.	**REPORT REPRODUCTION**					
1	Inception Report	Ls		1	$ 1,500.00	1,500.00
2	Preliminary Study Report	Ls		1	$ 1,500.00	1,500.00
3	Monthly Progress Report	Ls		1	$ 1,500.00	1,500.00
4	Draft Final Report	Ls		1	$ 1,500.00	1,500.00
5	Final Report	Ls		1	$ 1,500.00	1,500.00
					Sub-Total	**$ 7,500.00**
VII.	**SITE INVESTIGATION**					
1	Topographic Survey	Ls		1	$ 25,000.00	$ 25,000.00
2	Agriculture Market Survey	Ls		1	$ 30,000.00	$ 30,000.00
3	Public/Social Consultations	Ls		1	$ 10,000.00	$ 10,000.00
4	Geotechnical Investigation (borehole at the DAM site, etc.)	Ls		1	$ 120,000.00	$ 120,000.00
5	Establishment of River Stream Flow Measurement and Data Collection (2 locations)	Ls		2	$ 75,000.00	$ 150,000.00
	Rainfal Data Collection (3)	Ls		3	$ 10,000.00	$ 30,000.00
					Sub-Total	**$ 365,000.00**
					Contingency	**$ 64,000.00**
					Grand Total	**$ 1,401,650.00**

Verified by :
Antónia de F. Morais Soares
Engineer, ADN,I.P

Verified by :
Melenia da C. Barros
National Adviser, ADN,I.P

Checked by :
Rogerio M. Pires
Chefe Dep-ITIAS ADN,I.P

Certified by :
23/01/25
Jose Fernando Liu Soares
Coordinator UPA, ADN, I.P

TOR for the Feasibility Study
Belulic Water Resources Development Scheme

1) Objective of the Project

Belulic (Belulik) project in Ainaro, Timor-Leste is one of the priority irrigation schemes identified by the Government in the Agriculture Master Plan and Irrigation Development Plan (Master Plan). The basins of Belulic River has a productive agriculture land around 600 - 1000 ha with the potential more than 4000 ha (JICA Master Plan study 2015), but only 50% of this land is in active production for various crops. Water availability during the dry seasons is one of limitation factors for the effective agriculture productivity in this area. The area toward Westside of Belulik River such as Raimea and Jumalai also has relatively large agriculture area that have similar issues (low productivity, etc.). Water availability during the dry seasons is one of limitation factors for effective agriculture productivity in the mentioned area.

Therefore, the objective of this Feasibility Study is confirmation of possibility of water supply for multi-purpose use from the River Basins of Belulic based on comprehensive technical, financial, and environmental risk analysis.

2) Background

The current water volume in Belulic River is almost sufficient for various utilization in the agriculture crop production, especially rice during the rainy season, including covering the full area of potential or larger area of agriculture land. However, the water flow in the river decreases drastically during the dry season of 3 months. The various existing irrigation system (weirs, intake, and canal) in were developed in past years in downstream of Belulik, and beyond but these irrigation system cannot solve the dry season issues of the significant water flow reduction, especially to help farmers to produce rice. Preliminary analysis in the project concept suggested relatively high amount of rainfall might transfer into Belulik River that can be managed to fulfill the water demand for various purposes, such as irrigation demand and others. The feasibility study should analyze various options to manage the surface water availability within Belulik river basins, including but not limited to crop type and pattern, type of infrastructure to be constructed, frequency of production, etc.

3) Scope of Works

General requirement of FS

The purpose of this FS is to establish a rational option of water development plan through comprehensive study about local conditions including climate data, topography, and financial possibility.

Also, the risks on this new water development plan should be studied, such as environmental impact during and after the construction against the changing of river flow, especially in the downstream, forest, biology (including the marine flora and fauna), social life of people, and hazardous risks on the failure of the water control or storms. The Consultant is requested to execute FS to achieve the above-mentioned objectives by the following methods:

- Utilization of any past data of survey is recommended to shorten the implementation period of FS. However, the Consultant could propose actual survey/alternative method with reasonable goal, and if necessary to provide data for detail analysis.
- Shorten study period by parallel works for each survey and study is recommended.

FS shall include all investigations, survey, studies, and preparation of the documents as shown in Table below:

Table 1: Study Items to be done during FS

Category	**Requested Study Items** (but not limited to)	**Expected time to study**
a Background	Review of the relevant studies, such as Master plan, Sector plan, Government plans, etc. Review of applicable regulation/standard in Timor-Leste for water sector and water rights Recommendations to existing policy and regulation	
b Site survey	Clarification of the main purpose (*e.g., irrigation or water supply to other purpose, or power generation*) Current Social & Economic condition study Investigation of the current usage status of the river water and water rights Site survey of current conditions of the target farmland area about kind of crops, soil conditions, etc. Water availability from the river taking into account annual variations in the dry season Similar project records (if any)	
c Current condition study	Site investigation and/or demand/risks survey, including disaster, geology, hydrology, study of conditions (*e.g., ground conditions, volume, forest, village, estimated river flow especially during dry and rainy season flow*) Estimation of crop increase volume after project completion Study the possibility of double or triple cropping and developing a cultivation plan, taking into account the amount of water that can be taken in during the dry season Stakeholder's Opinion (farmers and related stakeholders, beneficiaries)	
d Design standard	Study of the Design Standards to be applied (preferable, TL standards)	
e Field Measurement and Data collection	**Rainfall – Runoff Data Collection** 1. Proposed the rainfall data collection to collect the hourly rainfall data within the catchment area (*3 sites for data collection are proposed*) 2. Conducted the river flow measurement (embellishment of measurement points, rating curve). Continues data collection during the study period to estimate the stream flow in the upstream of possible DAM location and at the downstream near Belulik River 3. The data of rainfall and runoff/stream flow must be used to justify the better estimation of water balance within the catchment area (system) Sediment data should also be collected to study the sedimentation rate during the rainy season as baseline to project the annual and long-term sedimentation, especially with the presence of DAM	

f Technical study	Technical Analysis, such as: 1. Review the target area of productive land and clarify the existing active area of cultivation and non-active area, and observe why not all productive area is actively producing the crops. The target area may be expanded beyond Belulik catchment system such as Raimea, Jumalai, and others lower area that may potentially taking the benefit of water supply from DAM 2. Hydrological study (rainfall-runoff modeling) to understand the water balance and variation from time to time for several options: ① With baseline – existing condition (with no development) ② Propose water resource development option (with Irrigation, DAM, etc.) 3. If DAM is an option, then the following investigation must be conducted: ① Asses the DAM location at the upstream of Belulic River branches based on various investigation: location of DAM in relation to farmland, soil/geotechnical information, rough cost, risk, etc. ② Hydrological Analysis with the DAM option to understand the impact of DAM to the river flow (flood control, operation of DAM, etc.) ③ Conduct the soil investigation and geo-technical site assessment for selected location (to understand the percolation loss and erosion rate in channel, etc.) ④ Risk assessment of DAM during the construction/after and Operation and Maintenance (especially sediment removal, dredging, etc.) 4. Study the total amount of water required during that period from sowing to harvest for the expected each crop in the target area 5. Considering the total required amount of water for development, study the loss rate in water canals, underground infiltration rate, transpiration rate, and direct precipitation to water development areas, especially during the dry season 6. Study the water balance during the dry season when assuming the use of the entire irrigated area, and when assuming partial use (as shown in *Table 2*) 7. Necessary capacity of facilities and resources of energy 8. Study of construction material resources and transportation 9. Outline Design & Rough Quantity for each option of the infrastructure development 10. Estimation of rough quantity of necessary facilities e.g., size and location of the DAM expected from the main purpose 11. Study of kinds and numbers of necessary supporting equipment for O&M 12. Countermeasures for the disasters, waste or emission 13. Estimation of possible amount of inflowing sediment and proposals for how to remove sedimentation 14. Required "Operation and Maintenance Manuals" after completion e.g., Sedimentation removal method from the bottom of reservoir and person in charge for canal cleaning, repairing methods of supplied O&M equipment 15. Owners' capability for O&M 16. Assumption of the construction period 17. Comparison study about applicable contract methods, such as, ordinary contract,	

	BOT, Turn-key etc.	
g Cost study	Rough estimation of Construction Cost Rough estimation of O&M annual cost	
h E&F study	Economic & Financial analysis (E& F analysis)	
i Risk and Environmental impacts	1. Estimation of the annual amount of sediment flowing into the reservoir, and methods or countermeasures for removing/reducing sediment with the necessary annual cost for them, such as biological-engineering 2. Considering the DAM collapses occurring around the world in recent years. Consultant should investigate their causes, such as flooding, earthquake, war, etc. And recommend countermeasures on how minimize or mitigate the risks 3. Countermeasures for the disasters, waste or emission 4. Identification of the potential environmental impacts for each proposal and respective mitigation measures 5. Influence of the project to the surroundings, including Resettlement and Land acquisition pre-conditions etc. 6. Social impact assessment and identification of the potential affected people	
j Alternative proposal	• Propose alternative ideas instead of reservoir/DAM construction, if possible • Possibility of installing of power plant as multipurpose dam with a rough study of the length, diameter, and construction cost of the waterway tunnel to the planned power plant construction site, taking into account the altitude of the dam installation point and water head difference required for power generation • Assess the potential water use for the animal production (if the multi-purpose DAM is selected)	
k	Preparation of TOR for the next stage of implementation (Detailed Design)	
l	Preparation of Checklist of the Study Report	

The Consultant is requested to have a study policy meeting based on the preliminary study report as shown in clause 9-1) of this TOR to decide the main target of this FS study.

4) Expected study for FS (Specific Item to be studied)

The necessary water volume during the dry season is variable according to the utilization methods of the irrigation area. Therefore, the possibility of expanding of existing weir/canals or new development will be different according to the new irrigation area plan (and for other water developments) as shown in the following table.

Table 2: Usage methods of irrigation area

Scenario	Usage methods in dry season	Symbols
1-1	All area for rice even in dry season (Necessary water volume becomes maximum)	R
2-1	Partially for rice production in dry season. Remained area could be used for other crops	R O
2-2	Some of the remained area out of rice area will be used for other crops in dry season	R O N
2-3	Limited area for rice and other area will not be used in dry season	R N
3-1	no rice production in dry season, and other crop production could be considered.	O
3-2	Limited area for other crops and other area will not be used in dry season	O N
		R: Rice, O: Other crops, N: No crops
Other crops, such as cassava or peanut, will require less water volume consumption comparing with rice, but their required water will be different by		

crops. Therefore, necessary water volume for other crops (except rice) could be used some supposed average of a few kinds

The Case study of irrigation in dry season is requested six cases as shown in above table (from 1-1~3-2).

The Attachment 2 at the end of this TOR is an example for the comparison analysis summary of each case study.

The necessary water volume in dry season should be proposed based on above case by case.

The final target area (tentatively ~4000 ha, but subject of investigation) may be divided equally to make simple the calculation in case of the multiple usage.

On the study of necessary water volume, the vaporing, penetration to the ground and re-usage of water from an area to other area should be studied and their backup data should be shown.

If the necessary water volume for the target irrigation area is bigger than the river flow volume in dry season, the reservoir with dam could be proposed with hydraulic analysis calculation.
In this analysis, Consultant should show appropriate reservoir volume and dame size based on the reasonable precipitation data from the minimum past 20 years for various source including the satellite based rainfall data with proper correction or else in other adjacent area that has reasonable record of historical rainfall data.
Water discharge control system on flood and **removal or protection methods of the cobbles sedimentation** should be proposed also.
If dam construction become necessary, consultant is expected to study about the possibility of the installation of a **power plant** and **flood control function** as **multi-purpose dam.**

5) Cooperation

The EMPLOYER will arrange a meeting prior to implementation of FS, and from time to time as necessary, require the Consultant to provide other technical support services which are deemed relevant to FS. In carrying out the work, the Consultant shall cooperate fully with the relevant Ministries and Government Agencies.

6) Responsibility of the Government

In relation to the works by the Consultant that require cooperation of other Government Agencies, the Government will provide liaison, and will ensure that the Consultant has access to all information that may be allowed by law for the performance of the Services.

7) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant the support and information to assist in performing the services for the effective implementation of the Project:

1) Counterpart staff (focal point);
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

8) Assignment of Experts

8-1) Period of FS

The required period for FS work is **8 months** after Notice to Proceed up to Submission of Final Study Report.

8-2) Assignment of Key Experts

It is expected that the list of necessary Experts will be as follows. But the Bidder should propose essential or better Experts in the proposal with the Assignment schedule based on the work plan according to TOR.

Table 3: Requirements for Experience and Qualification of the specialists

N	POSITION	QUALIFICATION	EXPERINCE
1	Water resource specialist (*Team Leader*)	Min. Master's Degree	Min. 18 years
2	Dam engineer (*Deputy Team Leader*)	Min. Master's Degree	Min. 15 years
3	Senior Engineer/Geologist	Min. Master's Degree	Min. 15 years
4	Hydrologist	Min. Master's Degree	Min. 12 years
5	Mechanical Engineer	Min. Master's Degree	Min. 12 years
6	Geotechnical engineer	Min. Master's Degree	Min. 12 years
7	Watershed management specialist	Min. Master's Degree	Min. 12 years
8	Hydropower specialist	Min. Master's Degree	Min. 12 years
9	Electro-mechanic engineer	Min. Master's Degree	Min. 10 years
10	Soil and land classification specialist	Min. Master's Degree	Min. 10 years
11	Agriculture specialist	Min. Master's Degree	Min. 12 years
12	Irrigation and drainage specialist	Min. Master's Degree	Min. 12 years
13	Economist/Cost estimator	Min. Master's Degree	Min. 12 years
14	Environmental specialist	Min. Master's Degree	Min. 12 years
15	Social safeguard specialist	Min. Master's Degree	Min. 10 years
16	Value Analysis (VA)/Value Engineering (VE) specialist	Min. Master's Degree	Min. 10 years
17	GIS specialist	Min. Master's Degree	Min. 10 years
National Staff			
18	Social Expert (Local)	Min. Master's Degree	Min. 5 years
19	Environmental Expert (Local)	Min. Master's Degree	Min. 5 years
20	Water Engineer (Local)	Min. Master's Degree	Min. 5 years

But the Bidder should propose the necessary or better Experts in the proposal with their Assignment schedule based on the work plan according to TOR. CV of each staff should be attached to the Technical Proposal, including brief introduction of the function at similar project engagement during the engaged period of the study.

The Work items in the previous Tables should follow the items in 3) Scope of Work, however, bidder may add (not delete) work items based on his idea. This is the subject at the Contract clarification and negotiation meeting.

The Bidder should show the summary table of work sharing of each expert as shown in Table of next page. (Hereinafter, "staff" refers to all consultant staff, and "expert" refers to key staff excluding assistants and administrative staff). Technical and cost proposal shall be prepared based on the staff assignment schedule of all staff within the total study period of FS.

Table 4: Summary of Work Sharing Table of Each Experts

Yellow part should be filled by the Consultant (*this is just an examp*

Experts Name quired Item in ToR (add es as shown in ToR)	Water resource development planning specialist	Planning Engineer / Dam engineer	Hydrologist	Geologist	Geodetic engineer	Civil engineer	Electro mechanic engineer	Water development and drainage engineer	Soil and land classification specialist	Agriculturist	Economist	Environmental specialist	Social safeguard specialist	Watershed management specialist	GIS specialist	Hydropower specialist	VE/A specia
ecutive Summary of : report	○	◉	○							◉							
Review of relevant dies	○	○								◉						◉	
Applicable Timor Leste ulation for the velopment	○	◉			○	○				◉							
Site survey about target a	○	○	◉		○			◉	◉	◉					◉	◉	
Social & Economic ndition study about rrent & Future				○		◉				◉							◉
Design standard to ply			◉		○			◉						◉			
Technical study	○	○	◉				◉	◉	◉					◉		○	
Outline design	○		○		◉		◉	◉						◉		○	
Estimation of rough ntity							◉	◉						◉		○	
Operation and intenance study		○	◉					◉						◉		○	
Assumption of nstruction period		○			◉												

Approximate nstruction cost			○		◎			◎									
nnual O& M cost	○		○		◎												
Initial Environmental amination						◎						◎					
Social impact essment						◎						◎					
Countermeasures for disasters, waste or ission		○	◎		○							○	◎				
E&F analysis				◎							◎						○
Alternative Proposals, if any		◎	○										◎				
Preparation of TOR for .D		◎	○		○												
Preparation of ecklist of the study ort		◎															
Total by hours																	
By days																	
By months																	

Note:	◎ Shows the main person for the study item, and ○ assistant
	Estimated times for the studies (hours) should be filled by the Consultant
	Expert's name should be actual assignment name
	The billing rate of each staff should be shown in Financial Proposal

9) Reports and Documents

9-1) Reports to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. The Main text of Final Report should be translated into Tetum (official language)

Table 5: Reports to be submitted for the Study

Report	Content (not limited to)
Inception Report	✓ Summary of the anticipated/proposed work ✓ Activities and necessary resources required for achieving projects purposes ✓ Activity schedule ✓ Contents and duration of project activities ✓ Key phases of implementation process ✓ Level of Stake holders to be involved ✓ Information about collecting tools, if any ✓ Data Collection and Analysis Rules. The type of skills and abilities required to team members ✓ Duties and responsibilities of each member ✓ Period of engagement of each team member
Monthly Progress Reports	Brief & concise description of followings: ✓ All activities and progress in the previous month ✓ Problems faced or problems anticipated with steps taken or recommendations for correction ✓ The works to be performed during the coming month
Preliminary Study Report	✓ Water availability ✓ Consultants' proposal about the water development including irrigation ✓ Calculation results of water development including each crop type and its cultivation utilization rate during the dry season (example of table is shown in the end of this TOR) ✓ Necessary water supply facilities for each proposal ✓ The construction cost of necessary facilities for each proposal ✓ The final cost estimation of supplied water for each proposal ✓ Cultivation costs (per unit weight) for each type of grain ✓ Expected selling price from farmers to traders for each type of grain ✓ Financial benefit vs cost table for each type of grain and for each alternative
Draft Final Report	✓ a) Review of relevant studies ✓ a) Applicable regulation and Standard study

Final Report (Main part should be within ~100 pages)	✓ a) Review of relevant studies including M/P and TL regulations to be applied d) study results about design standard to be applied ✓ b) Site investigation to find out current condition and issues ✓ c) Current Financial & Economic Conditions of the target Project area ✓ d) Study of Design Standard to be applied (preferable to use TL standards) ✓ e) Technical study including O&M methods ✓ f) Rough Cost Estimation ✓ g) E&F Analysis ✓ h) Risk study and Scope for Environmental Impact Assessment ✓ i) Alternative proposals ✓ j) TOR for DED ✓ k) Preparation of Checklist of the study (Page number of each item should be filled)

9-2) Copies of Reports and Submission dates

The Reports should be submitted as specified below:

Table 6: Reports related to the Feasibility Study

	Hard Copy/ Number	Time limit
Inception Report	2 copies, and soft copy	Within 2~3 calendar weeks after the Notice of the Commencement of the Services of the Project
Preliminary study report about financial possibilities	2 copies, and soft copy	Within 2 months after the Notice of the Commencement of the Services of the Project
Monthly Progress Report	2 copies, and soft copy	By the $20^{th} \sim 30^{th}$ of each month during Study period
Draft Final Report	3 copies, and soft copy	Within 3~5 calendar weeks before the final date of contract. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer)
Final Report	4 copies, and soft copy	Within 1~3 calendar weeks after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer
x **Soft Copy is required together with hard copies on the submission of each Report**		

9-3) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

a) Field measurement report (rainfall and stream flow data collection method and data analysis, topographic data (if available), geotechnical investigation, etc.)

b) Database in the format of GIS (Shape files) – (total potential land area, total active land agriculture land area, expected future expansion area, data collection sites, irrigation intakes, weirs, etc.)

c) Hydrological and Hydraulic analysis Report, including water balance (baseline, scenarios with/without DAM, etc.)

d) Crop pattern water demand analysis for various scenarios per table 2

e) Sedimentation countermeasure report;

f) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale on the consolation meeting with EMPLOYER prior to the work):
   - ✓ Location map of Dam, Canal, intake, and weirs
   - ✓ Layout plan of canal, weirs, DAM, and Intake, Beneficial Area
   - ✓ Typical cross section of dam, canal, pipe/intake, weirs
   - ✓ Facility plans for Dam

g) Rough Construction schedule;

h) Rough Cost estimates (see Attachment 2 Summary Table of Rough Cost estimate);

i) Quantities and Unit Rate of Major Item;

j) Unit rate reference of the past similar projects, e.g.:

Table 7: Reference to the unit rate of the similar projects

Project name				
Irrigation area, ha & Total project cost				
Dam volume & cost				
Reservoir volume				
Canal length & cost				
Others				

k) Checklist of the FS Report;

l) TOR for DED.

9-4) Checklist (Sample sheet, *Attachment 1* to TOR)

- ✓ Consultant shall prepare the Checklist as the sample sheet attached to TOR;
- ✓ Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER;
- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Attachment I-15 of FS Guideline Vol. I.;
- ✓ Consultant may change his subject name for survey and study but shall keep the Category of defined item categorization for the convenience of the appraisal by the EMPLOYER;
- ✓ Consultant may add survey subject or study subject within a defined Category;
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS;
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

10) Payments

10-1) The Payments will be executed as follows:

Table 8: Schedule of the payments

Time	Payment amount	Payment date
After acceptance of the **Inception Report**	10% of agreed Contract Amount	within 30 days after acceptance
After acceptance of the **Preliminary study Report**	15% of agreed Contract Amount	within 30 days after the final decision by the Employer to continue or discontinue FS
After acceptance of the **Draft Final Report**	35% of agreed Contract Amount	within 30 days after acceptance
After acceptance of the **Final Report**	40% of agreed Contract Amount	within 45 days after acceptance

10-2) important notice: The Consultant is requested to accept followings:

- The penalty will be applied against the delay of the submission of the Draft final Report and Final Report within the designated date as mentioned in Clause 9-2) of the TOR. If the submitted Draft report or Final report is not accepted by the Employer, the number of the days of the delay shall be excluded from the period between the date of submission of the report and the date of disapproval letter.
- The penalty amount 0.01 % of the Contract amount against the delay for one day. The penalty shall be deducted from the payment for the submission of the Draft final Report and Final Report respectively.

Attachment 1:

Checklist for the Survey/ Investigation and Study

Items to be surveyed and studied for the formulation of FS ("A-K" are category mark in Chapter 8 of FS Guideline)	*Report page/chap*	*Checked by LM*	*Date*	*Checked by MPS*	*Date*
Category A) Review of reference					
Ex: Review of relevant documents studies, such as Master plan					
Ex: Review of applicable regulations					
Category B) Site investigation to find out current condition and issues					
Ex: natural conditions such as climate, hydraulic with disaster matters, if necessary					
Ex: location survey, with topographic, geological matters, if necessary)					
Ex: Inventory survey for existing reusable facilities or demolished					
Ex. Opinion / Demand from Stakeholder (related local people)					
Ex: resources or energy study (such as aggregate, cement, steel, skilled labor, electric power supply, water, etc.), if necessary					
Category C) Current Financial & Economic Conditions related Project					
Ex: Social & Economic condition study about Current & Future					
Ex: Recent budget for the sector					
Ex: Current revenue, if any					
Ex: Similar project records (if any)					
Category D) Study of Design Standard to be applied					
Ex: (preferable TL standards)					
Category E) Technical Analysis					
Ex: future demand					
Ex: necessary capacities & necessary facilities resources energy					
Ex: Outline Design & Rough Quantity					
Ex: Rough Cost estimates with Unit Rate for Major Items					
Ex: Assumption of construction period					
Ex: Operation and Maintenance (O&M) plan					
Ex: Countermeasures for the disasters, waste or emission					
Category F) Rough Cost estimation					
Ex: Rough estimation of Construction Cost					
Ex: Rough estimation of annual O& M cost					
Category G) Economic & Financial analysis (E& F analysis)					
Ex: Project Cost vs Project benefit (refer Attachment i-3)					
Ex: Indirect Benefit					
Category H) Risk and Environmental study					
Ex: Influence of the project to the surroundings, including IEE, Resettlement etc.					
Ex: Social impact assessment					
Ex: Land acquisition possibility with their pre-conditions					
Ex: Classification of environmental category					
Category I) Alternative proposal, if any					
Ex: Future extension plan, if necessary					
Ex: Privatization tendency, if any					
Ex: Alternative proposal (such as location or routes or methodologies)					
Category J) Preparation of TOR for DED					
Category K) Preparation of Checklist of the study report					
Attachment to FS Report (Consultants may add drawing list, if necessary) see Vol I- Chapter 9	*Report page/chap*	*Checked by LM*	*date*	*Checked by MPS*	*date*
1) Location map					
2) General plan					
3) layout Plan					
4) Typical Cross section					
5) Facility Plan					

Checklist is the most important to make easy FS evaluation, and Consultants may put additional pages, if necessary

Necessary drawings are different according to the Project

Attachment 2:

Reference: Example of comparison table (period: necessary month from seeding to harvest)

Alternative	Planting (area)	Planting area (ha)	Possible crop production volume (ton/ha/cycle)	Farmer's selling price ($/ton)	Total income (mil $/cycle)	Planed cultivation cycle per year	period for one cycle	Total income per year	Required water in a second	Required water in a month (m3/month/ha)	Average river water flow in dry season per month		Shortage of water in dry month (m3/month)	Total required water in a month	otal construction cost for necessar facilities ($)	Facility cost per month during 20 years ($/month)	Water unit cost per m3 ($/m3)	Water cost for total area ($)	Cost for crops ($/ha/one period)	Total cost ($/year)	B/C
			A= Σ (kind)	B	c=A* area*B	cycle	period (month)	C=c*cycle	(lit/sec/ha)	D= Σ (kind)	(m3/sec)	E (m3/month)	F=E- D*area	(million m3)	G	h=G/20 H=h/period	I=H/F	J= I*F *period* cycle	K	L=(J+K*area*cycle)	M=C/L
1-1	R	2500	3	300	2.3	1	3	2.3	2.0	5184			-11.4	51.3	1190	20	1.74	60	900	61.8	0.04
2-1	R	1250	3	300		1	3		2.0												
	O	1250	5	500	1.1	1	4	3.1	0.2	518			0.9	0.0	10	0	0	0	1200	1.5	2.08
2-2	R	833	3	300		1	3		2.0												
	O	833	5	500		1	4		0.2		0.6	1.6									
2-3	R	1250	3	300		1	3		2.0												
3-1	O	2500	5	500		1	4		0.2												
3-2	O	1250	5	500		1	4		0.2												

Water Resource Development
Belulik River Basin

PROJECT CONCEPT

PREPARED BY STUDY TEAM:

Major Project Secretariat (MPS) & Integrated Planning Unit (UPI)

2024

Contents

1. Project Name

The project **"Feasibility Study of Water Resource Development South Coast River Basins (Belulik River Basins)"** proposed by the Ministry of Agriculture, Livestock, Fisheries, and Forestry (MAPPF) as an investment initiative with the aim to address water resource challenges along the south coast, particularly at the downstream of Belulik River Basins. This project seeks to increase and optimize water usage for agriculture (crops production such as rice and plantation crops), as well as domestic purposes, animal production, and flood control in the downstream catchment areas.

2. Issues to be solved

In the downstream area of Belulik River Basins approximately 4200 hectares of agriculture land. Other non-irrigable land that may be suitable for crop plantation has not been determined/identified. However, the productivity of crops is notably low per hectare per year for rice production as highlighted by the JICA Master Plan, 2015. According to this study, the total cultivable land in Timor-Leste is estimated around 66,500 hectares, and only approximately 52% of this land (around 34,359 hectares) is actively cultivated, and yield is relatively low for crop production per hectare annually. One significant factor of low productivity is insufficient water for irrigation during the dry season that is limiting agricultural output throughout the year. Additionally, during periods of high river flow, hundreds of hectares of farmland are frequently inundated, posing a threat to livelihoods.

The South Coast area has been marked as a petroleum industrial zone for development, encompassing Suai, Same, Natarbora, and Viqueque districts. This industrialization will enhance urban grow in the region that potentially require a substantial amount of water for purposes. The abundant rainfall in the mountainous areas, which translates into significant river flow, represents a valuable water resource that could be harnessed to meet the burgeoning water demands associated with the petroleum industry development. Furthermore, in alignment with the IX Government's constitutional mandate, there is a target to increase animal production over the course of the five-year term ending in 2028.

The proposed water resource development in the area offers an alternative solution to address several pressing issues, including meeting water demands during the dry season, implementing flood control measures, and bolstering the water need as part of the broader development agenda for the South Coast region.

The detailed feasibility study is essential to validate previous studies and address the following aspects:

- **Agricultural Land Assessment**: Define the potential and active agricultural areas, crop types, cropping frequency, and productivity issues within the project boundary;
- **Water Availability and Demand Analysis**: Conduct long-term hydrological studies to assess rainfall-runoff dynamics and identify water deficits to support government agricultural targets;
- **Irrigation System Evaluation**: Assess existing irrigation infrastructure and identify production limitations;
- **Risk and Impact Assessment**: Evaluate potential risks and impacts of proposed water infrastructure development;
- **Cost and Financial Projection**: Prepare detailed cost estimate & financial projection of project.

3. Location: South Coast (Belulik)

The map below shows the proposed development area, and provide a rough outline of the catchment areas, and agriculture-beneficial zones within the project boundary as proposed by the Ministry of Agriculture and Fishery (MAF) in 2015 for the Belulik project sites. The Belulik river basins constitute the east-northern branch of a larger river system within the target area.

It is crucial during the feasibility study to accurately identify the total low-lying areas that could potentially benefit from the upstream water resource development. In this regard, the JICA Master Plan team in 2015 has already identified some baseline information that can serve as a guiding framework for this endeavor.

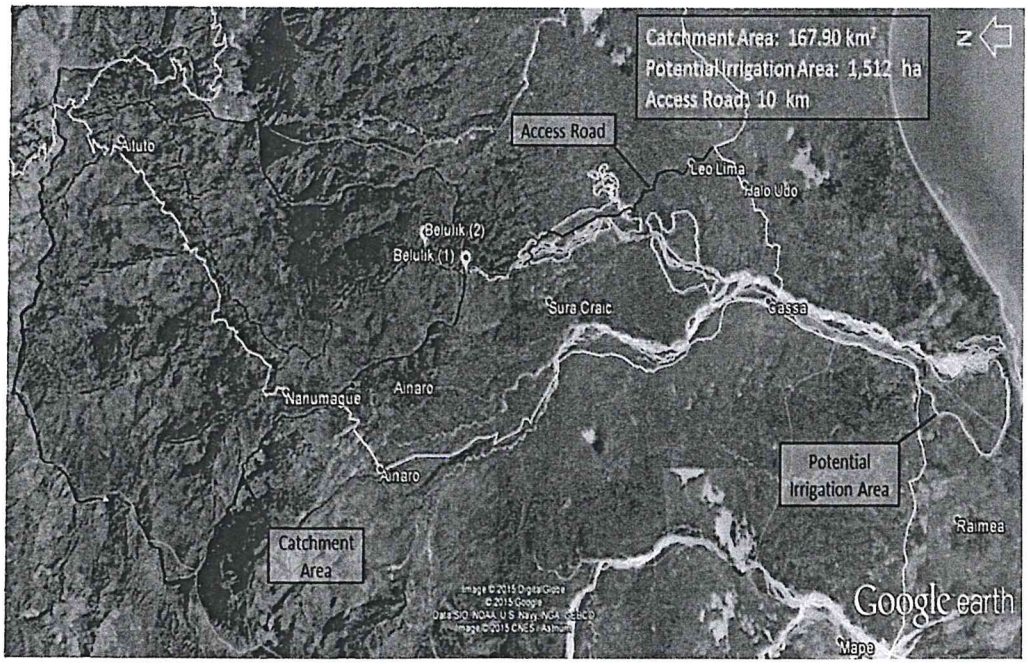


Figure 1: Project Location and beneficial area in Belulik

The precise delineation of catchment boundaries, and low-lying areas suitable for agriculture production must undergo thorough evaluation through comprehensive surveys and on-site assessments during the detailed feasibility study. This assessment should encompass various factors, including soil type, potential agricultural land for specific crops, soil characteristics, topography, and river networks. These data are essential for conducting diverse analyses, such as hydrological assessments and evaluations of water utilization potential.

4. Justification of the Project

This project aims is to address the following issues outlined by the Government:

- **National Plan for Increased Rice/Food Production**: In the South Coast area, specifically in Belulik, which possessing a combined productive land area around 4200 hectares, there is a need to boost rice and food production. The existing production yield is hindered by limited by water availability during a dry season;

- **National Food Security Priority**: It is imperative to enhance domestic food production to ensure Timor-Leste's food security. Currently, a significant portion of food items, particularly rice, is imported from foreign countries. The Government policy also is to reduce imported products of various plantation crops from the foreign countries, such as mangoes, oranges, tangerine, durian, etc. With the availability of water in the area, especially at the downstream region, the potential for crop plantation production could be initiated or commercialized;
- **Petroleum Industry Development**: The Strategic Development Plan (SDP) outlines the development of the petroleum industry in the South Coast region to facilitate economic diversification. This industrial expansion, along with urban growth, will necessitate a considerable amount of fresh water for both domestic and other purposes;
- **Government Program for Increasing Animal Production**: As part of the Government's agenda, there is a target to boost animal production by 20% by 2028, and beyond. Adequate water availability facilitated by dams or similar infrastructure can enhance the animal production;
- **Flood Control** in Downstream Belulik: There is a risk of flood from upstream areas potentially inundating several hectares of farmland in downstream Belulik. Construction of dam(s) can effectively control flooding, safeguarding agricultural land, and livelihoods.

5. Project Purposes and Targets

5.1 Project Propose

The primary purpose of the development project is to address water challenges within the targeted area, and to mitigate risk of flood on downstream farmland. The project will achieve the following goals:

- **Enhance agricultural productivity** across 4,200 hectares target area, encompassing of various activities such as animal production, with the overall aim to boost an agricultural output;
- **Ensure provision of clean water** to support future urban development, and sustain water for industry, particularly in alignment with the growth of petroleum sector along the South Coast;
- **Implement measures to safeguard downstream farmland** from the adverse impacts of severe flooding originating from upstream sections of the Belulik River, thereby protecting agricultural livelihoods and promoting resilience within the community.

5.2 Project Targets

The implementation of the proposed water resources development project should be designed in such way that the following realistic (achievable) target can be met:

- Target 1: Rice productivity in the target area to be increased to 4-6 tons/ha/year;
- Target 2: Animal production of minimum 2000 heads of cattle/cow per year in the area of 1000 ha (exact area and location to be consulted with MAF during the FS stage);
- Target 3: Domestic water supply of 7 million cubic meters per year;
- Target 4: Crop plantation to be increased and expanded for additional 500 – 1000 ha (exact area to be determined and consulted with MAF during the FS stage).

6. Preliminary Analysis of Water Supply and Demand

Conducting a comprehensive baseline study is essential during the feasibility stage of the water resource development project. This study will identify existing issues, propose solutions, and evaluate any challenges associated with implementing these solutions. The key components of the baseline study should include irrigation scheme assessment and issues, cultivated area analysis, land ownership, irrigation management, water resource availability, and demand analysis.

6.1 Rainfall data

The primary source of water for this river basins is rainfall.

The map below displays pertinent rainfall data within the project boundary.

Figure 2: Rainfall Distribution Network in Belulik River Basins

Taking the spatial average monthly data from the above map, the following figure has been derived as water input into the Belulik catchment system.

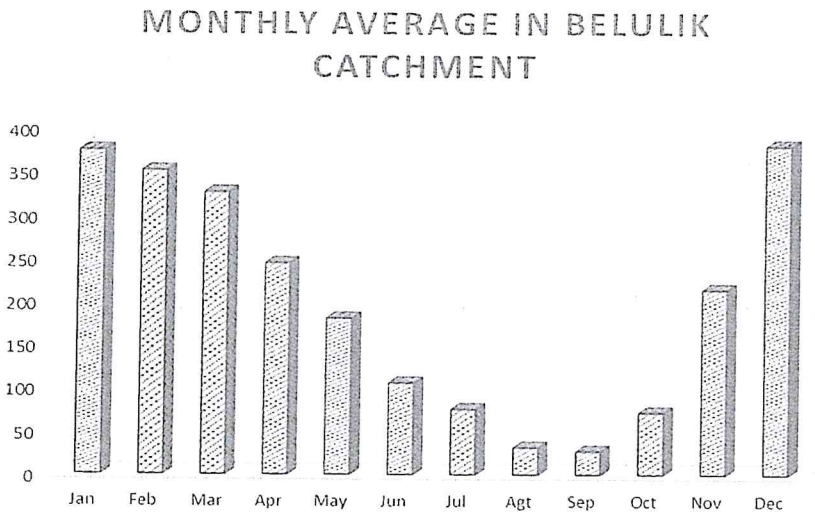


Figure 3: Distribution of Monthly Rainfall Data within Belulik Area

The monthly rainfall data reveals a potential deficit in water supply during August to September each year. However, for the remaining ten months, water availability exceeds demand significantly. Hence, it is useful to apply various technical methods, and Best Management Practices (BMPs) to mitigate the deficit by utilizing surplus water from other months or alternative sources such as groundwater storage.

Figure 4. GSMAP Data availability for Potential Water Budget Analyses

Monthly rainfall data reveals a potential deficit in water supply during August to October each year. However, for the remaining nine months, water availability exceeds demand significantly. The rainfall data based on the satellite derived data of 24 years is available for the entire Timor – Leste, with 10x10 km spatial representation. This data can be used to simulate the long-term hydrological analysis but the data need to be calibrated/corrected with the ground data in order to know the reliability. The preliminary analysis of rainfall data from GSMAP can be seen from the following figure.

6.2 Preliminary Calculation of Water Balance (Supply and Demand)

The river flow primarily derives from rainwater entering the river basins through the catchment system. Utilizing available historical rainfall records within the project areas, it possible to estimate the monthly water supply. The calculation is based on the following assumptions:

1. Approximately 50% of total rainfall will result in runoff (surface flow);
2. Rice production in the South Coast will occur twice a year compared to the existing once-a-year cycle. The benchmark for irrigation demand is estimated at around 1.5 l/s/ha (this data is subject to confirmation in the Feasibility Study). Each season spans around 4 months, and during the rainy season the demand is only 20% from the given benchmark;
3. Animal production will utilize around 1000 hectares of land, with an assumed production of 2000 cattle per year. During the dry season, it is estimated that around 40 liters per head of cattle per day will be required;
4. Domestic and industrial demand is estimated at 7.2 million cubic meters per year (based on assumptions).

Using these assumptions, the water supply and demand for each river basin can be calculated. Subsequently, the estimation the water balance deficit can be made. Other water demand, such as domestic and industrial use, will be determined during the feasibility study through consultations with the relevant government agencies (MAP, BTL, IPG, etc.).

Table 1: Monthly Water Availability and Demand Analysis of Belulik Catchment System

Belulik	Monthly Average, mm	Effective Rainfall, mm	Water Volume in the River, MCM	Demand1 (Rice Production), MCM	Domestic Water Supply	Demand 2, MCM (animal farming of 1000 HA	Total demand, MCM	Water Balance = Supply - Demand, MCM	Reservoir Volume, MCM
Jan	374.5	224.7	37.7496	2.3328	0.6	0.06	2.9928	34.7568	0
Feb	351.25	210.75	35.406	2.3328	0.6	0.06	2.9928	32.4132	0
Mar	326.25	195.75	32.886	2.3328	0.6	0.06	2.9928	29.8932	0
Apr	244.5	146.7	24.6456	4.6656	0.6	0.06	5.3256	19.32	0
May	181	108.6	18.2448	4.6656	0.6	0.527	5.79216	12.45264	0
Jun	106	63.6	10.6848	4.6656	0.6	0.293	5.55888	5.12592	
Jul	75.75	45.45	7.6356	4.6656	0.6	0.293	5.55888	2.07672	0
Agt	31.5	18.9	3.1752	11.664	0.6	0.643	12.9072	-9.732	9.732
Sep	27	16.2	2.7216	11.664	0.6	0.643	12.9072	-10.1856	10.1856
Oct	72	43.2	7.2576	11.664	0.6	0.643	12.9072	-5.6496	5.6496
Nov	214.25	128.55	21.5964	2.3328	0.6	0.06	2.9928	18.6036	0
Dec	381	228.6	38.4048	2.3328	0.6	0.06	2.9928	35.412	0
total	2385	1431	240.408	65.3184	7.2	3.40272	75.92112		25.5672

The calculation above is a preliminary estimation based on limited information. During the Feasibility Study (FS) the detailed calculations is necessary for more reliable estimation of the water balance analysis. For the current development project, the water demand is following:

- Irrigation for 3,000 – 3,500 hectares of land in the south coast area;
- Water demand for aquaculture and animal production in the downstream area, covering a total of 1000 hectares of land;
- Domestic water supply for a population of approximately 100,000 people, with a per capita water consumption of 200 liters per day;
- Demand for crop plantation with the total area of land should be estimated during the study.

The following table presents a summary of the water demand in the service area.

Table 2: Projected Demand for water in the Service Area (annual Demand)

Type	Demand (Belulik), MCM
Irrigation	65.32
Animal Production	3.4
Domestic consumption	7.2
Total	76

Estimation of the demand for industrial development poses challenges, but during the Feasibility Study (FS), consultations with the relevant stakeholders will be crucial to gauge water usage requirements for both domestic and industrial purposes. Based on this estimation of water balance analysis, it's evident that water demand poses no issue during the rainy season. However, it becomes a concern (resulting in a deficit) during the dry season about solutions to maintain agricultural and animal production within the target area. Table below outlines the rough estimation of water deficit.

Table 3: Summary of Water deficit in the target Area

Type	Demand (Belulik), MCM
Deficit	20-30

The government should explore various options to address these issues. The detailed feasibility study will be conducted for water supply and demand analysis to provide more precise estimation of the water balance (supply vs. demand), particularly focusing on the deficit during the dry season.

- Improve the Irrigation Systems;
- Implement Multi-purpose Dams (as one of options), and enhance irrigation infrastructure;
- Introduce Solar-powered groundwater Pumping Systems and Enhance irrigation facility.

The above table suggested that the deficit of water demand in Belulik that need to be solved in order to achieve the government target of improving the agriculture productivity. The detail feasibility study should be conducted to investigate the water supply and demand analysis, especially the long-term rainfall-runoff modeling must be conducted to provide the long-term trend of the water availability, particularly the variation between the wet and dry seasons, long-term variation of dry seasons, etc. The time series calculation on the water availability, should concluded the following important aspect of water budget in a frequency term.

- High season flow;
- Long-season;
- Extreme flow;
- Dry weather flow.

Based on this water budget analysis and demand forecast, the type of infrastructure development should be proposed. The demand of water within the watershed system shall be estimated based on the following scenarios:

(1). Water demand for irrigation;
(2). Water demand for animal production (the scale and size of the project need to be consulted);
(3). Water demand for crop plantation (the scale and size need to be consulted);
(4). Water demand for domestic water supply based on population growth.

7. Outlines of Technical Solutions

Various technical solutions must be compared during the feasibility study considering the factors such as technical feasibility, cost, operational and maintenance requirements, as well as financial benefits, and return of investment for each option. Therefore, three possible scenarios need to consider during FS:

- Improvement of the Irrigation Systems (primary aim to enhance the agricultural production);
- Integration of Irrigation with the Multi-purpose Dam (irrigation demand, domestic water supply, animal production, crop plantation, etc.);
- Irrigation using solar-power Water Pumping (irrigation, animal production, and crop plantation).

7.1. Catchment, Improvement for Irrigation and Agriculture Land Availability

Baseline Agriculture and Irrigation Assessment

The baseline assessment should be conducted as part of the preliminary study to evaluate key factors affecting agricultural productivity, and performance of irrigation systems. This assessment will establish better understanding of the current conditions and challenges, serving as a foundation for proposing future improvements. The assessment should including, but not limited to the following aspects:

- **Land Area Analysis:**
  - ✓ Catchment area characteristics: Evaluate the hydrological and topographical features of the catchment area;
  - ✓ Land Use Patterns: Assess current land use, including agricultural, residential, and natural areas;
  - ✓ Irrigation Land Assessment: Identify potential irrigable land and existing irrigation schemes.

- **Crop and Productivity Analysis:**
  - ✓ Crop types and yields: type of crops grown, productivity, and seasonal variations;
  - ✓ Water requirements: Analyze the crop-specific water needs based on local conditions;
  - ✓ Soil fertility: Evaluate soil conditions to determine suitability for various crops;
  - ✓ Irrigation methods and efficiency: Review current irrigation practices and identify inefficiencies.

- **Water Use and Demand Assessment:**
  - ✓ Assess current water use for agriculture, domestic, and other purposes;
  - ✓ Analyze future water demand based on projected development and population growth.

- **Geological and Soil Analysis:**

  Conduct geotechnical survey to understand soil types, stability, and suitability for agricultural and infrastructure development.

- **Socio-Economic Baseline:**

  Evaluate socio-economic conditions of the local communities, including:

  - Current agricultural practices and income levels;
  - Demographic condition and trends of population and livelihoods;
  - Access to markets, resources, and infrastructure;
  - Assess local governance, land ownership, and community involvement in irrigation.

The survey and identification of various information within the defined catchment system should be conducted as part of the study, including the productive land area, and existing utilization.

- Total area;
- Classified by the slope and elevation difference;
- Current land uses classification (rice field, forest coverage, plantation, housing, city, etc.);
- River/stream network;
- Soil type and characteristic and permeability within each sub-catchment system.

Improvement of the irrigation system stands as the least preferred choice to augment agricultural production within the target area of the proposed development project. Under this scenario, a comprehensive water supply and demand analysis should be conducted alongside the proposal to enhance agricultural output. Before suggesting irrigation improvement, a baseline study encompassing the status of water supply, demand, agricultural productivity (including crop types, yield per hectare per year, existing challenges, etc.) is imperative. The preliminary survey of farmland, covering active farmland, potential land availability, and productivity-related issues should be studied. Key elements such as intake water, irrigation canals, beneficial areas, crop types, and animal production need analysis. Additionally, an assessment of frequency of crop production based on water availability is necessary.

The baseline study of the status of water supply, demand, agriculture productivity (type of crop, yield of each crop per hectare per year, the problems, etc.) must be conducted prior to the proposal of the irrigation improvement. The preliminary survey of farmland should be conducted (active farmland, potential land availability, any issue related to the productivity, etc.).

- Intake water;
- Irrigation canal;
- Beneficial Area;
- Type of crops.

JICA study has already identified 8 irrigation schemes within the Belulik river basins for rehabilitation to boost food production in Timor-Leste. The table below summarizes each irrigation schemes, and the potential cultivable area associated with it.

Table 4: Summary of Irrigation Schemes characteristics in Belulik River Basins

No	Code	Name	Area - Actual, HA	Plan-Area, HA
1	2-c-1S	RAIBERE	101	245
2	2-c-4S	LUAN KADOE	69	71
3	2-c-5TR	KAKEULAKU	288	629
4	2-c-6TR	PAULATA	22	27
5	2-c-7TR	AKADIRU KEDE	27	629
6	2-c-8TR	LIAS	38	35
7	2-c-14TR	BUIHA	36	125
8		Oebaba	2000	2,500
Total			**2581**	**4,261**

Each of these 8 schemes for irrigation need to be investigated separately, including the cost and benefits of development or improvement of each schemes. More schemes and potential area may need to be assessed during the study. Beside the crops production, there should be also a need to reserve/indicate the land to promote animal production (cattle production) as one of the direct benefit of the water resource development in the South Coast area. In summary, the beneficiaries of the irrigation improvement project should compose the following: The study for these irrigation schemes require, but not limited, the following issues on the each of 8 irrigation scheme:

(1). Intake point of water source for the irrigation;

(2). Total irrigable land in each scheme plus animal potential for the extension the production area;

(3). Type of crops and crop rotation;

(4). Water supply and demand analysis of each schematic of irrigation to maximize the annual production yield;

(5). Outline of the project component of each irrigation, and rough cost estimation;

(6). Financial analysis of the overall investment.

The analysis of optimal utilization of the water resource from the improvement of each irrigation canal should be conducted in order to know the optimal benefits that could be possibly gained every year.

Crops and Irrigation Demand Assessment and Scenarios

Necessary water volume during the dry season is variable according to the utilization methods of the irrigation area. Therefore, the possibility of expanding of existing weir/canals or new development will be different according to the new irrigation area plan (and for other water developments) as shown in the following table.

Table 5: Usage methods of irrigation area

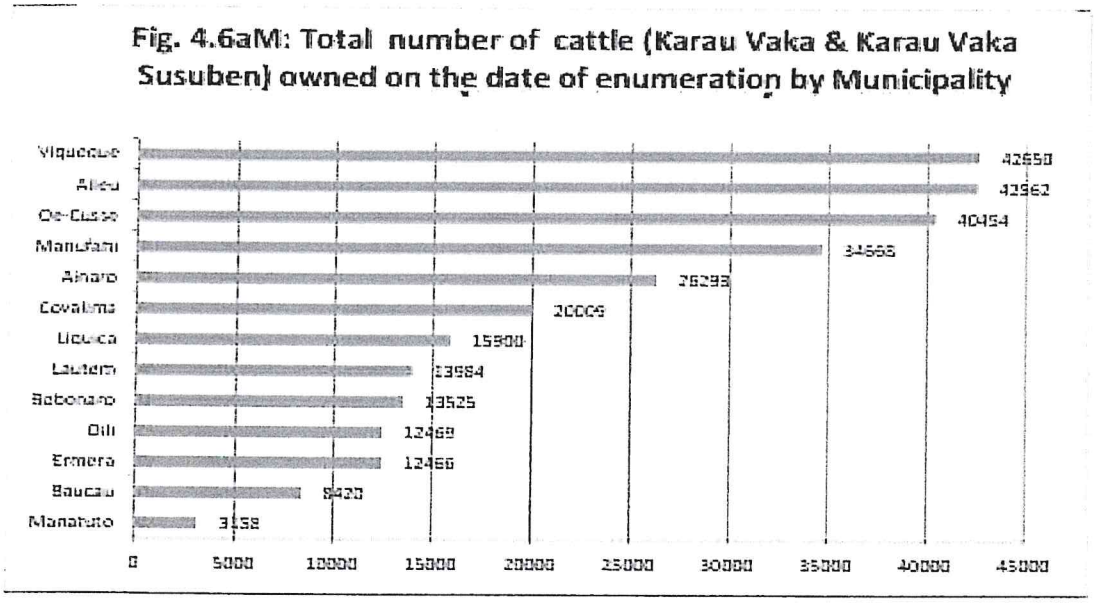
Scenario	Usage methods in dry season	Symbol
1-1	All area for rice even in dry season (Necessary water volume becomes maximum)	R
2-1	Partially for rice production in dry season. Remained area could be used for other crops	R O
2-2	Some of the remained area out of rice area will be used for other crops in dry season	R O N
2-3	Limited area for rice and other area will not be used in dry season	R N
3-1	no rice production in dry season, and other crop production could be considered.	O
3-2	Limited area for other crops and other area will not be used in dry season	O N
		R: Rice, O: Other crops, N: No crops
Other crops, such as cassava or peanut, will require less water volume consumption comparing with rice, but their required water will be different by crops. Therefore, necessary water volume for other crops (except rice) could be used some supposed average of a few kinds		

The Feasibility study of irrigation during the dry season is requested to consider the Scenarios for six cases as shown in above table (from 1-1~3-2). The necessary water volume during the dry season should be proposed based on the above case by case. The final target area (tentatively ~3000 ha, but subject of the investigation) may be divided equally to make simple the calculation in case of the multiple usage.

Among these component of potential water demand, irrigation requirement may take up around 80-90% of the whole water availability due to the size of agriculture land and the target of the government to increase the production of rice into minimum two times a year with higher productivity.

Animal Production review and demand assessment

The production of animal within the river basins is existing but it's not organized for industrial approach. The following table provides a summary of the quantity of animal (cattle, pig, and poultry).



Source: GDS-MoF. Timor-Leste Agriculture Census: 2019

Figure 5: Statistic of Animal Production by Municipalities

In this proposal the Consultant should present the study/scenarios where more systematic approach of the animal production will be conducted if the water availability is ensured. Other livestock will follow, but the study should focus on cattle production in the area where the land availability for the cattle production can be arranged (minimum 500 ha). The scenario of the total cattle that would enter the market system should be estimated based on the land size, water availability, and profit earned by the company. The Study shall be conducted, including but not limited to the following items:

- Land availability for animal production, including growing animal feed and cost;
- Water consumption for animal production (animal, to grow the animal food, and operate the facility) and the cost;
- Food for animal (source of the food: grass, tree, rice husk, rice leaves/after harvest, supplement, etc.);
- Other items relevant to the animal production.

The study should assess the problems faced by the current animal production in the area, and current number of the livestock in the area.

Crop Plantation Review and Demand Assessment

Crop plantation such as mango, banana, papaya, tangerine, apple, etc., can be also a valuable commodity product that can be produced if the land and water are available. The overall review of the existing condition on the import of the crop plantation commodity and study of the water availability that could enhance the crop plantation and food production within the project area.

7.2. Multi-Purpose DAM +Irrigation Improvement

The Multi-purpose DAM is one of the solutions endorsed by the Ministry of Agriculture and Fishery (MAF) in 2015, with Sui and Belulik identified as the potential suitable locations for the project. But other alternative options such as ground water pumping (but not limited) need to be considered as part of the feasibility study. The figure below shows a broad outline of the project, illustrating the DAM's location, the associated irrigation area, and its relation to future urbanization in the South Coast area.

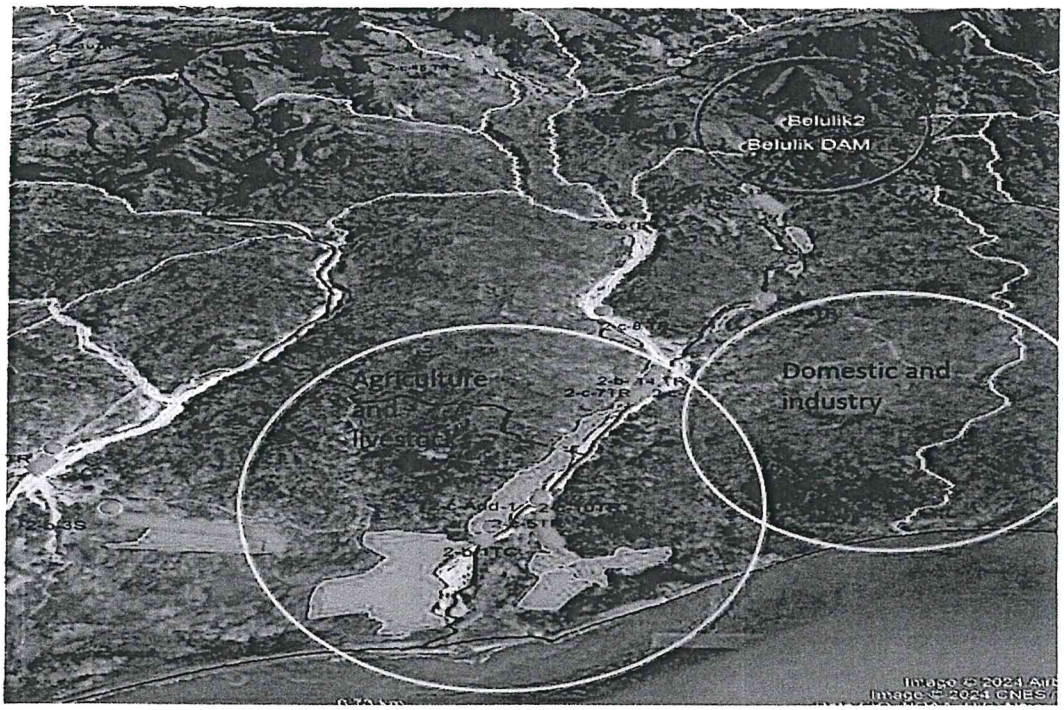


Figure 6: Multi-purpose DAM in addition to the option of the stage 1 above (irrigation improvement)

Based on this concept, construction of DAM is proposed to store and distribute water for irrigation, and water supply in the downstream area of the Belulik river basins. The project outline includes, but not limited to the following components:

- Construction of a DAM with a tentative crest length ranging from 500 to 800 meters, and a height between 80 to 150 meters;
- Implementation of an irrigation canal to irrigate 2000 -5000 hectares of farmland in Belulik;
- Establishment of a water tunnel;
- Installation of water transmission pipes from the tunnel to a water purification plant;
- Construction of a water purification plant downstream of Belulik;
- Development of a water distribution network or pipes;
- Animal production of 1000 hectares land at the downstream area of Belulik DAM (detail info to be consulted with MAPFF.
- Potential crop plantation with total area requirement need to be consulted with MAPFF.

The feasibility study should encompass a comprehensive technical analysis of all these project components, considering various aspects as outlined in the following section (Components of Studies).

7.3. Solar – Water Pumping

The proposal suggests a solar-power water pumping as an alternative to construction of multi-purpose DAM. Under this plan, solar-power pump will be installed to extract groundwater at the project site to address the water deficit. It is assumed that groundwater in the project area is potentially available for this purpose. Although a study must be conducted to confirm its availability.

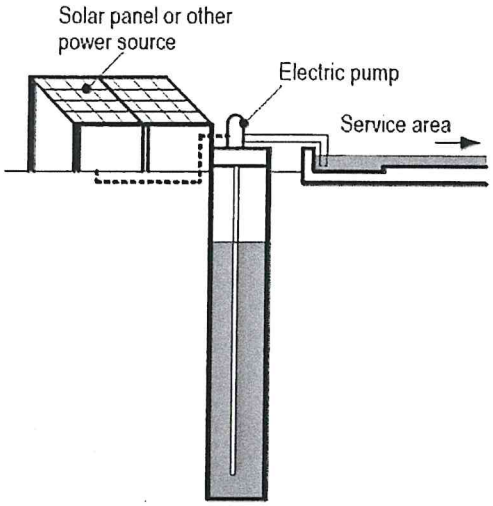


Figure 7: Concept of Water Solar Pumping

With the latest advancement in the solar-water pumping technology, the cost of solar-water pumping per volume rate of water is becoming more affordable. In various places, the solar-water pumping has been adopted to provide a stable water resource for agriculture production. Therefore, the option can be explored as a potential technical option to solve the water resources issue in project areas. In overall the technical outline of the solar-water pumping is presented as followed:

- Solar powered-water pumping system should deliver the water at the flow rate ranging between 30,000 to 50,000 cubic meters per day during 3 months of dry season in order to offset the deficit of water demand in the project area;
- Construction/installation of 50-100 wells (comprising shallow and deep wells) with a detailed investigation is required. The location of the wells is subject of investigation (can be near the river or at the downstream of the river basins);
- Piping system/route from each well to each intake of the irrigation canal;
- Construction of the irrigation canal for around 2,000 – 5,000 hectares of farmland downstream of Belulik, including Oebaba area in Covalima;
- Water transmission pipe (length to be determined) from the well to water distribution tank;
- Development of the water distribution network or pipes covering a distance from the distribution tanks to houses/users.

A detailed investigation of the groundwater availability is essential to determine the sustainable yield of the groundwater source before drawing conclusions on this option.

8. Project Outputs and Outcomes

The proposed water resource development project aim is to address the water deficit in the area through implementation of the following infrastructure:

- Irrigation canal (the total length need to be determined);
- Multi-purpose DAM or multiple wells equipped with the solar water pumping system;
- Water purification plant along with the water transmission and distribution pipes.

The presence of these output infrastructures will lead to various outcomes, both tangible and intangible:

- The productivity of the agricultural crops is expected to increase from 2 tons per hectare per year to 4.5 - 6 tons per hectare per year or more;
- Animal production in the downstream area of the Belulik river basins is projected to reach 2000 heads per year;
- Water supply to support the new urban and industrial development in the South Coast corridor.

9. Project Beneficiaries and Benefits

The proposed water resource development process (if realized), will bring several tangible benefit that can be measured financially. The potential beneficiaries of the project development include:

- Production of rice in the target area will increase to 4.5-6 tons/ha/yr (optimistic scenario);
- Ensuring water supply for domestic use in the area;
- Enhancing national food security through more frequent crop production and animal production for both domestic consumption and export-oriented markets;
- Increase the plantation crops in the project area.

Considering the contributions to food production and ensuring water supply for future urban growth, the proposed development project is expected to provide direct and indirect benefits that can be assessed both financially and economically. Assuming that the water deficit problem can be resolved with the mentioned technical solution options, the financial return from agricultural products, animal products, and clean water supply for domestic and industrial purposes can be estimated. The table below provides a very rough calculation of the financial return if the water deficit is resolved through the proposed multi-purpose DAM or any other feasible solution:

- Rice production is estimated to increase its yield to 4.5 – 6 tons per hectare per year of paddy with a sale price of $0.8 per kilogram of rice (1 kg of paddy conversion to rice is around 60%);
- Water revenue is anticipated to be generated with a total sale price of $0.7 per cubic meter with total annual production of 7 MCM;
- Revenue from animal production is expected at a cost of $1000 per head, with minimum annual sales estimated at 2000 heads;
- Potential crop plantation.

Beside the financial benefits, intangible benefits:

- Improve productivity of farming;
- Improve public health and sanitation;

- Enhance sustainability of groundwater system (water in the DAM shall penetrate into ground surface and recharge the aquifer);
- Enhance other sectors such as tourism, sport activity, fisheries, hotel, business, etc.

10. Implementation Timeline

The estimated implementation timeline of the project is presented in the following table below.

Table 6: The implementation timeline of the project

FS	DED	Land	Financing & procurement	Construction	O & M
2024 -2025	2025-2026	2027	2024-2025	2027 - 2030	2031
12 months	12 months	12 months	1 – 2 years	3 – 5 years	...

The initial stage of the study entails gathering crucial data, including rainfall, stream flow, and sediment data. This is essential to establish baseline information and verify water availability, as well as conduct a demand deficit analysis before initiating the tender process for the construction of the multi-purpose DAM. A minimum of five years of rainfall and stream flow data, recorded at hourly intervals, must be collected. This data will be utilized to assess water availability and make any necessary adjustments to the design if needed.

11. Data collection & measurement

Various data and information will be very important to support the study and analysis for this water resources development. Ideally, the data should be available for the consultant to carry out the necessary analysis. However, in Timor-Leste, the following important data for water resource development is not available or only limited:

- Meteorological data, especially long-term historical record of rainfall is required to perform the long-term water budget analysis within the catchment system, including the high flow and low flow in the rivers, base flow water analysis, wet season flow and dry season flow;
- Stream flow data, which is used to calibrate the hydrological model for water balance analysis;
- Sediment Transport data; this data is necessary for the consultant to know the sediment delivery from the catchment area to the river.

11.1 Meteorological Data Collection

In order to provide a minimum data for the current analysis during the feasibility study, it is necessary to establish the field measurement and data collection sites. The following maps shows the proposed location for the data collection of meteorological sites within the Belulik river basins.

Figure 8: Proposed tentative location of Meteorological data Collection

It is preferred to collect the automatic data collection with the latest instrumentation that transmit the data with the latest technology. The parameters of the meteorological data consist of the following:

- Rainfall;
- Solar radiation;
- Temperature;
- Wind speed and direction.

The above data should be collected in 3 location within Belulik catchment system. The time interval data is recommended to be hourly for rainfall and other parameter can be in daily time interval. The station need to be established by the consultant team and data collection of minimum 1 year should be available.

11.2 Stream Flow and Sediment data Collection

The second data set that will be required to help perform the water balance analysis is the stream flow and sediment transport data. The following map shows the proposed measurement location of stream flow and sediment.

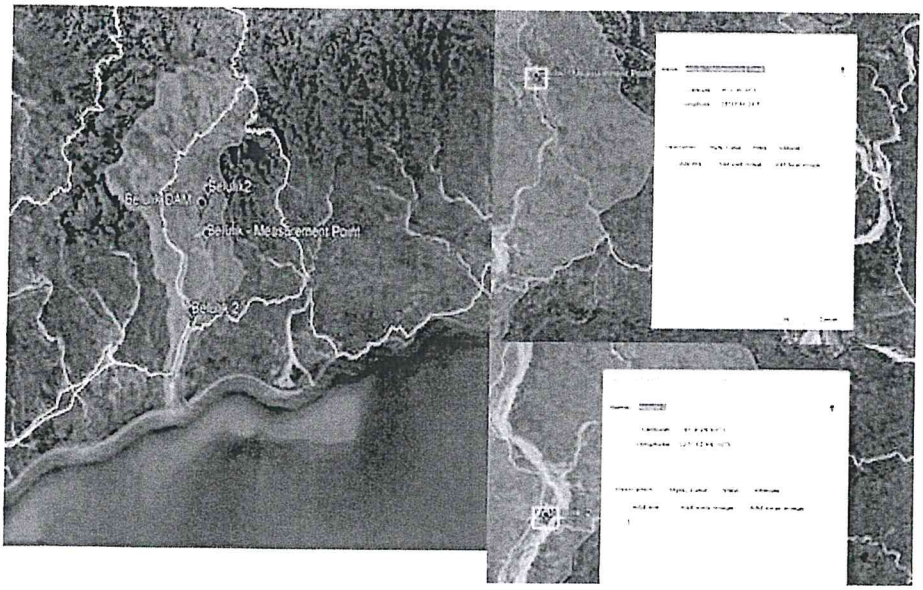


Figure 9: Proposed Measurement point of the River Flow

The automatic measurement of the water level in the stream should be installed to collect the long-term data of water level. The water level data is used to calculate the discharge rate or river flow in the river. Several important tasks must be performed in order to collect a reliable data of stream for the calculation of the water balance within the catchment system.

- Establishment of measurement points and installation of the instrument;
- Survey of cross section on the measurement points;
- Establishment of the rating curve (relationship between the water level and discharge);
- Continue data collection of water depth in the river;
- Calculate the discharge (or river flow) from the water level data;
- Present the data in time series.

The other important data to be collected is sediment transport data, which is very difficult but the consultant team should try to establish the data collection of sediment during the rainy day so that overall idea of sediment production and delivery from the catchment system can be analyzed. While the volume of data may not be sufficient, but these measurement data should be available to carry out the following study as part of the feasibility study in the water resources development in Belulik river basins.

- Calibration of GSMAP of rainfall data, which is available from 1998 -2023 in the hourly time interval. The calibration of this satellite data will be done with the collected rainfall data from the field measurement and some adjusted factor should be proposed in the 25 years rainfall data, as input to the long-term hydrological modeling;
- Hydrological Modeling Calibration with the measured stream flow data. The hydrological modeling should be prepared by using the measurement of rainfall and stream data that collected, as part of the project. The calibrated model will be used to calculate the long-term water budget analysis from the input data of long-term hourly rainfall data from GSMAP;
- The sediment transport model should also be established prior to the model utilization to estimate long-term impacts for of the sediment in catchment, river, and DAM.

12. Recommended Hydrological Modeling Tools

The hydrologic Modeling tool must be used to calculate the long-term trend of water resources in the catchment system. Any time series modeling could be used but the following are recommended one for the water resources development project.

- HEC – HMS Modeling Package (for the catchment modeling system);
- HEC-RAS modeling (for River Flow modeling and sediment transport);
- BASINS-HSPF Modeling tool (USEPA).

The modeling and analysis must be done with the following scenarios:

(1). Hydrological Model development and establishment of the model parameters (model Calibration);
(2). Using the calibrated model, calculate the long-term water balance/budget analysis from the catchment (sub-catchments) system and in each point of river (potential irrigation intake);
(3). Adding the DAM with required volume to store water during the rainy seasons and utilized during the dry season and perform the water balance analysis (supply – demand).

13. Specific Items to be studied

The detailed feasibility study for each specific aspect is essential to provide a comprehensive evaluation of the technical and financial viability of the proposed water resource development project. Therefore, during the feasibility study, in addition to general considerations outlined in the feasibility study guideline, specific tasks must be undertaken:

- Conduct a survey of the total productive agricultural land in the downstream area of the Belulik river basins. Analyze various scenarios regarding type of crops and suitable land for production;
- Install auto-weather stations (3 sites) and stream gauging (2 sites) devices to measure river flow, assess rainfall patterns, and understand the hydrological processes such as evapotranspiration and infiltration;
- Perform hydrological analysis, including rainfall-runoff modeling, long-term water budget analysis, and assessments of high and low flow conditions for several scenarios (base-case scenario, irrigation improvement only scenario, DAM option scenario) . Utilize topographic data from sources like Google Earth or SRTM/USGS/NASA and remote sensing data for land cover estimation;
- Conduct sediment transport analysis to understand sediment production, delivery, and maintenance costs associated with sediment loading from the catchment area to the dam site;
- Evaluate the suitability of the dam site through geological investigations, estimation of infiltration and percolation rates, and consideration of factors like backflow and impacted areas;
- Analyze water supply and demand in each beneficial area, proposing solutions to address water surplus and deficit, including alternatives to dam construction;
- To know an appropriate dam type for each project site, considering factors such as cost, material availability, geological conditions, and safety considerations, the following items should be assessed:
    1) Identification on how to get the construction material such as stone, boulder, from quarry once the dimension of DAM have already been estimated (Volume, height, crest length) and required volume of construction material. Where such big quarry site is can be made without major environmental affect?

2) Canal and Access Road could not construct on the riverbed of 40 to 50m width. It will be necessary to install on the slope of riverside cliff. Because the river flow rate will be approximately 10 m3/s during 9 months of rainy season. (Assuming the upstream catchment area is 100 km2, and the average monthly rainfall is 200 mm/month).
3) After completion of dam, big amount of sediment will flow in from upstream. How to prevent or remove it? It is not easy in case of height dam is over than 50 m.
4) If continuous big rainfall happened during flood (ex. 50mm/h~ 100mm/hour), what kind of water treatment measures or dam discharge system become necessary? 1,000m3/sec water flow is out of control.

- Evaluate the potential impacted area if DAM construction is pursued;
- Study operational and maintenance risks associated with the dam operation, including sedimentation, and the probability of the dam failure, and propose mitigation measures;
- Explore alternative solutions to water resource problems in the downstream of Belulik such as groundwater sources. Groundwater study, including the pumping test should be conducted in order to understand the overall aquifer in the target area and sustainability of the groundwater resources;
- Engage in proper consultation with government agencies and affected/benefiting communities;
- Identify environmental and social impacts, particularly if dam construction proceeds, to develop the scope of environmental and social impact assessments;
- Conduct studies on groundwater availability and sustainability at the dam site, and downstream locations in Belulik. Additionally, conduct a detailed investigation into the potential utilization of solar pumping, including technical issues, cost, and financial considerations.

Socio-Economic and Livelihood Analysis

Existing Socio economic review and projection with and without project development should be prepared as part of the feasibility study of this project.

Geological and Geo-technical Studies

Review of regional geological and geoscience information should be presented as part of the study and require investigation should be proposed as part of the infrastructure development. The level of geo-technical investigation shall be based on the type of infrastructure that will be proposed. Therefore, the feasibility study consultant should propose the type of the survey:

- Soil stability;
- Percolation loss or infiltration within the location of DAM construction;
- Testing of the rate of infiltration in the rice field to estimate the amount of irrigation requirement in a specific area;
- Resettlement issues;
- Soil Properties (Unit weight; Specific gravity; Moisture content);
- Grain Size Analysis;
- Atterberg limit (Liquid limit (W1); Plastic limit (Wp); Plasticity index (PI); Shrinkage limit);
- Triaxial test;
- Consolidation test;
- Compaction test;
- Unconfined compressive strength test;
- Permeability test.

Environmental Impact Study

During the feasibility study the consultant team should identify the potential environmental impact study that need to be further investigated as a consequence of the proposed infrastructure development. In that case, several solutions can be proposed (depending on the study) in terms of Infrastructure development. Potential infrastructure development options may consist of the following:

- Option 1: Construction of Irrigation improvement (Canal, Intake, weirs)
- Option 2: Option 1 + Multipurpose DAM (Reservoir)
- Option 3: Option 1 + Solar-Water Pumping

The **scope of the environmental impact assessment study** shall be prepared for the best selected option that is feasible. And the project document, including the Terms of References (ToR) for the environmental impact assessment study should be prepared.

The following table shows the summary of expected deliverable of the Environmental Scoping Study.

Table 7. Summary of Option of Infrastructure development and Scoping Study of EIA

Selected Option	Categorization of Environmental Impacts	Potential Impacts and Risk to be Studies	Items that Need to be studied
Option 1: Construction of Irrigation Improvement	Based on Decree Law of Timor – Leste Environmental Licensing law or refer to various best practice of environmental scale and categorization, the consultant will proposed the scale of irrigation infrastructure development as a primary information to categorize the environmental impact assessment. Irrigation improvement with total area >= 100 ha is a category A	▪ Water quantity at the downstream are of weirs ▪ Flooding as a result of construction of weirs ▪ Drought, especially at the downstream area ▪ Sedimentation and erosion ▪ Habitat loss ▪ Resettlement	▪ Baseline hydrological study and impact due to irrigation development (changing the flow regime, groundwater table, wetland, etc.) ▪ Ecological study (baseline) of flora and fauna that may be affected by the construction and operation of irrigation infrastructure ▪ Soil and sedimentation study from the upland catchment due to rainfall ▪ Water quality Analysis ▪ Social and Economic Impacts studies ▪ Environmental Flow requirement to maintain the balance in the ecosystem
Option 2: Option 1 + Construction of Multi-purpose DAM	Irrigation area and DAM height, as main parameters to determine the categorization of the environmental impact assessment	• Impact of water flow • Impact of water quality • Ecological and Biodiversity Impacts (aquatic system, terrestrial ecosystem, and biodiversity) • Soil and geology (erosion and sedimentation, seismic impact) • Social and economic impacts (resettlement, livelihood, cultural heritage) • Climate change • Water use and allocation • Public health and safety impacts (risk of waterborne disease and risk of DAM failure)	• Detail hydrological (water balance, high flow/low flow, probable maximum flooding, DAM failure modeling) • Ecological study (aquatic study of impact on aquatic life plus pattern, study on the impact of surrounding ecosystem such as forest, wetland, and wildlife habitat, as well as rare species) • Erosion and sedimentation study and potential seismic impact to DAM operation • Resettlement plan, impact of the project to the local economic, including agriculture and tourism, potential loss of cultural site and practice due to flooding and displacement • Climate change: greenhouse gas emission and adaptation • Public health and risk assessment
Option 3: Option 1 + Solar-water Pumping	Irrigation Area + Pumping rate to determine the environmental categorization	✓ Groundwater issue (subsidence and structural collapse, etc.) ✓ Water resources issue with pumping of large volume of groundwater ✓ Etc.	

Scope of Hydrological Assessment

The water supply and demand analysis is one of the important subject during the execution of the Feasibility study of the project, especially to provide information in order to make a decision of the scale of the infrastructure project to be executed in responding the forecasted demand in the future.

14.Some Preliminary data or Information

Some preliminary information and data may be available for the consultant to be used as basis to conduct the need and gap analysis prepare the detail plan on how to execute the feasibility study of this water resource development. It is the responsibility of the consultant to review the accuracy and reliability of the data and provide a plan on how to fill the data gap (if any) in order to provide a comprehensive analysis as part of the study.

(1). Digital Elevation Model (DEM) from ASTER and NASA;
(2). Soil data (Soil Texture);
(3). Hydro-geological map and river networks of Timor-Leste;
(4). Monthly rainfall data (compiled by SoF of the Ministry of Agriculture, Livestock, Fisheries, and Forestry (MAPPF): Excel and Google earth formats);
(5). JICA Master Plan report and backup data (in the annexes).

ADN

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

Dili, 27 de Janeiro de 2025

Ref : 0129 /ADN, I.P./ I/2025

Hato'o ba : **Sra. Epi Orleaes**
Coordenadora da Unidade de Planeamento Integrado - MPIE

Assuntu : **Rezultado Re-verifikasaun – Projeto Terms of Reference (ToR) Feasibility Study for Belulic and Carau Ulun River Water Resources Development Scheme Ainaro and Manufahi Municipality**

Ho Respeito,

Bazeia ba karta pedido verifikasaun ho no ref. 03/MPIE/UPI/SEV//I/2025 ho data 15 de Janeiro de 2025, ba asuntu ne'ebe mensiona iha leten, ekipa verifikasaun Unidade Avaliação dos Projetos – ADN, I.P. hala'o ona verifikasaun ba dokumentos refere. Ho nune bele hare rezultado re-verifikasaun iha *(aneksu)*.

Ba ita bo'ot nia atensaun ami hato'o agradecimento wain no subkreve ho konsiderasaun a'as tebes.

Rui Lourenço da Costa
Diretor Executivo - ADN, I.P.

Bedik-Hun, Fatuhada
Dili – Timor-Leste
info@mpie.gov.tl
+670 3310 289

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

FORMULARIO DE DESPACHO

Data de Entrada Documentos : 15 - 01 - 25 | **Data do Documentos :** 15 - 01 - 25

Husi : MPIE - UPI

No. Ref : 03 / MPIE / UPI / SEV / 1 / 2025

Projecto :

* Feasibility study for Caraulun River Water Resources Development Scheme, Manufahi Municipality.
* Feasibility study for Belulic River Water Resources Development Scheme Atauro Municipality

Quantidade Documentos : 3

Anexo :

* TOR : 2
* Resultado ADN : 1

Assuntos :

Revizaun TOR

No.Tlf : –

Companhia : _

Despacho :

- ○ Unidade de Gestão Administrativa
- ○ Unidade de Avaliação de Projectos
- ○ Unidade de Controlo e Validação de Qualidade
- ○ Unidade de Estudos e Desenvolvimento de Competências

Solisita UKP atu atende

- ○ Adjunto
- ○ Assesor/a
- ○ Gabinete DE / Base de Dadus
- ○ Other

Data : 15.01.25

Rui Lourenço da Costa
Director Executivo ADN

MINISTÉRIO DO PLANEAMENTO
E INVESTIMENTO ESTRATÉGICO
IX GOVERNO CONSTITUCIONAL
UNIDADE DE PLANEAMENTO INTEGRADO
(UPI)

Dili, 15 de Janeiro de 2025

Nu.Ref. : 03 /MPIE/UPI/SEV/I/2025
Hato'o ba : **Ex^mo. Sr. Rui Lourenço da Costa**
Diretor -Executivo da Agência de Dezenvolvimento Nacional,I.P
CC : **Gabinete do Ministério Planeamento e Investimento Estratégico**
Gabinete do Ministério Agricultura, Pecuária, Pesca e Floresta
Secretariado dos Grandes Projetos (SGP)
Assuntu : **Revizaun Termu Referensia (ToR) ba Estudu Viabilidade Projetu DAM Karaulun iha Munisipiu Manufahi no Belulik iha Munisipiu Ainaro**

Ho respeitu,

Dahuluk hato'o ami nia apresiasaun ba kolaborasaun diak husi ADN ne'ebe mak halo ona verifikasaun ba TOR no Kustu Estimativu ba projetu DAM Karaulun no Belulik. Rezultadu verifikasaun ba kustu estimativu Estudu viabilidade nian ho referensia karta ofisial husi ADN.IP datada 20 Dezembru 2024, ho numeru referensia, **2453/ADN,IP./XII/2024**. Ekipa FS analiza fila-fali no konsidera katak proposta projetu DAM rua (multi-funsaun) refere iha komplexidade bo'ot no ho ezizensia atu bele rekruta peritu/experts internasional kualifikadu. Ho nune'e, ekipa FS halo ona revizaun no adjustamentu iha ToR hodi bele hetan re-verifikasaun husi ADN, I.P.

Adjustamentu ne'ebe mak ami halo refleta iha ToR mak hanesan tuir-mai.

- Kualifikasaun husi Peritu/Experts: Peritu sira tenke iha pelumenus Mestradu iha área relevante no esperiénsia servisu profisionál liu tinan 10 (tinan 10–15) tuir tabela Expert Qualification iha aneksu.
- Peritu/Experts Adisionál: Aumenta tan peritu/experts senior nain rua ho Espesialidade Enjiñaria – Geologist no Mechanical Engineer. Atu bele halo investigasaun ba problemas hirak relasiona ho assuntus hidro-elektrika (hidopower) nian.
- Adisaun ba Provizaun Servisu: Inklui provizaun ida ba kolesaun dadus rainfall nian iha fatin tolu ba kada projetu ka estudu.

Detalles kona-ba alterasaun hirak ne'ebe bele assessu iha aneksu.

1. Revizaun ToR projetu Karaulun no Belulik.
2. Tabela Kustu Estimativu FS ba Projetu Karaulun no Belulik.

Melhores Cumprimentos,

Epi Orleães
Coordenadora da Unidade de Planeamento Integrado - MPIE

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

COST ESTIMATE - FEASIBILITY STUDY FOR "CARAULUN RIVER WATER RESOURCES DEVELOPMENT SCHEME, MANUFAHI, TIMOR-LESTE"

NO.	DESCRIPTIONS	Unit	Total M-M	Remuneration			Per Diem		
				QTY	Avarage Monthly Rate	Amount	No. of Days (Avarage)	Daily Rate	Amount
I.	**INTERNATIONAL EXPERTS**								
1	Water resource specialist (Team Leader)	Month	8.0	1	$ 17,250.00	$ 138,000.00	240.00	$ 60.00	$ 14,400.00
2	Dam Engineer	Month	5.0	1	$ 14,825.00	$ 74,125.00	150.00	$ 60.00	$ 9,000.00
3	Senior Engineer/Geologist	Month	4.0	1	$ 14,825.00	$ 59,300.00	120.00	$ 60.00	$ 7,200.00
4	Mechanical Engineer	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
5	Hydrologist	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
6	Geotechnical Specialist/Engineer	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
7	Watershed Management specialist	Month	2.0	1	$ 12,400.00	$ 24,800.00	60.00	$ 60.00	$ 3,600.00
8	Hydropower Specialist	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
9	Electro Mechanic Engineer	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
10	Soil and Land Classification Specialist	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
11	Agriculture Specialist	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
12	Irrigation and drainage engineer	Month	2.0	1	$ 12,400.00	$ 24,800.00	60.00	$ 60.00	$ 3,600.00
13	Economist/Cost estimator	Month	3.0	1	$ 12,400.00	$ 37,200.00	90.00	$ 60.00	$ 5,400.00
14	Environmental Specialist	Month	2.0	1	$ 12,400.00	$ 24,800.00	60.00	$ 60.00	$ 3,600.00
15	Social Safeguards Specialist	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
16	Value Engineering /Analyzing Specialist	Month	3.0	1	$ 10,775.00	$ 32,325.00	90.00	$ 60.00	$ 5,400.00
17	GIS Specialist	Month	2.0	1	$ 10,775.00	$ 21,550.00	60.00	$ 60.00	$ 3,600.00
	Sub-total for International Experts		**52.0**	**17**		**$ 687,550.00**		**Sub-Total**	**$ 93,600.00**
II.	**NATIONAL EXPERTS**								
1	Social Consultations (Local Expert)	Month	4.0	1	$ 4,250.00	$ 17,000.00	90.00	$ 40.00	$ 3,600.00
2	Environmental Expert	Month	4.0	1	$ 4,250.00	$ 17,000.00	90.00	$ 40.00	$ 3,600.00
3	Water Engineer	Month	4.0	1	$ 4,250.00	$ 17,000.00	90.00	$ 40.00	$ 3,600.00
4	Administrative Officer	Month	8.0	1	$ 500.00	$ 4,000.00			
5	Driver	Month	8.0	2	$ 400.00	$ 6,400.00			
6	Secretary	Month	8.0	1	$ 500.00	$ 4,000.00			
7	Utilityman	Month	8.0	1	$ 200.00	$ 1,600.00			
	Sub-total for National Experts		**44.0**	**8**		**$ 67,000.00**		**Sub-Total**	**$ 10,800.00**
III.	**REIMBURSABLES EXPENSES**								
1	International Transportation	R. Trip	17.0	2	$ 1,500.00	$ 51,000.00			
2	Local Transportation (Vechicle Rent & Fuel)	Month	8.0	2	$ 1,650.00	$ 26,400.00			
3	Communications Cost	Month	8.0	20	$ 50.00	$ 8,000.00			
						Sub-Total			**$ 85,400.00**
IV.	**FACILITIES**								
1	Office Establisment	Month	8.0	1	$ 1,000.00	$ 8,000.00			
2	Office Equipment & Furniture	Ls	1.0	1	$ 10,000.00	$ 10,000.00			
3	Office Operations (Office Suplies, Software,Toner,etc)	Month	8.0	1	$ 350.00	$ 2,800.00			
						Sub-Total			**$ 20,800.00**

AGÊNCIA DE DESENVOLVIMENTO NACIONAL, I. P.

COST ESTIMATE - FEASIBILITY STUDY FOR "CARAULUN RIVER WATER RESOURCES DEVELOPMENT SCHEME, MANUFAHI, TIMOR-LESTE"

VI.	**REPORT REPRODUCTION**					
1	Inception Report	Ls		1	$ 1,500.00	1,500.00
2	Preliminary Study Report	Ls		1	$ 1,500.00	1,500.00
3	Monthly Progress Report	Ls		1	$ 1,500.00	1,500.00
4	Draft Final Report	Ls		1	$ 1,500.00	1,500.00
5	Final Report	Ls		1	$ 1,500.00	1,500.00
					Sub-Total	**$ 7,500.00**
VII.	**SITE INVESTIGATION**					
1	Topographic Survey	Ls		1	$ 25,000.00	$ 25,000.00
2	Agriculture Market Survey	Ls		1	$ 30,000.00	$ 30,000.00
3	Public/Social Consultations	Ls		1	$ 10,000.00	$ 10,000.00
4	Geotechnical Investigation (borehole at the DAM site, etc.)	Ls		1	$ 120,000.00	$ 120,000.00
5	Establishment of River Stream Flow Measurement and Data Collection (2 locations)	Ls		2	$ 75,000.00	$ 150,000.00
	Rainfal Data Collection (3)	Ls		3	$ 10,000.00	$ 30,000.00
					Sub-Total	**$ 365,000.00**
					Contingency	**$ 64,000.00**
					Grand Total	**$ 1,401,650.00**

Verified by :
Antónia de F. Morais Soares
Engineer, ADN,I.P

Verified by :
Melenia da C. Barros
National Adviser, ADN,I.P

Checked by :
Rogério M. Pires
Chefe Dep-ITIAS ADN,I.P

Certified by :
Jose Fernando Lia Soares
Coordinator UPA, ADN,I.P

Terms of Reference for Feasibility Study (ToR)
Caraulun River Water Resources Development Scheme

1) Objective of the Project

Caraulun project in Manufahi, Timor-Leste is one of the priority irrigation schemes identified by the Government in the Agriculture Master Plan and Irrigation Development Plan (Master Plan). The basins of Caraulun River has a productive agriculture land around 800 - 1000 ha with the potential more than 3500 ha (JICA Master Plan, 2015), but only 50% of this land is in active production for various crops. Water availability during the dry seasons is one of limitation factors for the effective agriculture productivity in this area.

Therefore, the objective of this Feasibility Study is confirmation of possibility of water supply for multi-purpose use from the Caraulun River Basins based on comprehensive technical, financial, and environmental risk analysis.

2) Background

The current water volume in Caraulun River is almost sufficient for various utilization in the agriculture crop production, especially rice during the rainy season, including covering the full area of potential or larger area of agriculture land. However, the water flow in the river decreases drastically during the dry season of 3 months. The existing irrigation system (weirs, intake, and canal) was developed in 2015 in Caraulun but this irrigation system cannot solve the dry season issue of significant water flow reduction, especially help the farmer to produce rice.

Preliminary analysis in the project concept suggested relatively high amount of rainfall might translate into the Caraulun River that can be managed to fulfill the water demand for various utilizations, such as irrigation demand and others. The Detail feasibility study should analyze various options to manage the surface availability within Caraulun river basins, including but not limited to crop type and pattern, type of infrastructure to be constructed, frequency of production, etc.

3) Scope of Works

General requirement of FS

The purpose of this FS is to establish a rational option of water development plan through comprehensive study about local conditions including climate data, topography, and financial possibility.

Also, the risks on this new water development plan should be studied, such as environmental impact during and after the construction against the changing of river flow especially in the downstream, forest, biology (including the marine flora and fauna), social life of people, and hazardous risks on the failure of the water control or storms.
The Consultant is requested to execute FS to achieve the above-mentioned objectives by the following methods:

- Utilization of any past data of survey is recommended to shorten the implementation period of FS. However, the Consultant could propose actual survey/alternative method with reasonable goal, and if necessary to provide data for detail analysis.
- Shorten study period by parallel works for each survey and study is recommended.

FS shall include all investigations, survey, studies, and the preparation of the documents as shown in Table below:

Table 1: Study Items to be done during FS

Category	**Requested Study Items** (but not limited to)	**Expected time to study**
a Background	Review of relevant studies, such as Master plan, Sector plan, Government plans, etc. Review of applicable TL regulation/standards to regulate the water flow and water rights Recommendations to existing policy and regulation	
b Site survey	Clarification of the main purpose (*e.g., irrigation or water supply to other purpose, or power generation*) Current Social & Economic condition study Investigation of the current usage status of the river water and water rights Site survey of current conditions of the target farmland area about kind of crops, soil conditions Water availability from the river taking into account annual variations in the dry season Similar project records (if any)	
c Current condition study	Site investigation and/or demand/risks Survey, including disaster, geology, hydrology, study of conditions (*e.g., ground conditions, volume, forest, village, estimated river flow especially during dry and rainy season flow*) Estimation of crop increase volume after project completion Study the possibility of double or triple cropping and developing a cultivation plan, taking into account the amount of water that can be taken in during the dry season Stakeholder's Opinion (farmers and related stakeholders, beneficiaries)	
d Design standard	Study of the Design Standards to be applied (preferable, TL standards)	
e Field Measurement and Data collection	**Rainfall – Runoff Data Collection** 1. Proposed the rainfall data collection to collect the hourly rainfall data within the catchment area (*3 sites for data collection are proposed*) 2. Conducted the river flow measurement (embellishment of measurement points, rating curve). Continues data collection during the study period to estimate the stream flow in the upstream of possible DAM location and at the downstream near Carauulun River 3. The data of rainfall and runoff/stream flow must be used to justify the better estimation of water balance within the catchment area (system) 4. Sediment data should also be collected to study the sedimentation rate during the rainy season as baseline to project the annual and long-term sedimentation, especially with the presence of DAM	
f Technical study	Technical Analysis, such as:	
	1. Review the target area of productive land and clarify the existing active area of cultivation and non-active area, and observe why not all productive area is actively producing the crops 2. Hydrological study (rainfall-runoff modeling) to understand the water balance and variation from time to time for several options: ① With baseline –existing condition (with no development) ② Propose water resource development option (with Irrigation, DAM, etc.)	

	3. If DAM is an option, then the following investigation must be conducted: ① Asses the DAM location at the upstream of Caraulun River branches based on various investigation: location of DAM in relation to farmland, soil/geotechnical information, rough cost, risk, etc. ② Hydrological Analysis with the DAM option to understand the impact of DAM to the river flow (flood control, operation of DAM, etc.) ③ Conduct the soil investigation and geo-technical site assessment for the selected DAM location (to understand the percolation loss and erosion rate in channel, etc.) ④ Risk assessment of DAM during the construction/after and Operation and Maintenance (especially sediment removal, dredging, etc.) 4. Study the total amount of water required during that period from sowing to harvest for the expected each crop in the target area 5. Considering the total required amount of water for development, study the loss rate in water canals, underground infiltration rate, transpiration rate, and direct precipitation to water development areas, especially during the dry season 6. Study the water balance during the dry season when assuming the use of the entire irrigated area, and when assuming partial use (as shown in *Table 2*) 7. Necessary capacity of facilities and resources of energy 8. Study of construction material resources and transportation 9. Outline Design & Rough Quantity for each option of the infrastructure development 10. Estimation of rough quantity of necessary facilities e.g., size and location of the DAM expected from the main purpose 11. Study of kinds and numbers of necessary supporting equipment for O&M 12. Countermeasures for the disasters, waste or emission 13. Estimation of possible amount of inflowing sediment and proposals for how to remove sedimentation 14. Required "Operation and Maintenance Manuals" after completion e.g., Sedimentation removal method from the bottom of reservoir and person in charge for canal cleaning, repairing methods of supplied O&M equipment 15. Owners' capability for O&M 16. Assumption of the construction period 17. Comparison study about applicable contract methods, such as, ordinary contract, BOT, Turn-key etc.	
g Cost study	Rough estimation of Construction Cost Rough estimation of O&M annual cost	
h E&F study	Economic & Financial analysis (E& F analysis)	
i Risk and Environmental impacts	1. Estimation of the annual amount of sediment flowing into the reservoir, and methods or countermeasures for removing/reducing sediment with the necessary annual cost for them, such as biological-engineering 2. Considering the DAM collapses occurring around the world in recent years. Consultant should investigate their causes, such as flooding, earthquake, war,	

	etc. And recommend countermeasures on how minimize or mitigate the risks 3. Countermeasures for the disasters, waste or emission 4. Identification of the potential environmental impacts for each proposal and respective mitigation measures 5. Influence of the project to the surroundings, including Resettlement and Land acquisition pre-conditions etc. 6. Social impact assessment and identification of the potential affected people	
j Alternative proposal	• Propose alternative ideas instead of reservoir/DAM construction, if possible • Possibility of installing of power plant as multipurpose dam with a rough study of the length, diameter, and construction cost of the waterway tunnel to the planned power plant construction site, taking into account the altitude of the dam installation point and the water head difference required for power generation • Assess the potential water use for the animal production (if the multi-purpose DAM is selected)	
k	Preparation of TOR for the next stage of implementation (Detailed Design)	
l	Preparation of Checklist of the Study Report	

The Consultant is requested to have a study policy meeting based on the preliminary study report as shown in clause 9-1) of this TOR to decide the main target of this FS study.

4) Expected study for FS (Specific Item to be studied)

The necessary water volume during the dry season is variable according to the utilization methods of the irrigation area. Therefore, the possibility of expanding of existing weir/canals or new development will be different according to the new irrigation area plan (and for other water developments) as shown in the following table.

Table 2: Usage methods of irrigation area

Scenario	Usage methods in dry season	symbols
1-1	All area for rice even in dry season (Necessary water volume becomes maximum)	R
2-1	Partially for rice production in dry season. Remained area could be used for other crops	R O
2-2	Some of the remained area out of rice area will be used for other crops in dry season	R O N
2-3	Limited area for rice and other area will not be used in dry season	R N
3-1	no rice production in dry season, and other crop production could be considered.	O
3-2	Limited area for other crops and other area will not be used in dry season	O N
		R: Rice, O: Other crops, N: No crops
Other crops, such as cassava or peanut, will require less water volume consumption comparing with rice, but their required water will be different by crops. Therefore, necessary water volume for other crops (except rice) could be used some supposed average of a few kinds		

The Case study of irrigation in dry season is requested six cases as shown in above table (from 1-1~3-2).

The Attachment 2 at the end of this TOR is an example for the comparison analysis summary of each case study.

The necessary water volume in dry season should be proposed based on above case by case.

The final target area (tentatively ~3500 ha, but subject of investigation) may be divided equally to make simple the calculation in case of the multiple usage.

On the study of necessary water volume, the vaporing, penetration to the ground and re-usage of water from an area to other area should be studied and their backup data should be shown.

If the necessary water volume for the target irrigation area is bigger than the river flow volume in dry season, the reservoir with dam could be proposed with hydraulic analysis calculation.
In this analysis, Consultant should show appropriate reservoir volume and dame size based on the reasonable precipitation data from the minimum past *20* years for various source including the satellite based rainfall data with proper correction or else in other adjacent area that has reasonable record of historical rainfall data.
Water discharge control system on flood and **removal or protection methods of the cobbles sedimentation** should be proposed also.
If dam construction become necessary, consultant is expected to study about the possibility of the installation of a **power plant** and **flood control function** as **multi-purpose dam.**

5) Cooperation

The EMPLOYER will arrange a meeting prior to implementation of FS, and from time to time as necessary, require the Consultant to provide other technical support services which are deemed relevant to FS. In carrying out the work, the Consultant shall cooperate fully with the relevant Ministries and Government Agencies.

6) Responsibility of the Government

In relation to the works by the Consultant that require cooperation of other Government Agencies, the Government will provide liaison, and will ensure that the Consultant has access to all information that may be allowed by law for the performance of the Services.

7) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant the support and information to assist in performing the services for the effective implementation of the Project:

1) Counterpart staff (focal point);
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

8) Assignment of Experts

8-1) Period of FS

The required period for FS work is 8 **months** after Notice to Proceed up to Submission of Final Study Report.

8-2) Assignment of Key Experts

It is expected that the list of necessary Experts will be as follows. But the Bidder should propose essential or better Experts in the proposal with the Assignment schedule based on the work plan according to TOR.

Table 3: Requirements for Experience and Qualification of the specialists

N	POSITION	QUALIFICATION	EXPERINCE
1	Water resource specialist (*Team Leader*)	Min. Master's Degree	Min. 18 years
2	Dam engineer (*Deputy Team Leader*)	Min. Master's Degree	Min. 15 years
3	Senior Engineer/Geologist	Min. Master's Degree	Min. 15 years
4	Hydrologist	Min. Master's Degree	Min. 12 years
5	Mechanical Engineer	Min. Master's Degree	Min. 12 years
6	Geotechnical engineer	Min. Master's Degree	Min. 12 years
7	Watershed management specialist	Min. Master's Degree	Min. 12 years
8	Hydropower specialist	Min. Master's Degree	Min. 12 years
9	Electro-mechanic engineer	Min. Master's Degree	Min. 10 years
10	Soil and land classification specialist	Min. Master's Degree	Min. 10 years
11	Agriculture specialist	Min. Master's Degree	Min. 12 years
12	Irrigation and drainage specialist	Min. Master's Degree	Min. 12 years
13	Economist/Cost estimator	Min. Master's Degree	Min. 12 years
14	Environmental specialist	Min. Master's Degree	Min. 12 years
15	Social safeguard specialist	Min. Master's Degree	Min. 10 years
16	Value Analysis (VA)/Value Engineering (VE) specialist	Min. Master's Degree	Min. 10 years
17	GIS specialist	Min. Master's Degree	Min. 10 years
National Staff			
18	Social Expert (Local)	Min. Master's Degree	Min. 5 years
19	Environmental Expert (Local)	Min. Master's Degree	Min. 5 years
20	Water Engineer (Local)	Min. Master's Degree	Min. 5 years

But the Bidder should propose the necessary or better Experts in the proposal with their Assignment schedule based on the work plan according to TOR. CV of each staff should be attached to the Technical Proposal, including brief introduction of the function at similar project engagement during the engaged period of the study.

The Work items in the previous Tables should follow the items in 3) Scope of Work, however, bidder may add (not delete) work items based on his idea. This is the subject at the Contract clarification and negotiation meeting.

The Bidder should show the summary table of work sharing of each expert as shown in Table of next page. (Hereinafter, "staff" refers to all consultant staff, and "expert" refers to key staff excluding assistants and administrative staff). Technical and cost proposal shall be prepared based on the staff assignment schedule of all staff within the total study period of FS.

Table 4: Summary of Work Sharing Table of Each Experts

Yellow part should be filled by the Consultant (*this is just an examp*

Experts Name quired Item in ToR (add es as shown in ToR)	Water resource development planning specialist	Planning Engineer / Dam engineer	Hydrologist	Geologist	Geodetic engineer	Cost engineer	Electro mechanic engineer	Water development and drainage engineer	Soil and land classification specialist	Agriculturist	Economist	Environmental specialist	Social safeguard specialist	Watershed management specialist	GIS specialist	Hydropower specialist	VEC speci
ecutive Summary of : report	○	◎	○							◎							
Review of relevant dies	○	○								◎						◎	
Applicable Timor Leste ulation for the velopment	○	◎			○	○				◎							
Site survey about target a	○	○	◎		○			◎	◎	◎					◎	◎	
..																	
Social & Economic dition study about rrent & Future				○		◎				◎							◎
..																	
Design standard to ply			◎		○			◎						◎			
...																	
Technical study	○	○	◎				◎	◎	◎					◎		○	
..																	
Outline design	○		○		◎		◎	◎						◎		○	
Estimation of rough ntity							◎	◎						◎		○	
Operation and intenance study		○	◎					◎						◎		○	
Assumption of nstruction period		○			◎												
..																	
Approximate			○		◎			◎									

ıstruction cost																	
ınnual O& M cost	○		○		◎												
Initial Environmental ɜmination						◎						◎					
Social impact essment						◎						◎					
Countermeasures for disasters, waste or ission		○	◎		○							○	◎				
E&F analysis				◎							◎						○
Alternative Proposals, if any		◎	○										◎				
Preparation of TOR for D		◎	○		○												
Preparation of ecklist of the study ort		◎															
Total by hours By days By months																	

Note:	◎ Shows the main person for the study item, and ○ assistant
	Estimated times for the studies (hours) should be filled by the Consultant
	Expert's name should be actual assignment name
	The billing rate of each staff should be shown in Financial Proposal

9) Reports and Documents

9-1) Reports to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. The Main text of Final Report should be translated into Tetum (official language)

Table 5: Reports to be submitted for the Study

Report	Content (not limited to)
Inception Report	✓ Summary of the anticipated/proposed work ✓ Activities and necessary resources required for achieving projects purposes ✓ Activity schedule ✓ Contents and duration of project activities ✓ Key phases of implementation process ✓ Level of Stake holders to be involved ✓ Information about collecting tools, if any ✓ Data Collection and Analysis Rules. The type of skills and abilities required to team members ✓ Duties and responsibilities of each member ✓ Period of engagement of each team member
Monthly Progress Reports	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems faced or problems anticipated with steps taken or recommendations for correction ✓ The works to be performed during the coming month
Preliminary Study Report	✓ Water availability ✓ Consultants' proposal about the water development including irrigation ✓ Calculation results of water development including each crop type and its cultivation utilization rate during the dry season (example of table is shown in the end of this TOR) ✓ Necessary water supply facilities for each proposal ✓ The construction cost of necessary facilities for each proposal ✓ The final cost estimation of supplied water for each proposal ✓ Cultivation costs (per unit weight) for each type of grain ✓ Expected selling price from farmers to traders for each type of grain ✓ Financial benefit vs cost table for each type of grain and for each alternative
Draft Final Report	✓ a) Review of relevant studies ✓ a) Applicable regulation and Standard study

Final Report (Main part should be within ~100 pages)	✓ a) Review of relevant studies including M/P and TL regulations to be applied d) study results about design standard to be applied ✓ b) Site investigation to find out current condition and issues ✓ c) Current Financial & Economic Conditions of the target Project area ✓ d) Study of Design Standard to be applied (preferable to use TL standards) ✓ e) Technical study, including O&M methods ✓ f) Rough Cost Estimation ✓ g) E&F Analysis ✓ h) Risk study and Scope for Environmental Impact Assessment ✓ i) Alternative proposals ✓ j) TOR for DED ✓ k) Preparation of Checklist of the study (Page number of each item should be filled)

9-2) Copies of Reports and Submission dates

The Reports should be submitted as specified below:

Table 6: Reports related to the Feasibility Study

	Hard Copy/ Number	Time limit
Inception Report	[2] copies	Within [2~3] calendar weeks after the Notice of the Commencement of the Services of the Project
Preliminary study report about financial possibilities	[2] copies	Within [2] months after the Notice of the Commencement of the Services of the Project
Monthly Progress Report	[2] copies	By the [*10th* ~ 30th] day of each month during Study period
Draft Final Report	[4] copies	Within [3~5] calendar weeks before the final date of contract. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer)
Final Report	[4] copies	Within [1~3] calendar weeks after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer
[x] **Soft Copy is required together with hard copies on the submission of each Report**		

9-3) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

a) Field measurement report (rainfall and stream flow data collection method and data analysis, topographic data (if available), geotechnical investigation, etc.)

b) Database in the format of GIS (Shape files) – (total potential land area, total active land agriculture land area, expected future expansion area, data collection sites, irrigation intakes, weirs, etc.)

c) Hydrological and Hydraulic analysis Report, including water balance (baseline, scenarios with/without DAM, etc.)

d) Crop pattern water demand analysis for various scenarios per *Table 2*

e) Sedimentation countermeasure report;

f) Outline drawings (Scale shall be around [1/1000-1/5000.] Consultant shall decide the necessary drawing and its scale on the consolation meeting with EMPLOYER prior to the work):

- ✓ Location map of Dam, Canal, intake, and weirs
- ✓ Layout plan of canal, weirs, DAM, and Intake, Beneficial Area
- ✓ Typical cross section of dam, canal, pipe/intake, weirs
- ✓ Facility plans for Dam

g) Rough Construction schedule;

h) Rough Cost estimates (see Attachment 2 Summary Table of Rough Cost estimate);

i) Quantities and Unit Rate of Major Item;

j) Unit rate reference of the past similar projects, e.g.:

Table 7: Reference to the unit rate of the similar projects

Project name				
Irrigation area, ha & Total project cost				
Dam volume & cost				
Reservoir volume				
Canal length & cost				
Others				

k) Checklist of the FS Report;

l) TOR for DED.

9-4) Checklist (Sample sheet, *Attachment 1* to TOR)

- ✓ Consultant shall prepare the Checklist as the sample sheet attached to TOR;
- ✓ Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER;
- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Attachment I-15 of FS Guideline Vol. I.;
- ✓ Consultant may change his subject name for survey and study but shall keep the Category of defined item categorization for the convenience of the appraisal by the EMPLOYER;
- ✓ Consultant may add survey subject or study subject within a defined Category;
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS;
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

10) Payments

10-1) The Payments will be executed as follows:

Table 8: Schedule of the payments

Time	Payment amount	Payment date
After acceptance of the **Inception Report**	10% of agreed Contract Amount	within 30 days after acceptance
After acceptance of the **Preliminary study Report**	15% of agreed Contract Amount	within 30 days after the final decision by the Employer to continue or discontinue FS
After acceptance of the **Draft Final Report**	35% of agreed Contract Amount	within 30 days after acceptance
After acceptance of the **Final Report**	40% of agreed Contract Amount	within 45 days after acceptance

10-2) important notice: The Consultant is requested to accept followings:

- The penalty will be applied against the delay of the submission of the Draft final Report and Final Report within the designated date as mentioned in Clause 9-2) of the TOR. If the submitted Draft report or Final report is not accepted by the Employer, the number of the days of the delay shall be excluded from the period between the date of submission of the report and the date of disapproval letter.
- The penalty amount 0.01 % of the Contract amount against the delay for one day. The penalty shall be deducted from the payment for the submission of the Draft final Report and Final Report respectively.

Attachment 1:

Checklist for the Survey/ Investigation and Study

Items to be surveyed and studied for the formulation of FS ("A-K" are category mark in Chapter 8 of FS Guideline)	*Report page/chap*	*Checked by LM*	*Date*	*Checked by MPS*	*Date*
Category A) Review of reference					
Ex: Review of relevant documents studies, such as Master plan					
Ex: Review of applicable regulations					
Category B) Site investigation to find out current condition and issues					
Ex: natural conditions such as climate, hydraulic with disaster matters, if necessary					
Ex: location survey, with topographic, geological matters, if necessary)					
Ex: Inventory survey for existing reusable facilities or demolished					
Ex. Opinion / Demand from Stakeholder (related local people)					
Ex: resources or energy study (such as aggregate, cement, steel, skilled labor, electric power supply, water, etc.), if necessary					
Category C) Current Financial & Economic Conditions related Project					
Ex: Social & Economic condition study about Current & Future					
Ex: Recent budget for the sector					
Ex: Current revenue, if any					
Ex: Similar project records (if any)					
Category D) Study of Design Standard to be applied					
Ex: (preferable TL standards)					
Category E) Technical Analysis					
Ex: future demand					
Ex: necessary capacities & necessary facilities resources energy					
Ex: Outline Design & Rough Quantity					
Ex: Rough Cost estimates with Unit Rate for Major Items					
Ex: Assumption of construction period					
Ex: Operation and Maintenance (O&M) plan					
Ex: Countermeasures for the disasters, waste or emission					
Category F) Rough Cost estimation					
Ex: Rough estimation of Construction Cost					
Ex: Rough estimation of annual O& M cost					
Category G) Economic & Financial analysis (E& F analysis)					
Ex: Project Cost vs Project benefit (refer Attachment i-3)					
Ex: Indirect Benefit					
Category H) Risk and Environmental study					
Ex: Influence of the project to the surroundings, including IEE, Resettlement etc.					
Ex: Social impact assessment					
Ex: Land acquisition possibility with their pre-conditions					
Ex: Classification of environmental category					
Category I) Alternative proposal, if any					
Ex: Future extension plan, if necessary					
Ex: Privatization tendency, if any					
Ex: Alternative proposal (such as location or routes or methodologies)					
Category J) Preparation of TOR for DED					
Category K) Preparation of Checklist of the study report					
Attachment to FS Report (Consultants may add drawing list, if necessary) see Vol I- Chapter 9	*Report page/chap*	*Checked by LM*	*date*	*Checked by MPS*	*date*
1) Location map					
2) General plan					
3) layout Plan					
4) Typical Cross section					
5) Facility Plan					

Checklist is the most important to make easy FS evaluation, and Consultants may put additional pages, if necessary

Necessary drawings are different according to the Project

Attachment 2:

Reference: Example of comparison table (period: necessary month from seeding to harvest)

Alternative	Planting (area)	Planting area (ha)	Possible crop production volume (ton/ha/cycle) A= Σ (kind)	Farmer's selling price ($/ton) B	Total income (mil $/cycle) c=A* area*B	Planed cultivation cycle per year cycle	period for one cycle period (month)	Total income per year C=c*cycle	Required water in a second (lit/sec/ha)	Required water in a month (m3/month/ha) D= Σ (kind)	Average river water flow in dry season per month (m3/sec)	E (m3/month)	Shortage of water in dry month (m3/month) F=E- D*area	Total required water in a month (million m3)	otal construction cost for necessar facilities ($) G	Facility cost per month during 20 years ($/month) h=G/20 H=h/period	Water unit cost per m3 ($/m3) I=H/F	Water cost for total area ($) J= I*F *period* cycle	Cost for crops ($/ha/one period) K	Total cost ($/year) L=(J+K*area*cycle)	B/C M=C/L
1-1	R	2500	3	300	2.3	1	3	2.3	2.0	5184			-11.4	51.3	1190	20	1.74	60	900	61.8	0.04
2-1	R	1250	3	300		1	3		2.0												
	O	1250	5	500	1.1	1	4	3.1	0.2	518			0.9	0.0	10	0	0	0	1200	1.5	2.08
2-2	R	833	3	300		1	3		2.0												
	O	833	5	500		1	4		0.2		0.6	1.6									
2-3	R	1250	3	300		1	3		2.0												
3-1	O	2500	5	500		1	4		0.2												
3-2	O	1250	5	500		1	4		0.2												

Water Resource Development In Caraulun River Basin

PROJECT CONCEPT

PREPARED BY STUDY TEAM:

Major Project Secretariat (MPS) & Integrated Planning Unit (UPI)

2024

Contents

1. Project Name

Feasibility Study of Water Resource Development in the basin of Caraulun River.

The project for Caraulun River has been proposed by the Ministry of Agriculture, Livestock, Fisheries, and Forestry (MAPPF) as an investment initiative with the aim to address water resource challenges along the south coast, particularly at the downstream of Belulik River Basins. This project seeks to increase and optimize water usage for agriculture (crops production such as rice and plantation crops), as well as domestic purposes, animal production, and flood control in the downstream catchment areas.

2. Project Background

In 2015, the Ministry of Agriculture and Fisheries (MAF) conducted a preliminary study for 15 rivers in Timor-Leste to evaluate the potential for multi-purpose dam development. Three sites were shortlisted based on the valley shape, potential downstream benefits, and low sedimentation rates. Among these sites – Sui River that is located upstream in the Caraulun River Basin as a promising location that can provide water for various utilization in the downstream area of Sui River.

In the same year 2015, the JICA Team provided a technical assistance to develop the Irrigation Master Plan for Timor-Leste. The master plan included mapping active agricultural areas, identifying around 2,000 – 4,000 hectares of irrigable farmland. According to the study, Timor-Leste has 66,500 hectares of the cultivable land, but only 52% (approximately 34,359 hectares) was actively farmed with low crop yields per hectare. Limited water availability during the dry season was identified as a major constraint on the year-round agricultural productivity. Additionally, during the high-flow periods the rivers have caused significant farmland erosion and jeopardized livelihoods.

The South Coast region, designated as a petroleum industry zone (Suai, Same, Natarbora, and Viqueque) that will require significant water volume for domestic and industrial use. High rainfall in the mountainous areas contributing to river flow, and offers a valuable water resource that can be used to meet urban development and agricultural needs. The IX Government aim during its five-year mandate is to increase animal production by 2028. Water resource development in the area could address the key issues, including water shortages during the dry season, flood control, and support for urban growth as part of the South Coast development.

The detailed feasibility study is essential to validate previous studies and address the following aspects:

- **Agricultural Land Assessment**: Define the potential and active agricultural areas, crop types, cropping frequency, and productivity issues within the project boundary;
- **Water Availability and Demand Analysis**: Conduct long-term hydrological studies to assess rainfall-runoff dynamics and identify water deficits to support government agricultural targets;
- **Irrigation System Evaluation**: Assess existing irrigation infrastructure and identify production limitations;
- **Risk and Impact Assessment**: Evaluate potential risks and impacts of proposed water infrastructure development;
- **Cost and Financial Projection**: Prepare detailed cost estimate & financial projection of project.

3. Location: South Coast (Sui River)

The following map shows the location of proposed development area, including the rough alignment of the catchment areas, and agriculture beneficial areas within the project boundary (estimated and presented by MAF in 2015) for the selected project site.

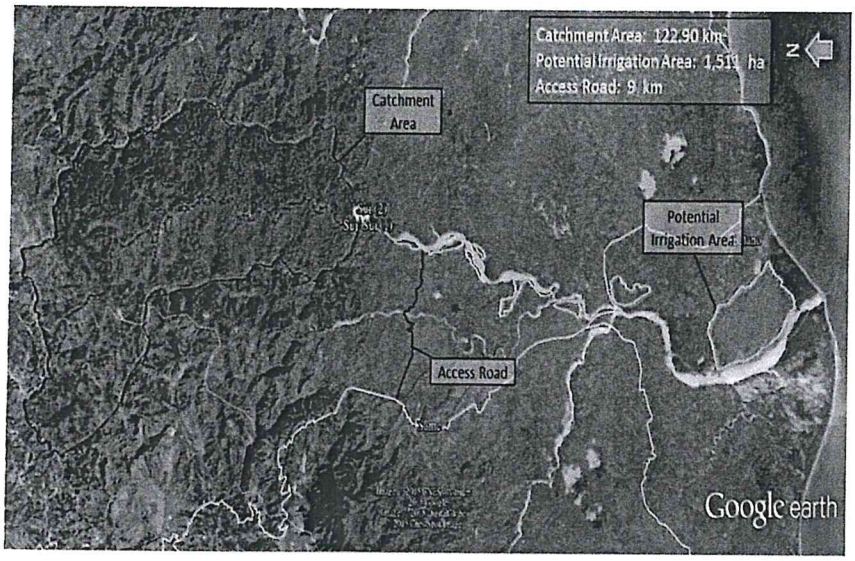


Figure 1. Project Location and beneficial area in Sui (upstream of Carauulun River

The exact boundary of the catchment and low land area for agriculture production should be properly assessed through the survey and site assessment during the feasibility study, including the type of soil, land characteristic, topography, and river network for various analysis, such as hydrological and water utilization assessment.

4. Justification of the Project

This study is necessity also to find and propose other alternative solutions to supply water to address the following issues that raised by the Government:

- National priority to increase the food production in order to ensure the food security in Timor – Leste. Currently, many items of food, including rice (mainly) imported from foreign countries;
- National Plan to increase rice/food production, especially in the South Coast such as Caraulun area has total combined productive land of 3600 hectares. The current production yield is low due to the limitation of water availability during the dry season;
- According to SDP (2011-2030), the petroleum industry will be developed in the South Coast area to help or initiate the economic diversification. The petroleum industry and other urban expansion as part of the industrialization will need a substantial amount of water for domestic and industry utilization;
- The Government program to increase animal production for 20% by 2028 and beyond. The availability of water for DAM or other solution can enhance the activity of animal production;
- Several hectares of farmland in the downstream Caraulun potentially can be washed by the floodwater from the upstream (recently Beikala irrigation area has already washed by the flood

water from Caraulun). By constructing the DAM, flood can be controlled and downstream flow can be released gradually such that the damaged of productive land can be minimized.

5. Project Purpose and Targets

5.1 Project Propose

The main purpose of the proposed development project is to solve the water deficit issue within the target areas, as well as reduce the risk of high flow water within the downstream farmland.

- Increase productivity of agriculture in the target area of 3600 hectares;
- Enhance animal production within Caraulun river basins;
- Provide clean water to the future urban area and water industry as part of development of petroleum industry in the South Coast;
- Protect the downstream farmland from the severe flooding from upstream Caraulun Rivers.

5.2 Project Targets

The implementation of the proposed water resource development project should be designed in such way that the following realistic (achievable) target can be met:

- Target 1: Rice productivity in the target area must be increased to 4-6 tons/ha/year;
- Target 2: Animal production of minimum 2000 heads of cattle (cow) per year in the area of 1000 ha (exact area and location need to be consulted with MAPFF during the FS stage);
- Target 3: Domestic water supply of 4 million cubic meters per year;
- Target 4: Crop plantation to be increased and expanded for additional 500 – 1000 ha (exact area to be determined and consulted with MAPFF during the FS stage).

6. Existing Baseline Information

Conducting a comprehensive baseline study is essential during the feasibility stage of the water resource development project. This study will identify existing issues, propose solutions, and evaluate any challenges associated with implementing these solutions. The key components of the baseline study should include irrigation scheme assessment and issues, cultivated area analysis, land ownership, irrigation management, water resource availability, and demand analysis.

6.1 Baseline Agriculture and Irrigation Assessment

The baseline assessment should be conducted as part of the preliminary study to evaluate key factors affecting agricultural productivity, and performance of irrigation systems. This assessment will establish better understanding of the current conditions and challenges, serving as a foundation for proposing future improvements. The assessment should including, but not limited to the following aspects:

- **Land Area Analysis:**
  - ✓ Catchment area characteristics: Evaluate the hydrological and topographical features of the catchment area;
  - ✓ Land Use Patterns: Assess current land use, including agricultural, residential, and natural areas;
  - ✓ Irrigation Land Assessment: Identify potential irrigable land and existing irrigation schemes.

- **Crop and Productivity Analysis:**
  - ✓ Crop types and yields: type of crops grown, productivity, and seasonal variations;
  - ✓ Water requirements: Analyze the crop-specific water needs based on local conditions;
  - ✓ Soil fertility: Evaluate soil conditions to determine suitability for various crops;
  - ✓ Irrigation methods and efficiency: Review current irrigation practices and identify inefficiencies.
- **Water Use and Demand Assessment:**
  - ✓ Assess current water use for agriculture, domestic, and other purposes;
  - ✓ Analyze future water demand based on projected development and population growth.
- **Geological and Soil Analysis:**

  Conduct geotechnical survey to understand soil types, stability, and suitability for agricultural and infrastructure development.
- **Socio-Economic Baseline:**

  Evaluate socio-economic conditions of the local communities, including:
  - Current agricultural practices and income levels;
  - Demographic condition and trends of population and livelihoods;
  - Access to markets, resources, and infrastructure;
  - Assess local governance, land ownership, and community involvement in irrigation.

6.1.1 Catchment and Agriculture Land Availability

The total catchment area of Caraulun river basin is around 580 KM^2 from the upland catchment to the downstream area, but specific measurement and details need to be determined and analyzed. The following map shows the larger catchment of Caraulun as presented by SoL (2015).

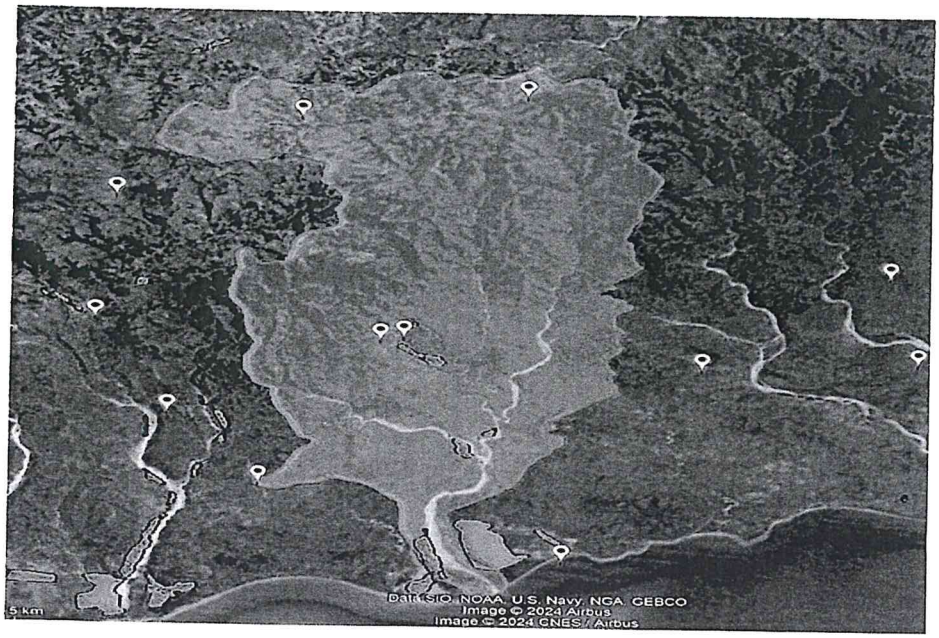


Figure 2. Catchment of the River Basins of Caraulun River

The survey and identification of various information within the defined catchment system should be conducted as part of the study, including the productive land area, and existing utilization.

- Total area;
- Classified by the slope and elevation difference;
- Current land uses classification (rice field, forest coverage, plantation, housing, city, etc.);
- River/stream network;
- Soil type and characteristic and permeability within each sub-catchment system.

The baseline study of the status of water supply, demand, agriculture productivity (type of crop, yield of each crop per hectare per year, the problems, etc.) must be conducted prior to the proposal of the irrigation improvement. A preliminary survey of farmland (active farmland, potential land availability, any issue related to the productivity, etc.) should be conducted.

- Intake water;
- Irrigation canal;
- Beneficial Area;
- Type of crops.

Analysis of the crop rotation and frequency of crop production should be conducted based on the water supply (availability). In total, 5 irrigation schemes were identified by JICA study to be rehabilitated within Caraulun river basins in order to contribute to the food production in Timor-Leste. The following table provide the summary of each irrigation schemes and potential area that can be cultivated.

Table 1. Summary of Irrigation Schemes in Caraulun River Basins

No	Ref. No.	Scheme	Actual Area, Ha	Available Area, Ha
1	2-c-12TR	BOBE	388	1,190
2	2-c-13TR	BUIRUBU	85	31
3	2-a-1TC	CARAULUN	850	2,196
4	2-a-6TR	KAKEU LULIK	91	60
5	2-a-9TR	SENT BOOT	25	200
Total			**1439**	**3,677**

Each of this 5 schemes of irrigation will need to be investigated separately, including the cost and benefits of development or improvement of each schemes. More schemes and potential area may need to be assessed during the study. Beside the crops production, there should be also a need to reserve/indicate the land around 1000 ha to promote animal production (cattle production) as one of the direct benefit of the water resource development in the South Coast area. In summary, the beneficiaries of the irrigation improvement project should compose the following:

(1). Intake point of water source for the irrigation;

(2). Total irrigable land in each scheme plus animal potential for the extension the production area;

(3). Type of crops and crop rotation;

(4). Water supply and demand analysis of each schematic of irrigation to maximize the annual production yield;

(5). Outline of the project component of each irrigation, and rough cost estimation;

(6). Financial analysis of the overall investment.

Analysis of the optimal utilization of the water resource from the improvement of each irrigation canal should be conducted in order to know the optimal benefits that could be possibly gained every year.

6.1.2 Crops and Irrigation Demand Assessment and Scenarios

Necessary water volume during the dry season is variable according to the utilization methods of the irrigation area. Therefore, the possibility of expanding of existing weir/canals or new development will be different according to the new irrigation area plan (and for other water developments) as shown in the following table.

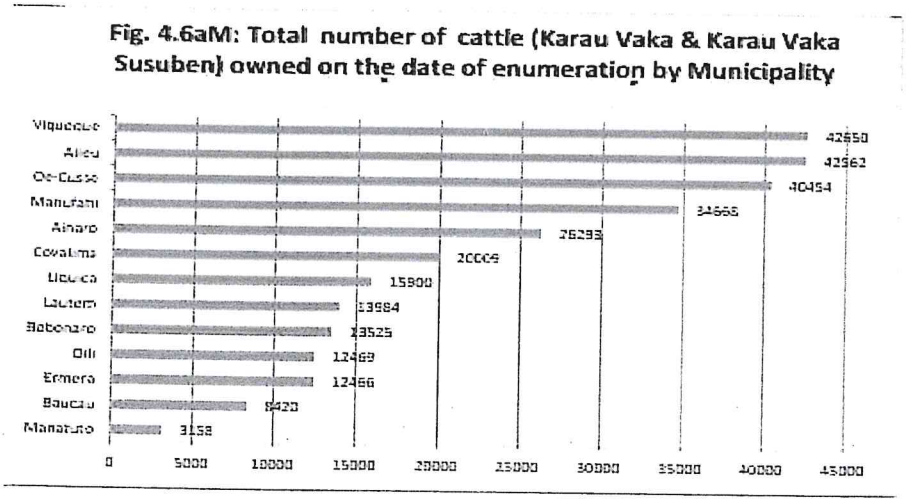
Table 2: Usage methods of irrigation area

Scenario	Usage methods in dry season	Symbol
1-1	All area for rice even in dry season (Necessary water volume becomes maximum)	R
2-1	Partially for rice production in dry season. Remained area could be used for other crops	R O
2-2	Some of the remained area out of rice area will be used for other crops in dry season	R O N
2-3	Limited area for rice and other area will not be used in dry season	R N
3-1	no rice production in dry season, and other crop production could be considered.	O
3-2	Limited area for other crops and other area will not be used in dry season	O N
	R: Rice, O: Other crops, N: No crops	
Other crops, such as cassava or peanut, will require less water volume consumption comparing with rice, but their required water will be different by crops. Therefore, necessary water volume for other crops (except rice) could be used some supposed average of a few kinds		

The Feasibility study of irrigation during the dry season is requested to consider the **Scenarios for six cases as shown in above table** (from 1-1~3-2). The necessary water volume during the dry season should be proposed based on the above case by case. The final target area (tentatively ~3000 ha, but subject of the investigation) may be divided equally to make simple the calculation in case of the multiple usage.

6.1.3 Animal Production review and demand assessment

Animal production within Caraulun river basins is existing but it's not organized for industrial approach. The following table provides a summary of the quantity of animal (cattle, pig, and poultry) produced within the Caraulun River Basin.



Source: GDS-MoF. Timor-Leste Agriculture Census: 2019

Figure 1: Statistic of Animal Production within Caraulun River Basins (Same, Manufahi Municipality)

In this proposal the Consultant should present the study/scenarios where more systematic approach of the animal production will be conducted if the water availability is ensured. Other livestock will follow,

but the study should focus on cattle production in the area where the land availability for the cattle production can be arranged (minimum 500 ha). The scenario of the total cattle that would enter the market system should be estimated based on the land size, water availability, and profit earned by the company. The Study shall be conducted, including but not limited to the following items:

- Land availability for animal production, including growing animal feed and cost;
- Water consumption for animal production (animal, to grow the animal food, and operate the facility) and the cost;
- Food for animal (source of the food: grass, tree, rice husk, rice leaves/after harvest, supplement, etc.);
- Other items relevant to the animal production.

The study should assess the problems faced by the current animal production in the area, and current number of the livestock in the area.

6.1.4 Crop Plantation Review and Demand Assessment

Crop plantation such as mango, banana, papaya, tangerine, apple, etc., can be also a valuable commodity product that can be produced if the land and water are available. The overall review of the existing condition on the import of the crop plantation commodity and study of the water availability that could enhance the crop plantation and food production within the project area.

6.2 Socio-Economic and Livelihood Analysis

Existing Socio economic review and projection with and without project development should be prepared as part of the feasibility study of this project.

6.3 Geological and Geo-technical Studies

Review of regional geological and geoscience information should be presented as part of the study and require investigation should be proposed as part of the infrastructure development. The level of geo-technical investigation shall be based on the type of infrastructure that will be proposed. Therefore, the feasibility study consultant should propose the type of the survey:

- Soil stability;
- Percolation loss or infiltration within the location of DAM construction;
- Testing of the rate of infiltration in the rice field to estimate the amount of irrigation requirement in a specific area;
- Resettlement issues;
- Soil Properties (Unit weight; Specific gravity; Moisture content);
- Grain Size Analysis;
- Atterberg limit (Liquid limit (W1); Plastic limit (Wp); Plasticity index (PI); Shrinkage limit);
- Triaxial test;
- Consolidation test;
- Compaction test;
- Unconfined compressive strength test;
- Permeability test.

6.4 Environmental Impact Study

During the feasibility study the consultant team should identify the potential environmental impact study that need to be further investigated as a consequence of the proposed infrastructure development. In that case, several solutions can be proposed (depending on the study) in terms of Infrastructure development. Potential infrastructure development options may consist of the following:

- Option 1: Construction of Irrigation improvement (Canal, Intake, weirs)
- Option 2: Option 1 + Multipurpose DAM (Reservoir)
- Option 3: Option 1 + Solar-Water Pumping

The **scope of the environmental impact assessment study** shall be prepared for the best selected option that is feasible. And the project document, including the Terms of References (ToR) for the environmental impact assessment study should be prepared.

The following table shows the summary of expected deliverable of the Environmental Scoping Study.

Table 3. Summary of Option of Infrastructure development and Scoping Study of EIA

Selected Option	Categorization of Environmental Impacts	Potential Impacts and Risk to be Studies	Items that Need to be studied
Option 1: Construction of Irrigation Improvement	Based on Decree Law of Timor – Leste Environmental Licensing law or refer to various best practice of environmental scale and categorization, the consultant will proposed the scale of irrigation infrastructure development as a primary information to categorize the environmental impact assessment. Irrigation improvement with total area >= 100 ha is a category A	▪ Water quantity at the downstream are of weirs ▪ Flooding as a result of construction of weirs ▪ Drought, especially at the downstream area ▪ Sedimentation and erosion ▪ Habitat loss ▪ Resettlement	▪ Baseline hydrological study and impact due to irrigation development (changing the flow regime, groundwater table, wetland, etc.) ▪ Ecological study (baseline) of flora and fauna that may be affected by the construction and operation of irrigation infrastructure ▪ Soil and sedimentation study from the upland catchment due to rainfall ▪ Water quality Analysis ▪ Social and Economic Impacts studies ▪ Environmental Flow requirement to maintain the balance in the ecosystem
Option 2: Option 1 + Construction of Multi-purpose DAM	Irrigation area and DAM height, as main parameters to determine the categorization of the environmental impact assessment	• Impact of water flow • Impact of water quality • Ecological and Biodiversity Impacts (aquatic system, terrestrial ecosystem, and biodiversity) • Soil and geology (erosion and sedimentation, seismic impact) • Social and economic impacts (resettlement, livelihood, cultural heritage) • Climate change • Water use and allocation • Public health and safety impacts (risk of waterborne disease and risk of DAM failure)	• Detail hydrological (water balance, high flow/low flow, probable maximum flooding, DAM failure modeling) • Ecological study (aquatic study of impact on aquatic life plus pattern, study on the impact of surrounding ecosystem such as forest, wetland, and wildlife habitat, as well as rare species) • Erosion and sedimentation study and potential seismic impact to DAM operation • Resettlement plan, impact of the project to the local economic, including agriculture and tourism, potential loss of cultural site and practice due to flooding and displacement • Climate change: greenhouse gas emission and adaptation • Public health and risk assessment
Option 3: Option 1 + Solar-water Pumping	Irrigation Area + Pumping rate to determine the environmental categorization	✓ Groundwater issue (subsidence and structural collapse, etc.) ✓ Water resources issue with pumping of large volume of groundwater ✓ Etc.	

6.5 Scope of Hydrological Assessment

The water supply and demand analysis is one of the important subject during the execution of the Feasibility study of the project, especially to provide information in order to make a decision of the scale of the infrastructure project to be executed in responding the forecasted demand in the future.

6.5.1 Rainfall data

The main source of water supply in above-mentioned river basins comes from rainfall. The following map shows the available rainfall information around project boundary.

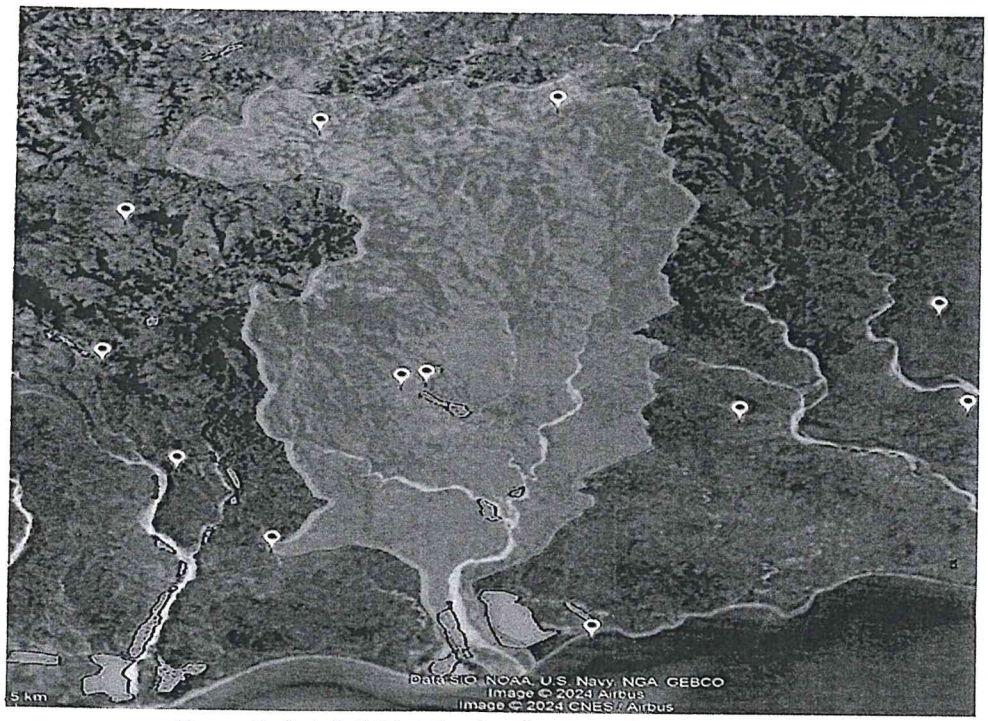


Figure 2. Rainfall Distribution for Caraulun River Basins

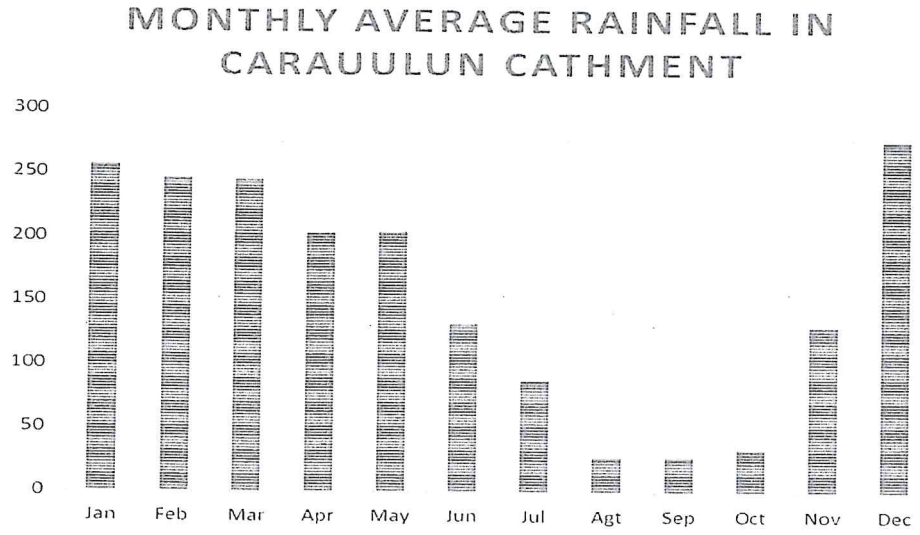


Figure 3. Monthly Average Rainfall Distribution (MAF, 2015)

Monthly rainfall data reveals a potential deficit in water supply during August to October each year. However, for the remaining nine months, water availability exceeds demand significantly. The rainfall data based on the satellite derived data of 24 years is available for the entire Timor – Leste, with 10x10 km spatial representation. This data can be used to simulate the long-term hydrological analysis but the data need to be calibrated/corrected with the ground data in order to know the reliability. The preliminary analysis of rainfall data from GSMAP can be seen from the following figure.

Figure 4. GSMAP Data availability for Potential Water Budget Analyses

The average monthly rainfall data in each station within the Caraulun catchment system can be seen in the following figure.

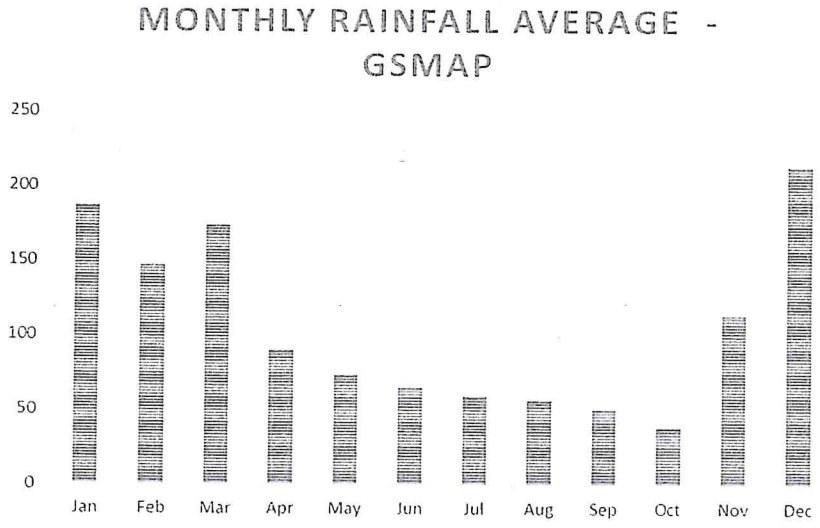


Figure 5. Monthly Rainfall Average from Satellite base Data

As can be seen that the satellite base data provide monthly average rainfall that much lower than some past historical data, and the consultant team need to correct the GSMAP data from the measured rainfall data or existing measured data (if GSMAP data with the long-term record shall be used to perform the hydrological modeling calculation). The corrected GSMAP data will be used to conduct the long-term water budget analysis.

6.5.2 River Flow/Surface water

In general, the river flow data and continuous measurement in Timor-Leste is not available, but these data is very important to justify and proof that estimation or calculation result can be trusted. The following information presented in table was collected during the Portuguese time during 1952 -1974 for monthly periods. This stream flow data represent the point of measurement near Betano area with the total catchment area of 554 Km^2. These data can be used to analyze water yield from any sub-catchment in the absence of field data measurement in each sub-catchment.

Table 4. Monthly Average Flow in Caraulun River

		Caraulun River - Monthly Streamflow (m3/s)											
		A=	554	km2									
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1952	0.91	5.22	20.59	21.09	11.32	7.42	4.65	3.07	2.13	1.41	7.82	11.27	8.08
1953	9.77	12.33	11.77	21.27	19.58	12.16	7.43	4.76	3.20	2.05	5.74	2.60	9.39
1954	4.53	10.51	15.98	28.73	28.74	21.23	12.59	7.88	5.15	3.21	2.22	13.62	12.87
1955	15.21	28.17	27.18	24.39	18.45	14.22	9.62	6.10	4.09	2.62	2.09	2.42	12.88
1956	17.47	28.70	27.18	28.09	24.17	19.77	13.62	8.69	5.72	3.61	3.46	3.00	15.29
1957	4.91	12.84	28.74	27.31	15.18	9.82	6.10	3.99	2.75	1.80	1.31	40.23	12.91
1958	18.87	27.26	30.88	26.40	16.91	12.35	8.39	5.32	3.55	2.27	2.31	3.64	13.18
1959	12.16	24.98	24.41	21.37	25.38	22.49	14.10	8.70	5.66	3.49	2.36	1.76	13.91
1960	1.53	4.80	9.40	13.10	21.35	17.47	9.48	6.01	3.99	2.52	1.76	3.09	7.88
1961	8.55	52.51	31.43	17.02	10.79	7.10	4.47	2.96	2.05	1.36	1.18	2.53	11.83
1962	4.17	9.67	12.38	11.67	8.17	5.75	3.69	2.53	1.88	1.32	1.05	6.97	5.77
1963	11.60	28.92	42.59	41.93	30.19	19.66	11.78	7.36	4.79	2.96	1.98	1.30	17.09
1964	1.22	1.09	2.06	3.24	24.13	19.24	8.80	5.59	3.72	2.42	5.92	2.74	6.68
1965	9.77	22.33	33.74	31.08	18.78	12.08	7.37	4.72	3.16	2.00	1.40	9.65	13.01
1966	6.49	17.25	26.90	24.42	14.21	9.25	5.75	3.77	2.59	1.71	1.33	11.38	10.42
1967	19.32	24.56	33.45	30.01	16.97	10.92	6.68	4.27	2.86	1.82	1.28	11.73	13.66
1968	8.91	7.53	10.61	18.06	25.30	24.55	21.19	14.20	8.50	5.20	3.45	9.42	13.08
1969	8.70	13.95	19.26	17.40	10.44	7.40	5.10	3.37	2.37	1.62	1.23	8.63	8.29
1970	7.37	12.40	13.07	13.78	30.11	27.03	16.23	9.84	6.40	3.95	5.43	4.03	12.47
1971	7.95	42.24	71.90	52.87	31.00	20.67	12.38	7.74	5.05	3.14	4.98	9.66	22.47
1972	14.62	22.43	27.64	33.44	27.03	20.15	13.68	8.41	5.46	3.35	2.24	8.90	15.61
1973	13.42	21.48	33.88	34.37	28.59	20.94	12.25	7.70	5.09	3.23	2.80	4.63	15.70
1974	3.82	14.39	16.74	16.15	14.09	10.31	6.96	4.49	3.05	1.99	11.46	8.87	9.36

This monthly average flow can be used as a secondary information for water budget analysis, especially to be used as a preliminary information for the base-flow for the catchment analysis. The JICA Master plan team in 2015 also collected some stream flow information that may be useful for the hydrological modeling and analysis (Report will be in the annex as part of the information to be provided to the consultant team). More recent data may need to be collected for model calibration and verification of the water budget analysis. Preferable, daily data should be collected to provide certain level detail of data to support model calibration for long-term water budget estimation from rainfall data.

6.5.3 Preliminary Calculation of the Water Balance (Supply and Demand)

Water source in the river (as river flow) comes from the rainwater entering the river basins (catchment system). Important data that should be available is the rainfall and stream flow data that show the water entering the catchment system (rainfall) and coming out of catchment system as a stream flow. Analysis of water availability in a system (catchment) is one of the main subject of the feasibility to assess how water transform from rainfall to surface flow and groundwater that eventually can be used as source of utilization by human being. The monthly rainfall data presented early, indicated that around 4 months is considered as dry season with relatively small amount of rainfall. From the monthly rainfall, the calculation of surface runoff, as water that potentially available in the river can approximate, on the following assumptions:

1. Around 50% of the total rainfall will become runoff (surface flow);
2. Rice production in south coast will conducted twice a year (compare to the existing one only once a year). The demand of irrigation is estimated to be 15520 m3/ha/season (this information is subject of confirmation through the Feasibility Study);
3. Animal production will occupy land of 1000 ha, and production is assumed 2000 cattle per year. Every day around 40 L/head of water will be required during the dry season.

Based on these assumptions, the water supply and demand can be calculated for each river basins. Then, the water balance deficit can be estimated.

Table 5. Monthly Water Availability and Demand Analysis of Carauulun Catchment System

Carauulun	Monthly Average, mm	Effective Rainfall, mm	Water Volume in the River, MCM	Demand1 (Rice Production), MCM	Demand 2, MCM (animal farming of 1000 HA	Domestic water supply	Total demand, MCM	Water Balance = Supply - Demand	Reservoir Volume
Jan	256.75	128.375	16.58605	2.3328	0.023328	0.3	2.656128	13.929922	0
Feb	246.75	123.375	15.94005	2.3328	0.023328	0.3	2.656128	13.283922	0
Mar	245.75	122.875	15.87545	2.3328	0.023328	0.3	2.656128	13.219322	0
Apr	204	102	13.1784	4.6656	0.046656	0.3	5.012256	8.166144	0
May	205	102.5	13.243	4.6656	0.046656	0.3	5.012256	8.230744	0
Jun	132	66	8.5272	4.6656	0.046656	0.3	5.012256	3.514944	
Jul	88	44	5.6848	4.6656	0.046656	0.3	5.012256	0.672544	
Agt	28.25	14.125	1.82495	11.664	0.11664	0.3	12.08064	-10.25569	10.25569
Sep	28.25	14.125	1.82495	11.664	0.11664	0.3	12.08064	-10.25569	10.25569
Oct	34.75	17.375	2.24485	11.664	0.11664	0.3	12.08064	-9.83579	9.83579
Nov	130.75	65.375	8.44645	2.3328	0.023328	0.3	2.656128	5.790322	0
Dec	276.75	138.375	17.87805	2.3328	0.023328	0.3	2.656128	15.221922	0
total	1877	938.5	121.2542	65.3184	0.653184	3.6	69.57158		30.34717

From the rough calculation of the water budget, it is expected that water deficit only occurs during the three months period (August- October) with roughly 30.5 MCM. For the current proposed development project, the demand consist of the following:

1. Irrigation of 3000 hectares land in the downstream of Caraulun river basin;
2. Demand for downstream area for Aquaculture/animal production (land area assumed 1000 ha)
3. Water Supply demand at the rate of 3-5 MCM annually.

The following table provides the summary of water demand in the service area.

Table 6. Projected Demand for water in the Service Area (annual Demand)

Type	Demand Caraulun, MCM
Irrigation	60-80
Animal Production	1-3
Domestic water supply	3-5
Total	70-90

Based on this high-level estimation of water balance analysis, it is clear that water demand during the rainy season is not issue or supply is much larger than the demand. The water demand become an issue (deficit) during the dry season that need to be solved in order to maintain productivity of the agriculture and animal within the target area. The following table shows the rough estimation of the water deficit.

Table 7. Summary of Water deficit in the target Area

Type	Demand Caraulun, MCM
Deficit	25-40

The above table suggested that the deficit of water demand in Caraulun that need to be solved in order to achieve the government target of improving the agriculture productivity. The detail feasibility study should be conducted during the study to investigate the water supply and demand analysis. Especially, the long-term rainfall-runoff modeling must be conducted to provide the long-term trend of the water availability, particularly the variation between the wet and dry seasons, long-term variation of dry seasons, etc. The time series calculation on the water availability, should concluded the following important aspect of water budget in a frequency term.

- High season flow;
- Long-season;
- Extreme flow;
- Dry weather flow.

Based on this water budget analysis and demand forecast, the type of infrastructure development should be proposed. The demand of water within Caraulun watershed system shall be estimated based on the following scenarios:

(1). Water demand for irrigation;

(2). Water demand for animal production (the scale and size of the project need to be consulted);

(3). Water demand for crop plantation (the scale and size need to be consulted);

(4). Water demand for domestic water supply based on population growth.

Among these component of potential water demand, irrigation requirement may take up around 80-90% of the whole water availability due to the size of agriculture land and the target of the government to increase the production of rice into minimum two times a year with higher productivity.

7. Possible Outline of Technical Solutions

Various technical solutions must be compared during the feasibility study, considering such factors as technical feasibility, cost, operational and maintenance requirements, as well as financial benefits, and return of investment for each option. Three scenarios require further investigation during FS:

- Improvement of the Irrigation Systems (primary aim to enhance the agricultural production);
- Integration of Irrigation with the Multi-purpose Dam (irrigation demand, domestic water supply, animal production, crop plantation);
- Irrigation using solar-power Water Pumping (irrigation, animal production, and crop plantation).

7.1. Improvement of Irrigation

Improvement of irrigation is the least option to be taken in order to increase the agriculture production in the target area of the proposed development project. Within this scenario, the water supply and demand analysis should be conducted with the proposal of increasing the agriculture production. The baseline study of the status of water supply, demand, agriculture productivity (type of crop, yield of each crop per hectare per year, the problems, etc.) must be conducted prior to the proposal of the irrigation improvement. The preliminary survey of farmland should be conducted (active farmland, potential land availability, any issue related to the productivity, etc.).

- Intake water;
- Irrigation canal;
- Beneficial Area;
- Type of crops.

Analysis of the crop rotation and frequency of crop production should be conducted based on water supply (availability). In total, 5 irrigation schemes were identified by JICA study to be rehabilitated within Caraulun river basin in order to contribute to the food production in Timor-Leste. The following table provides the summary of each irrigation schemes and potential area that can be cultivated.

Table 8. Summary of Irrigation Schemes in Caraulun River Basin

No	Ref. No.	Scheme	Actual Area, Ha	Available Area, Ha
1	2-c-12TR	BOBE	388	1,190
2	2-c-13TR	BUIRUBU	85	31
3	2-a-1TC	CARA-ULUN	850	2,196
4	2-a-6TR	KAKEU LULIK	91	60
5	2-a-9TR	SENT BOOT	25	200
Total			1439	3,677

Each of 5 schemes for irrigation need to be investigated separately, including the cost and benefit of development or improvement of each schemes. Beside the crop production, there should be also a need to reserve/indicate the land around 1000 ha to promote animal production (cattle production) as one of the direct benefit of the water resource development in the south coast area. In summary, the beneficiaries of the irrigation improvement project should composed of the following:

(1). Intake point of water source for the irrigation;

(2). Total irrigable land in each scheme plus animal potential for the extension the production area;

(3). Type of crops and crop rotation;

(4). Water supply and demand analysis of each schematic of irrigation to maximize the annual production yield;

(5). Outlining the project component of each irrigation and rough cost estimation;

(6). Financial analysis of the overall investment.

Analysis of the optimal utilization of the water resource from the improvement of each irrigation canal should be conducted in order to know the optimal benefits that could be possibly gained every year.

7.2. Multi-Purpose DAM +Irrigation Improvement

Multi-purpose DAM is one of the solutions as recommended by the Ministry of Agriculture and Fishery (MAF) in 2015 when upstream of Caraulun river at Sui was shortlisted as a potential proper location for the multi-purpose DAM. The following figure provides a general overview of the project that includes the location of DAM, irrigation area, and in relation to the future urbanization in the south coast area. This Multi-purpose DAM in addition to the option of the stage 1 above (irrigation improvement),

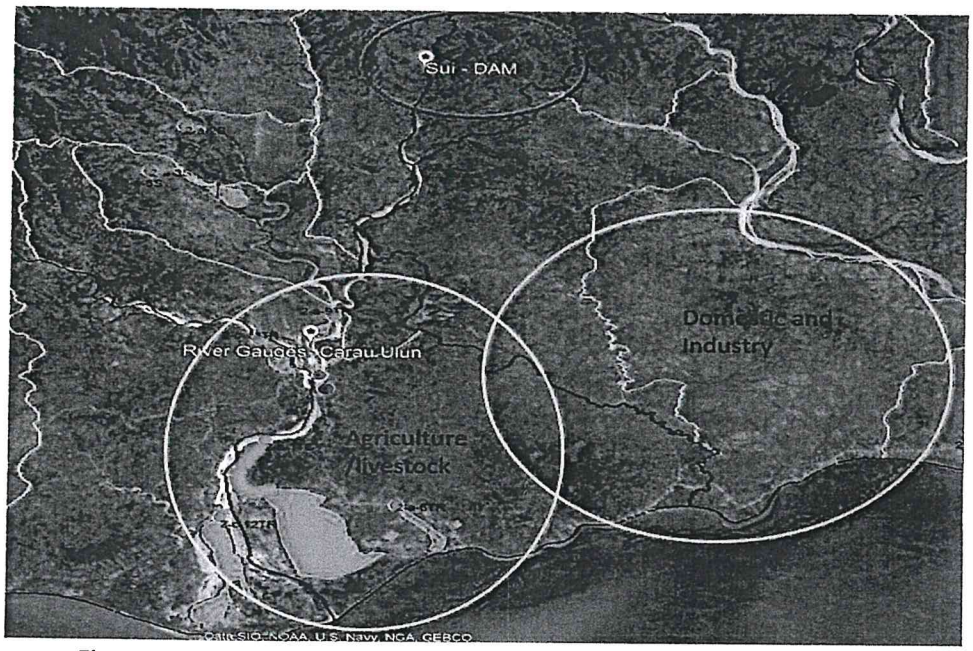


Figure 6. Overview of DAM Location and Potential utilization of water

According to above concept, a DAM shall be constructed to store and supply the water for irrigation and water supply in the target area (agriculture and domestic water supply).

Therefore, the outline of the project may consist, but not limited to the following:

1) DAM with tentative crest length and height should be estimated;
2) Irrigation Canal to irrigate 3000 ha of farmland in the downstream of Caraulun;
3) Water Tunnel (tentatively 10- 20 km);
4) Water supply from DAM to center of animal production (potential pipeline).

The feasibility study should cover the technical study of all these component of the project with multi-aspects as presented in the following section (Component of studies).

7.3. Solar – Water Pumping

The proposal suggests using solar-power water pumping as an alternative to construction of the multi-purpose DAM. Under this idea, solar-power pump will be installed to extract groundwater at the project site to address the water demand deficit. It is assumed that groundwater in the project area is potentially available for this purpose, although a study must be conducted to confirm its availability.

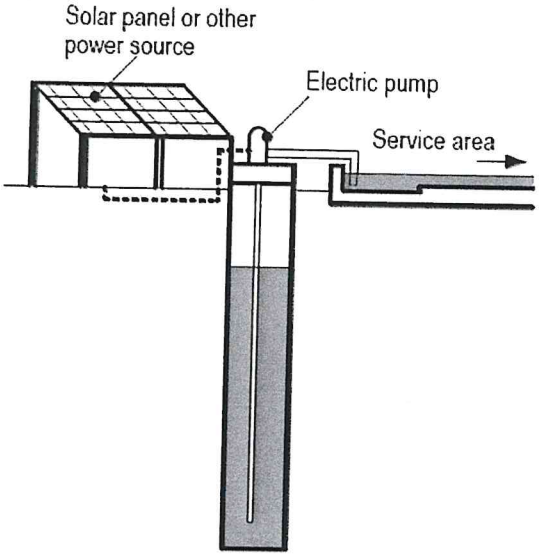


Figure 7: Concept of Water Solar Pumping

With the latest advancement in the solar-water pumping technology, the cost of solar-water pumping per volume rate of water is becoming more affordable. In various places, the solar-water pumping has been adopted to provide a stable water resource for agriculture production. Therefore, the option can be explored as a potential technical option to solve the water resources issue in project areas. In overall the technical outline of the solar-water pumping is presented as followed:

- Solar powered-water pumping system should deliver the water at the flow rate ranging between 30,000 to 50,000 cubic meters per day during 3 months of dry season in order to offset the deficit of water demand in the project target area;
- Construction and Installation of 50-100 wells (comprising shallow and deep wells) with the detailed investigation is required. The location of the wells is a subject for investigation (can be near the river or at the downstream of river basins);
- Piping system/route from each well to each intake of irrigation canal;
- Construction of the irrigation canal to irrigate around 2,000 – 3,000 hectares of farmland downstream of Caraulun river basin.

The detailed investigation of the groundwater availability is essential to determine the sustainable yield of the groundwater source before drawing conclusions on this option.

8. Project Outputs and Outcomes

The proposed water resource development aims to address the water deficit that limits the agriculture productivity, and perhaps other economic opportunities in the area through implementation of the following infrastructure as the ultimate output of the project.

- Irrigation Canal with intake weirs (the total length is yet to be determined);
- Multi-purpose DAM or multiple wells equipped with solar water pumping systems;
- Water pipeline from multi-purpose DAM to the animal production center;
- Possibility of water supply to the crop plantation from the multipurpose DAM.

The presence of these output infrastructures will lead to various outcomes, both tangible and intangible:

- Productivity of agricultural crops is expected to increase from 2 tons per hectare/per year to 3-5 tons or more per hectare/per year;
- Animal production in the downstream area of the river basin is projected to reach 2000 heads per year entering the market;
- Potential crop plantation system in the project target area that could become an important commodity to limit the import products.

9. Project Beneficiaries and Benefit

The proposed water resource development process (if realized), will bring several tangible benefit that can be measured financially. The potential beneficiaries of the project development include:

- Production of rice in the target area will increase to 4.5-6 tons/ha/yr (optimistic scenario);
- Ensuring water supply for domestic use in the area;
- Enhancing national food security through more frequent crop production and animal production for both domestic consumption and export-oriented markets;
- Increase the plantation crops in the project area.

Considering the contributions to food production and ensuring water supply for future urban growth, the proposed development project is expected to provide direct and indirect benefits that can be assessed both financially and economically. Assuming that the water deficit problem can be resolved with the mentioned technical solution options, the financial return from agricultural products, animal products, and clean water supply for domestic and industrial purposes can be estimated. The table below provides a very rough calculation of the financial return if the water deficit is resolved through the proposed multi-purpose DAM or any other feasible solution:

- Rice production is estimated to increase its yield to 4.5 – 6 tons per hectare per year of paddy with a sale price of $0.8 per kilogram of rice (1 kg of paddy conversion to rice is around 60%);
- Water revenue is anticipated to be generated with a total sale price of $0.7 per cubic meter with total annual production of 7 MCM;
- Revenue from animal production is expected at a cost of $1000 per head, with minimum annual sales estimated at 2000 heads;
- Potential crop plantation.

Beside the financial benefits, intangible benefits:

- Improve productivity of farming;
- Improve public health and sanitation;
- Enhance sustainability of groundwater system (water in the DAM shall penetrate into ground surface and recharge the aquifer);
- Enhance other sectors such as tourism, sport activity, fisheries, hotel, business, etc.

10. Implementation Timeline

The estimated implementation timeline of the project is presented in the following table below.

Table 9: The implementation timeline of the project

FS	DED	Land	Financing & procurement	Construction	O & M
2024 -2025	2025-2026	2027	2024-2025	2027 - 2030	2031
12 months	12 months	12 months	1 – 2 years	3 – 5 years	

The initial stage of the study entails gathering crucial data, including rainfall, stream flow, and sediment data. This is essential to establish baseline information and verify water availability, as well as conduct a demand deficit analysis before initiating the tender process for the construction of multi-purpose DAM.

11. Data collection & measurement

Various data and information will be very important to support the study and analysis for this water resources development. Ideally, the data should be available for the consultant to carry out the necessary analysis. However, in Timor-Leste the following important data for water resource development is not available or only limited:

- Meteorological data, especially long-term historical record of rainfall is required to perform the long-term water budget analysis within the catchment system, including the high flow and low flow in the rivers, base flow water analysis, wet season flow and dry season flow;
- River stream flow data to calibrate the hydrological model for water balance analysis;
- Sediment Transport data; this data is necessary for the consultant to know the sediment delivery from the catchment area to the river.

Therefore, the field measurement to collect the hydrological data is require during the feasibility study in order to provide some preliminary information, especially to conduct the hydrological analysis, including the setup model, model calibration, and long-term water budget calculation to see the trend of the water availability to fulfill the necessary demand.

12.1 Meteorological Data Collection

In order to provide a minimum data for the current analysis during the feasibility study, it is necessary to establish the field measurement and data collection sites. The following maps shows the proposed location for the data collection of meteorological sites within the Carauulun river basins.

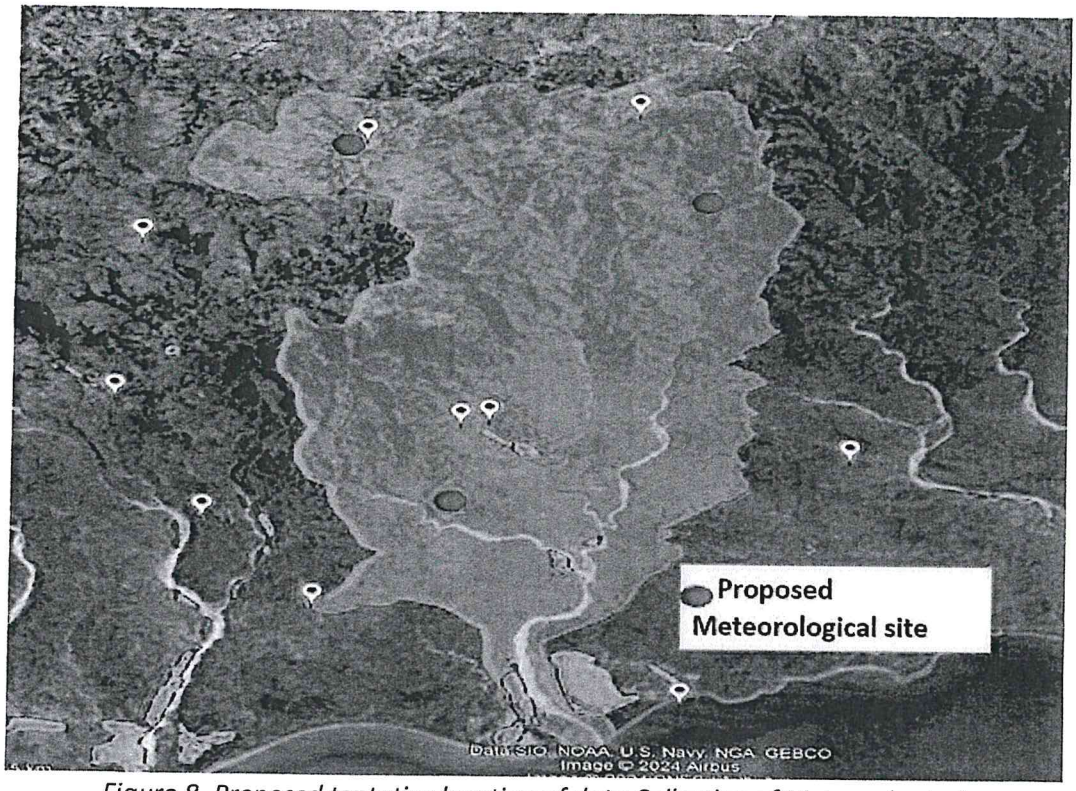


Figure 8. Proposed tentative location of data Collection of Meteorological

It is preferred to collect the automatic data collection with the latest instrumentation that transmit the data with the latest technology. The parameters of the meteorological data consist of the following:

- Rainfall (Require);
- Solar radiation (Optional);
- Temperature (optional);
- Wind speed and direction (optional).

The above data should be collected in 3 location within Carauulun catchment system. The time interval data is recommended to be hourly for rainfall and other parameters (optional) daily time interval. The station need to be established by the consultant team and data collection of minimum 1 year during the study period and the operation of the station beyond the study period will be handover to the Ministry of Planning and Strategic Investment to continue operation and collect the long-term data for future better planning purpose.

11.1Stream Flow and Sediment data Collection

The second data set that will be required to help perform the water balance analysis is the stream flow and sediment transport data. The following map shows the proposed measurement location of stream flow and sediment at the two stations.

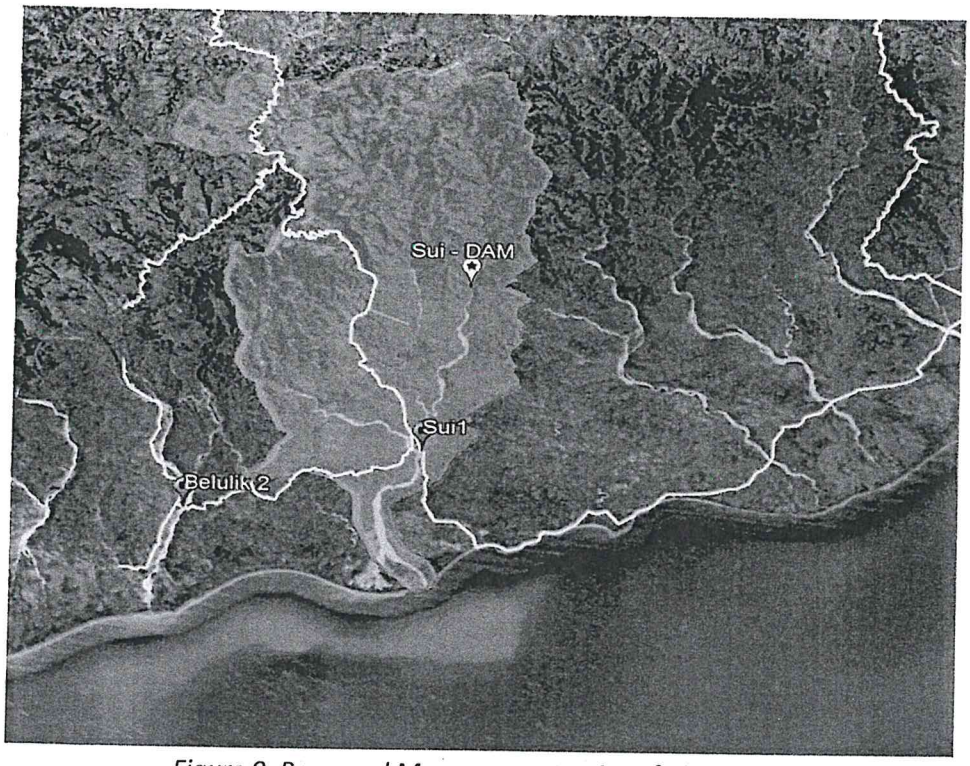


Figure 9. Proposed Measurement point of River Flow

The automatic measurement of the water level in the stream should be installed to collect the long-term data of water level. The water level data is used to calculate the discharge rate or river flow in the river. Several important tasks must be performed in order to collect a reliable data of stream for the calculation of the water balance within the catchment system.

- Establishment of measurement points and installation of the instrument;
- Survey of cross section on the measurement point;
- Establishment of the rating curve (relationship between the water level and discharge);
- Continue data collection of water depth in the river;
- Calculate the discharge (or river flow) from the water level data;
- Present the data in time series.

The other important data to be collected is sediment transport data, which is very difficult but the consultant team should try to establish the data collection of sediment during the rainy day so that overall idea of sediment production and delivery from the catchment system can be analyzed.

While, the volume of data may not be sufficient, but these measurement data should be available to carry out the following study as part of the feasibility study in the water resources development in Carauulun river basins.

- Calibration of GSMAP of rainfall data, which is available from 1998 -2023 in the hourly time interval. The calibration of this satellite data will be done with the collected rainfall data from the field measurement and some adjusted factor should be proposed in the 24 years rainfall data, as input to the long-term hydrological modeling;

- Hydrological Modeling Calibration with the measured stream flow data. The hydrological modeling should be prepared by using the measurement of rainfall and stream data that collected, as part of the project. The calibrated model will be used to calculate the long-term water budget analysis from the input data of long-term hourly rainfall data from GSMAP;
- The sediment transport model should also be established prior to the model utilization to estimate long-term impacts for of the sediment in catchment, river, and DAM.

12. Recommended Hydrological Modeling Tools

The hydrologic Modeling tool must be used to calculate the long-term trend of water resources in the catchment system. Any time series modeling could be used but the following are recommended one for the water resources development project.

- HEC-HMS Modeling Package (for the catchment modeling system);
- HEC-RAS modeling (for River Flow modeling and sediment transport);
- BASINS-HSPF Modeling tool (USEPA).

The modeling and analysis must be done with the following scenarios:

(1). Hydrological Model development and establishment of the model parameters (model Calibration);

(2). Using the calibrated model, calculate the long-term water balance/budget analysis from the catchment (sub-catchments) system and in each point of river (potential irrigation intake);

(3). Adding the DAM with required volume to store water during the rainy seasons and utilized during the dry season and perform the water balance analysis (supply – demand).

13. Some Preliminary data or Information

Some preliminary information and data may be available for the consultant to be used as basis to conduct the need and gap analysis prepare the detail plan on how to execute the feasibility study of this water resource development. It is the responsibility of the consultant to review the accuracy and reliability of the data and provide a plan on how to fill the data gap (if any) in order to provide a comprehensive analysis as part of the study.

(1). Digital Elevation Model (DEM) from ASTER and NASA with 30x30 resolution

(2). Soil data (Soil Texture)

(3). Landover data per 2016

(4). Hydro-geological map and river networks of Timor-Leste

(5). Monthly rainfall data (compiled by SoF of the Ministry of Agriculture and Fishery (Excel and Google earth formats)

(6). Latest rainfall data within the study area (data files)

(6). JICA Master Plan report and backup data (in the annexes)

(6). JAXA Rainfall data: https://sharaku.eorc.jaxa.jp/GSMaP/

The available data will be provided to the Consultant team that will carry out the feasibility study.

REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE
Ministério do Planeamento e Investimento Estratégico
Fundo das Infraestruturas

NOTA DE DESPAICHO

1. ORIGEM DO DOCUMENTO

Proveniência do Documento

N Ref: 05/MPIE-UPI/SEV/II/2025

Data do Documento : 06/02/2025

UPI - MPIE

2. DETALHES DO DOCUMENTO

Enviado ao:

Data Entrada do Documento: 06/02/2025

1. Sr/ Mauricio Borges
2. Sr/a
3. Sr/a
4. Assessores Nacionais / Internacionais

Assunto: Pedidu Fahe kodigu ba Projetu Estudu Viabilidade Barajetu Caraulun Munisipiu Manufahi no Belulik Munisipiu Ainaro

3. INSTRUÇÃO DO DIRETOR DO SGP

Para Sr/a

Data do Despacho: 6/2/2025

1. Sr/a ~~Mauricio Borges~~
2. Sr/a ~~Ao~~
3. Sr/a Nuno F

Despacho: Hare Atu ihe rae

Assinatura :

Mauricio Borges

IX GOVERNO CONSTITUCIONAL
MINISTÉRIO DO PLANEAMENTO
E INVESTEMENTO ESTRATÉGICO
UNIDADE PLANEAMENTO INTEGRADO
(UPI)

Data	:	**Díli, 06 de Fevereiro de 2025**
Nú. Referénsia	:	**N.º Ref. 05/MPIE-UPI/SEV/II/2025**
Hato'o ba	:	**Exmo. Diretor Executivo do Secretariado dos Grandes Projetos Sr. Mauricio Borges**
Asuntu	:	**Pedidu fahe kodigu ba Projetu Estudu Viabilidade Barajetu Caraulun Munisipiu Manufahi no Belulik Munisipiu Ainaro**

Exelentíssimo Diretór,
Tuir informasaun husi Diresaun Gestaun de Fundo das Infraestruturas, Secretariado dos Grandes Projetos (SGP) persija loke tan kodigu orsamentu ba Projetu Estudu Viabilidade Barangen Caraulun no Belulik. Rasaun loke kodigu foun tamba kodigu: 5104701 ba **Estudo de viabilidade para Projecto de Infra-estruturas** ba iha programa 510: Funcionamento e Desenvolvimento Institucional ne'e linha ida de'it.

Liu husi karta oficio ida ne'e husu atu SGP loke tan lina rua ba projetu tuir mai:

1. Estudo de Viabilidade para Esquema de Desenvolvimento de Recursos Hídricos do Rio Caraulun/Sui (*Feasibility study for Caraulun/Sui River Water Resources Development Scheme);*
2. Estudo de Viabilidade para Esquema de Desenvolvimento de Recursos Hídricos do Rio Belulik (*Feasibility study for Belulic River Water Resources Development Scheme*);

Ba Diretór ezecutivu nia konsiderasaun superior ba pedidu ida ne'e, ha'u hato'o obrigado wain.

Melhores Kumprímentos

Epi Orleães
Coordenadora da Unidade de Planeamento Integrado - MPIE

Democratic Republic of Timor Leste

Ministry Of Finance

DIV/ACT/LITEM Overview Report

Fiscal Year : 2025

Filter Criteria : Budget Control Type - DIV/ACT/LITEM; Hierarchical Coding Block Elements - FND : FUND SOURCE (From : 5101) (To : 5103) , PROG : PROGRAM , OBJ : LINE ITEM (From : 5010101) (To : 5050117)

Coding Block	Original Budget	Current Budget	Difference Current - Original	Forecast	YTD Actual	Obligations	Commitment	FreeBalance
FUND SOURCE / PROGRAM / ACTIVITY / LINE ITEM	A	B	C = B - A	D	E	F	G	H = B - (E + F + G)
5101 Infrastructure Fund	**261,913,128.00**	**261,913,128.00**	-	-	**612,344.90**	**2,749,727.63**	**1,808,790.00**	**256,742,265.47**
510 Functioning and Institutional Development	**9,650,684.00**	**9,650,684.00**	-	-	**83,498.69**	-	-	**9,567,185.31**
510013O Construction of Democracy & Civic Education Center, Dili Mun	**100,000.00**	**100,000.00**	-	-	-	-	-	**100,000.00**
5050102 Administrative Buildings	100,000.00	100,000.00	-	-	-	-	-	100,000.00
510013P Construction of Municipal Assembly Office Building, Baucau M	**100,000.00**	**100,000.00**	-	-	-	-	-	**100,000.00**
5050102 Administrative Buildings	100,000.00	100,000.00	-	-	-	-	-	100,000.00
510013Q Renovation of Presidential Palace, Dili Municipality	**100,000.00**	**100,000.00**	-	-	-	-	-	**100,000.00**
5050102 Administrative Buildings	100,000.00	100,000.00	-	-	-	-	-	100,000.00
510013R New Construction of STAE Office Building + Fence, RAEOA	**100,000.00**	**100,000.00**	-	-	-	-	-	**100,000.00**
5050102 Administrative Buildings	100,000.00	100,000.00	-	-	-	-	-	100,000.00
5100202 Financial management, Administration and Logistics	**962,095.00**	**962,095.00**	-	-	**83,498.69**	-	-	**878,596.31**
5010102 Salaries for Members of M	78,742.00	78,742.00	-	-	6,500.00	-	-	72,242.00
5010104 Salary of Employees and A	663,980.00	663,980.00	-	-	53,835.06	-	-	610,144.94
5010105 National Contractual Staf	78,742.00	78,742.00	-	-	8,500.00	-	-	70,242.00
5010106 International Contractual	110,670.00	110,670.00	-	-	9,683.63	-	-	100,986.37
5020301 Uniform	4,000.00	4,000.00	-	-	-	-	-	4,000.00
5020404 Other Public Goods	7,530.00	7,530.00	-	-	-	-	-	7,530.00
5020901 Office Supplies	11,231.00	11,231.00	-	-	-	-	-	11,231.00
5022401 Allowances for Local Busi	7,200.00	7,200.00	-	-	980.00	-	-	6,220.00
5024230 Petty Cash	-	-	-	-	4,000.00	-	-	(4,000.00)
5100206 Human Resource Management	**225,945.00**	**225,945.00**	-	-	-	-	-	**225,945.00**
5022002 International Transports	33,000.00	33,000.00	-	-	-	-	-	33,000.00
5022402 Allowances for Overseas B	40,495.00	40,495.00	-	-	-	-	-	40,495.00
5022501 Studies, Expert Recommend	103,345.00	103,345.00	-	-	-	-	-	103,345.00
5022507 Other Professional Servic	49,105.00	49,105.00	-	-	-	-	-	49,105.00
5100207 HR training and development	**117,530.00**	**117,530.00**	-	-	-	-	-	**117,530.00**

5022002 International Transports	26,100.00	26,100.00	-	-	-	-	-	26,100.00
5022401 Allowances for Local Busi	14,400.00	14,400.00	-	-	-	-	-	14,400.00
5022402 Allowances for Overseas B	48,030.00	48,030.00	-	-	-	-	-	48,030.00
5022502 Training and Lectures	29,000.00	29,000.00	-	-	-	-	-	29,000.00
5100211 Procurement and contract management	**59,248.00**	**59,248.00**	-	-	-	-	-	**59,248.00**
5021002 Vehicle Operation Fuel	8,700.00	8,700.00	-	-	-	-	-	8,700.00
5021601 Cleaning and Hygiene	13,500.00	13,500.00	-	-	-	-	-	13,500.00
5022101 Catering	12,950.00	12,950.00	-	-	-	-	-	12,950.00
5022504 IT Service	15,622.00	15,622.00	-	-	-	-	-	15,622.00
5022703 Printing	8,476.00	8,476.00	-	-	-	-	-	8,476.00
5100212 ICT management	**88,800.00**	**88,800.00**	-	-	-	-	-	**88,800.00**
5021901 Fixed Communications	1,400.00	1,400.00	-	-	-	-	-	1,400.00
5021902 Mobile Communications	16,400.00	16,400.00	-	-	-	-	-	16,400.00
5021903 Data Communications	19,200.00	19,200.00	-	-	-	-	-	19,200.00
5022504 IT Service	1,800.00	1,800.00	-	-	-	-	-	1,800.00
5040103 IT Equipment	30,000.00	30,000.00	-	-	-	-	-	30,000.00
5040113 Furniture	20,000.00	20,000.00	-	-	-	-	-	20,000.00
5100417 Construção do novo edificio de Comissão Nacional de Aprovisi	**700,000.00**	**700,000.00**	-	-	-	-	-	**700,000.00**
5050102 Administrative Buildings	700,000.00	700,000.00	-	-	-	-	-	700,000.00
5100420 New Construction of National Center Archive Centro National	**850,000.00**	**850,000.00**	-	-	-	-	-	**850,000.00**
5050102 Administrative Buildings	850,000.00	850,000.00	-	-	-	-	-	850,000.00
5100424 Teste Solo e Redesnho (DED/BoQ) para Construção e Supervisão	**200,000.00**	**200,000.00**	-	-	-	-	-	**200,000.00**
5050102 Administrative Buildings	200,000.00	200,000.00	-	-	-	-	-	200,000.00
5100427 Konstrusaun Edificio PCIC	**50,000.00**	**50,000.00**	-	-	-	-	-	**50,000.00**
5050102 Administrative Buildings	50,000.00	50,000.00	-	-	-	-	-	50,000.00
5100428 Konstrusaun Edificio PJR	**250,000.00**	**250,000.00**	-	-	-	-	-	**250,000.00**
5050102 Administrative Buildings	250,000.00	250,000.00	-	-	-	-	-	250,000.00
510051B Construction of New Office Building of Ministry of state Adm	**1,000,000.00**	**1,000,000.00**	-	-	-	-	-	**1,000,000.00**
5050102 Administrative Buildings	1,000,000.00	1,000,000.00	-	-	-	-	-	1,000,000.00
510051E Construção do Centro de Formação INAP	**489,000.00**	**489,000.00**	-	-	-	-	-	**489,000.00**
5050102 Administrative Buildings	489,000.00	489,000.00	-	-	-	-	-	489,000.00
510051F Consulting Services for Construction Supervision of New Offi	**163,000.00**	**163,000.00**	-	-	-	-	-	**163,000.00**
5050102 Administrative Buildings	163,000.00	163,000.00	-	-	-	-	-	163,000.00
510051K Construction supervision for New Construction of national Ce	**200,000.00**	**200,000.00**	-	-	-	-	-	**200,000.00**

5050102 Administrative Buildings	200,000.00	200,000.00	-	-	-	-	-	200,000.00
510051L Reabilitação do Edificio da Embaixada de Cuba em Farol-Dili	**57,466.00**	**57,466.00**	-	-	-	-	-	**57,466.00**
5050102 Administrative Buildings	57,466.00	57,466.00	-	-	-	-	-	57,466.00
510051M Construção do novo Edifício de PDHJ	**500,000.00**	**500,000.00**	-	-	-	-	-	**500,000.00**
5050102 Administrative Buildings	500,000.00	500,000.00	-	-	-	-	-	500,000.00
510051N Supervisaun para o novo Construção do Edifício de PDHJ	**200,000.00**	**200,000.00**	-	-	-	-	-	**200,000.00**
5050102 Administrative Buildings	200,000.00	200,000.00	-	-	-	-	-	200,000.00
510051O Acquisition and Rehabilitation a building for the premises o	**50,000.00**	**50,000.00**	-	-	-	-	-	**50,000.00**
5050102 Administrative Buildings	50,000.00	50,000.00	-	-	-	-	-	50,000.00
5100528 Construction of wall, Water Supply and Electricity for Futur	**51,228.00**	**51,228.00**	-	-	-	-	-	**51,228.00**
5050102 Administrative Buildings	51,228.00	51,228.00	-	-	-	-	-	51,228.00
5100530 New construction & supervision of MPO/ADN office	**700,800.00**	**700,800.00**	-	-	-	-	-	**700,800.00**
5050102 Administrative Buildings	700,800.00	700,800.00	-	-	-	-	-	700,800.00
5100532 Construction of INDMO office in Tibar	**300,000.00**	**300,000.00**	-	-	-	-	-	**300,000.00**
5050102 Administrative Buildings	300,000.00	300,000.00	-	-	-	-	-	300,000.00
5100552 Construction of new building of the Public Works Ministry	**1,000,000.00**	**1,000,000.00**	-	-	-	-	-	**1,000,000.00**
5050102 Administrative Buildings	1,000,000.00	1,000,000.00	-	-	-	-	-	1,000,000.00
510055A New E-Recruitment Building-CFP	**350,000.00**	**350,000.00**	-	-	-	-	-	**350,000.00**
5050102 Administrative Buildings	350,000.00	350,000.00	-	-	-	-	-	350,000.00
5104701 Feasibility study for Infrastructure Project	**150,000.00**	**150,000.00**	-	-	-	-	-	**150,000.00**
5050102 Administrative Buildings	150,000.00	150,000.00	-	-	-	-	-	150,000.00
5105408 Supervision for Construction of INDMO office in Tibar	**60,000.00**	**60,000.00**	-	-	-	-	-	**60,000.00**
5050102 Administrative Buildings	60,000.00	60,000.00	-	-	-	-	-	60,000.00
5105416 Redesign sub-structure and upper-structure building of Munic	**47,590.00**	**47,590.00**	-	-	-	-	-	**47,590.00**
5050102 Administrative Buildings	47,590.00	47,590.00	-	-	-	-	-	47,590.00
5105418 Supervision for construction of New E-Recruitment Building-C	**80,000.00**	**80,000.00**	-	-	-	-	-	**80,000.00**
5050102 Administrative Buildings	80,000.00	80,000.00	-	-	-	-	-	80,000.00
5105420 Supervision of the Construction of the INAP Training Centre	**148,000.00**	**148,000.00**	-	-	-	-	-	**148,000.00**
5050102 Administrative Buildings	148,000.00	148,000.00	-	-	-	-	-	148,000.00
5105441 Redesenho do Novo Edifício da Comissão Nacional de Aprovisio	**99,982.00**	**99,982.00**	-	-	-	-	-	**99,982.00**
5050102 Administrative Buildings	99,982.00	99,982.00	-	-	-	-	-	99,982.00

5105443 Supervision for Construction of Democracy & Civic Education	**100,000.00**	**100,000.00**	-	-	-	-	-	**100,000.00**
5050102 Administrative Buildings	100,000.00	100,000.00	-	-	-	-	-	100,000.00
521 Basic Education	**1,322,776.00**	**1,322,776.00**	-	-	-	-	-	**1,322,776.00**
Total	**312,203,618.00**	**312,203,618.00**	-	-	**612,344.90**	**2,749,727.63**	**1,808,790.00**	**307,032,755.47**

Note :

*Program 510 was called Good Governance and Institutional Management from 2018 until July 2023

*Program 980 was called Gender Equality and Social Inclusion from 2018 until July 2023

*Sub Program 51001 was called Boa Governação from 2018 until July 2023

*Sub Program 51002 was called Gestão Institucional from 2018 until July 2023

	ODS: OBJETIVO 11 : CIDADES E COMUNIDADES SUSTENTÁVEIS - Objetivo 11. Tornar as cidades e comunidades inclusivas, seguras, resilientes e sustentáveis															
	ODS: OBJETIVO 8 : TRABALHO DIGNO E CRESCIMENTO ECONÓMICO - Objetivo 8. Promover o crescimento económico inclusivo e sustentável, o emprego pleno e produtivo e o trabalho digno para todos															
	PED SETÓR: CAPITAL SOCIAL															
	PED SETÓR: DESENVOLVIMENTO DE INFRAESTRUTURA															
	PED SETÓR: DESENVOLVIMENTO DE ECONÓMICO															
	PED SETÓR: ENQUADRAMENTO INSTITUCIONAL															
	Objetivo ba Longu Prazu 1): Em 2030, o povo de Timor-Leste será educado e experiente, capaz de viver uma vida longa e produtiva e ter acesso a uma educação de qualidade que lhes permita participar do desenvolvimento económico, social e político da nossa nação.															
	Objetivo ba Longu Prazu 2): Uma extensa rede de estradas de qualidade e bem conservadas conectará nossas comunidades, promoverá desenvolvimento rural, indústria e turismo e proporcionará acesso aos mercados.															
	Objetivo ba Longu Prazu 3): Com muito a oferecer aos visitantes internacionais, forneceremos uma variedade de experiências de turismo que aproveitam nossa beleza natural, cultura e patrimônio.															
	Objetivo ba Longu Prazu 4): Adotaremos uma estratégia abrangente para construir o sistema de justiça de Timor-Leste e aumentar a sua capacidade para cumprir o seu papel e funções.															
	Objetivo ba Longu Prazu 5): O setor público em Timor-Leste será fundamental para construir a confiança no governo, que é um pré-requisito para a construção da nação.															
	Objetivo ba Longu Prazu 6): O Plano Estratégico de Desenvolvimento e os grandes projetos de infraestruturas serão implementados da maneira mais econômica e eficiente possível.															
	Objetivo ba Longu Prazu 7): Desenho e Supervisão de Novos Projetos (Fundo Infraestruturas)															
	Objetivo ba Longu Prazu 8): Edifício Público (Fundo Infraestruturas)															
	Objetivo ba Longu Prazu 9): Estradas e Pontes (Fundo Infraestruturas)															
11	Programa 510: Funcionamento e Desenvolvimento Institucional															$9,650,684
	Objetivu Médiu Prazu (Outcome): 510.0.0: Construir confiança no governo															$9,500,684
	Subprograma 51001: Funcionamento Instituicional															$400,000
	Rezultadu Kurtu Prazu (Output) 51001.0.0: Melhorar os índices de transparência e responsabilização no funcionamento da administração pública.															$400,000
	Atividade new_el10018: Timor-Leste Embassy Building Acquisition in Lisbon, Portugal									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$0
	Atividade new_el11668: Construction of Democracy & Civic Education Center, Dili Municipality									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$100,000
	Atividade new_el11721: Construction of Municipal Assembly Office Building, Baucau Municipality									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$100,000
	Atividade new_el11775: Renovation of Presidential Palace, Dili Municipality									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$100,000
	Atividade new_el11886: New Construction of STAE Office Building + Fence, RAEOA									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$100,000
	Atividade new_el11943: Construction of the New Ministry of Education Building in Dili									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$0
	Rezultadu Kurtu Prazu (Output) 51001.0.5: Melhorar as condições administrativas e físicas necessárias ao exercício das funções parlamentares, garantindo a gestão autónoma, eficaz, eficiente e efetiva dos recursos humanos, financeiros e patrimoniais															$0
	Atividade 510011L: Reabilitação Edifício e Património Estado do Ex Titulares (sub-projetu: Reha-bilitação do Edifício do Ex Titulares Bloco A) em Farol, Dili									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$0
	Atividade 510013K: Reabilitação Edifício e Património Estado do Ex Titulares (sub-projetu: Reha-bilitação do Edifício do Ex Titulares Bloco B) em Farol, Dili									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$0
	Subprograma 51002: Desenvolvimento Instituicional															$1,453,618
	Rezultadu Kurtu Prazu (Output) 51002.0.0: Plano Anual implementado															$1,453,618
	Atividade 5100202: Gestão Financeira, Administração e Logística									080: Fundo Infraestrutura	0800102: Secretariado dos Grandes Projetos	5101: Infrastructure Fund				$962,095
	Atividade 5100206: Gestão de recursos humanos									080: Fundo Infraestrutura	0800102: Secretariado dos Grandes Projetos	5101: Infrastructure Fund				$225,945
	Atividade 5100207: Formação e capacitação de recursos humanos									080: Fundo Infraestrutura	0800102: Secretariado dos Grandes Projetos	5101: Infrastructure Fund				$117,530
	Atividade 5100211: Aprovisionamento e gestão de contratos									080: Fundo Infraestrutura	0800102: Secretariado dos Grandes Projetos	5101: Infrastructure Fund				$59,248
	Atividade 5100212: Gestão de sistemas de informação e de comunicação									080: Fundo Infraestrutura	0800102: Secretariado dos Grandes Projetos	5101: Infrastructure Fund				$88,800
	Subprograma 51004: Infraestruturas Edifícios administrativos															$2,050,000
	Rezultadu Kurtu Prazu (Output) 51004.0.0: Instalações administrativas construídas e concluídas com boa qualidade															$500,000
	Atividade 5100424: Teste Solo e Redesnho (DED/BoQ) para Construção e Supervisão o novo edifício Secretaria de Estado da Igualdade-SEI									080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund				$200,000

Atividade 5100425: Konstrusaun Edifício Impresaun Nacional Timor Leste (INTL,IP.)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100426: Konstrusaun Edifício SNI					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100427: Konstrusaun Edifício PCIC					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$50,000
Atividade 5100428: Konstrusaun Edifício PJR					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$250,000
Atividade 5100429: Construction of the IGE Office, Workshop and Warehouse Complex Building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100430: Construction Supervision of the IGE Office, Workshop and Warehouse Complex Building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100431: Supervisaun ba Edifício Nacional STAE					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100432: Supervisao para Construção novo edifício de Administracao Municipal em Ermera					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100433: Construção novo edifício do MAP em Díli					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Rezultadu Kurtu Prazu (Output) new_el828: Melhora no rehabilitasaun edifisio iha Fundu Infraestrutura												$1,550,000
Atividade 5100417: Construção do novo edifício de Comissão Nacional de Aprovisionamento (CNA, I.P.).					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$700,000
Atividade 5100418: Supervisaun para o novo Construção de edifício Comissão Nacional de Aprovisionamento (CNA, I.P.).					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100419: Supervisaun para Construção do novo edifício de Ministério das Obras Públicas (MOP)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100420: Nova Construção do Arquivo do Centro Nacional Centro Nacional Chega (CNC)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$850,000
Subprograma 51005: Edifícios públicos												$5,061,494
Rezultadu Kurtu Prazu (Output) 51005.0.0: Construção concluída												$4,572,494
Atividade 510050A: Study and DED of The Academy of Arts					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051A: Konstrusaun Edifício Central MAE					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051B: Construction of New Office Building of Ministry of state Administration in Manatuto Municipality					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$1,000,000
Atividade 510051C: Ressettlement - Site Clearence for Good Governance and Institutional Management Program					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051F: Consulting Services for Construction Supervision of New Office Building of Ministry of state Administration in Manatuto Municipality					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$163,000
Atividade 510051G: Construção novo edifício do Parlamento Nacional					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051K: Construction supervision for New Construction of national Center Archive Centro National Chega (CNC)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$200,000
Atividade 510051L: Reabilitação do Edifício da Embaixada de Cuba em Farol-Díli					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$57,466
Atividade 510051M: Construção do novo Edifício de PDHJ					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$500,000
Atividade 510051N: Supervisaun para o novo Construção do Edifício de PDHJ					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$200,000
Atividade 510051O: Aquisição e Reabilitação de um edifício para as instalações da Embaixada de Timor-Leste em Londres, Reino Unido					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$50,000
Atividade 510051P: Rehabilitação Ex-Edificio Ministerio das Financas (Actual Edificio Alfandega) inclui KOBE Houses nebe atribui ona mai Parlamento Nacional					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051Q: Supervizaun ba Konstrusaun Edifício SNI					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051R: Supervizaun ba Konstrusaun Edifício PCIC					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051S: Supervizaun ba Konstrusaun Edifício PJR (Procuradoria Geral da República)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510051T: Estudo e dezenho Edifício MCI					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100528: Construção de muros, abastecimento de água e electricidade para futura edifício IGE em Hera					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$51,228

Atividade 5100529: New construction of ige outbuilding and covered ways and vehicle wash facility building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100530: New construction & supervision of MPO/ADN office					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$700,800
Atividade 5100531: Prototipe Construction for Buildings Administrations of Municipality of Ermera					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100532: Construction of INDMO office in Tibar					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$300,000
Atividade 5100535: Construção do novo edifício do MAP em Dlli					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100544: Construção de nova Investigação Criminal					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100548: Projetu Konstrusaun Edifício CAC					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100552: Construction of new building of the Public Works Ministry					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$1,000,000
Atividade 5100556: Construção de novos edifício da INAP					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 510055A: New E-Recruitment Building-CFP					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$350,000
Atividade 5100574: Construção do Novo Edifício do Ministério da Educação em Dili					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100586: Konstrusaun Edifício administrasaun MANATUTO					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5100599: Konstrusaun Edifício STAE Nasional					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade new_el18641: Contrução o novo Edifício Secretaria de Estado da Igualdade					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade new_el18643: Supervisão para Contrução o novo Edifício Secretaria de Estado da Igualdade					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Rezultadu Kurtu Prazu (Output) 51005.0.2: O funcionamento do edifício público												$489,000
Atividade 510051E: Construção do Centro de Formação INAP					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$489,000
Subprograma 51054: Preparação de Desenhos e Supervisão de Novos Projetos												$535,572
Rezultadu Kurtu Prazu (Output) 51054.0.0: TBD												$535,572
Atividade 5105401: Supervisão Para Construção do novo edifício do MAP em Dlli					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105402: Preparation of the Detailed Study and Design of the National Parliament Building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105403: Estudos e Deseinho Engenharia Detalhada(DED) do Novo Edificio Arquivo Naçional					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105406: Estúdo Viabilidade para construcao edificio Escritório Parlamento Nacional					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105408: Supervision for Construction of INDMO office in Tibar					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$60,000
Atividade 5105409: Supervision for Prototipe for Buildings Administrations of Municipality of Ermera					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105410: Supervizaun ba Konstrusaun Edificio Central MAE					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105411: Supervision for New construction & supervision of MPO/ADN office					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105416: Redesenho da subestrutura e telhado da Administração Municipal de Ermera					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$47,590
Atividade 5105417: Serviços de Consultoria para o Projecto de Engenharia Detalhada do Edifício de Escritórios do CAC					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105418: Supervisão para a construção do Novo Edifício de E-Recruitment Building-CFP					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$80,000
Atividade 5105420: Supervisão do Construção do Centro de Formação INAP					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$148,000
Atividade 5105422: Supervisão para Construção dos Projetos do Fundo das Infra - estruturas					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
Atividade 5105426: Consulting Services for The Detailed Engineering Design of The IGE Office, Workshop, Warehouse Complex Building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0

	Atividade 5105427: Detailed Engineering Design of MCIA Office Building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade 5105428: Detailed Engineering Design of MCIA Training Centre					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade 5105430: Detail Design for Press Conference Office Building					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade 5105438: Study and DED of National Museum of Timor-Leste					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade 5105440: Feasibility Study for Main Office including Data Tape and Core Storage Facility (DTCSF) and Laboratory Project					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade new_el11830: Supervision for Construction of Democracy & Civic Education Center, Dili Municipality					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$100,000
	Atividade new_el12001: Supervision for Construction of the New Ministry of Education Building in Dili					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade new_el9994: Redesenho do Novo Edifício da Comissão Nacional de Aprovisionamento e do Secretariado dos Grandes Projetos					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$99,982
	Objetivu Médiu Prazu (Outcome): 510.0.6: Método de avaliação dos projetos colocados, número de projetos realizados por ano e método de revisão dos projetos												$150,000
	Subprograma 51047: Apoio de Administração e Técnico ao CAFI												$150,000
	Rezultadu Kurtu Prazu (Output) 51047.0.0: 1. Reuniões facilitadas e realizadas com o CAFI 2. Todos os relatórios são precisos e avaliados												$150,000
	Atividade 5104701: Estudo de viabilidade para Projecto de Infra-estruturas					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$150,000
	ODS: OBJETIVO 4 : EDUCAÇÃO DE QUALIDADE - Garantir o acesso à educação inclusiva, de qualidade e equitativa, e promover oportunidades de aprendizagem ao longo da vida para todos												
	PED SETÓR: CAPITAL SOCIAL												
	Objetivo ba Longu Prazu: Em 2030, o povo de Timor-Leste será educado e experiente, capaz de viver uma vida longa e produtiva e ter acesso a uma educação de qualidade que lhes permita participar do desenvolvimento económico, social e político da nossa nação.												
12	Programa 521: Ensino Básico												$1,322,776
	Objetivu Médiu Prazu (Outcome): 521.0.0: As crianças participaram no ensino básico e completaram com sucesso no etapa final de educação básica de qualidade												$1,322,776
	Subprograma new_el2731: Infraestrutura e Fasilidade do Ensino Basico												$1,322,776
	Rezultadu Kurtu Prazu (Output) 52112.0.0: Construção de novas salas de aula para o ensino básico												$1,322,776
	Atividade new_el10001: Desenho Detalhado de Engenharia (DDE) de Infraestruturas Escolares (Espacos de Aprendizagem do seculo XXI)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$500,000
	Atividade new_el12635: Construction of New School in Baucau, with Referral to the Portuguese School of Dili					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$262,008
	Atividade new_el12644: Construção de Nova Escola Polo de Lospalos					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$250,000
	Atividade new_el12654: Construção de Nova Escola Polo de Liquica					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$275,256
	Atividade new_el12665: Construção de Nova Escola Polo de Suai					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$20,505
	Atividade new_el12690: Projeitu Fornesementu e Transformasaun Edukasaun basiku					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$0
	Atividade new_el9919: Site Work Construction for EBF School Balibar (Site Works ba Eskola Contrusaun EBF Balibar_SSS/115/MPIE-2024)					080: Fundo Infraestrutura	0800101: Fundo de Infraestrutura (FI)	5101: Infrastructure Fund					$15,007
	ODS: OBJETIVO 4 : EDUCAÇÃO DE QUALIDADE - Garantir o acesso à educação inclusiva, de qualidade e equitativa, e promover oportunidades de aprendizagem ao longo da vida para todos												
	ODS: OBJETIVO 9: INDÚSTRIA, INOVAÇÃO E INFRAESTRUTURAS - Objetivo 9. Construir infraestruturas resilientes, promover a industrialização inclusiva e sustentável e fomentar a inovação												
	ODS: OBJETIVO 12 : PRODUÇÃO E CONSUMO SUSTENTÁVEIS - Objetivo 12. Garantir padrões de consumo e de produção sustentáveis												
	PED SETÓR: CAPITAL SOCIAL												
	PED SETÓR: DESENVOLVIMENTO DE INFRAESTRUTURA												
	Objetivo ba Longu Prazu 1): Em 2030, o povo de Timor-Leste será educado e experiente, capaz de viver uma vida longa e produtiva e ter acesso a uma educação de qualidade que lhes permita participar do desenvolvimento económico, social e político da nossa nação.												
	Objetivo ba Longu Prazu 2): Desenvolvimento Rural e Urbana (Fundo Infraestruturas)												
	Objetivo ba Longu Prazu 3): Edifício Público (Fundo Infraestruturas)												
	Objetivo ba Longu Prazu 4): Estradas e Pontes (Fundo Infraestruturas)												
13	Programa 522: Ensino Secundário Geral e Tecnico Vocacional												$1,390,980