

ỦY BAN NHÂN DÂN TỈNH BÌNH THUẬN
SỞ NÔNG NGHIỆP PHÁT TRIỂN NÔNG THÔN TỈNH BÌNH THUẬN

Formatted: Highlight

TERMS OF REFERENCE FOR DETAILED ENGINEERING DESIGN

Water Efficiency Improvement in Drought-Affected Provinces Project
(WEIDAP/ADB8 project)

Commented [HNĐ1]: Insert the Subproject name(s)

Deleted:

Deleted: .

Formatted: Highlight

TABLE OF CONTENTS

1. BACKGROUND OF WEIDAP/ADB8 PROJECT	5
1.1. Rationales of WEIDAP/ADB8 project.....	5
1.2. Objectives of WEIDAP/ADB8 project.....	7
2. INTRODUCTION OF SUB-PROJECTS IN BÌNH THUẬN	8
2.1. Sub-project: Irrigation canal Đu Đủ - Tân Thành, Hàm Thuận Nam district, Bình Thuận province.....	8
2.1.1. General information.....	8
2.1.2. Sub-project objectives and tasks	9
2.1.3. Sub-project Investment scope and activities	9
2.1.4. Proposed works and costs estimated on basis of feasibility study.....	10
2.1.5. Proposed detailed engineering design (DED) options.....	11
2.1.6. Total investment cost, funding sources and financial arrangements	15
2.2. Sub-project: Upgrade and modernization of Trà Tân reservoir irrigation system, Đức Linh district, Bình Thuận province.....	17
2.2.1. General information.....	17
2.2.2. Sub-project objectives and tasks	18
2.2.3. Sub-project investment scope and activities	18
2.2.4. Proposed works and costs estimated on basis of feasibility study.....	20
2.2.5. Proposed detailed engineering design (DED) options.....	20
2.2.6. Total investment cost, funding sources and financial arrangements	24
3. OBJECTIVES AND SCOPE OF CONSULTANCY SERVICES	27
3.1. Objectives:.....	27
3.2. Duties of the consultants	28
3.2.1. Survey tasks	28
3.2.2. Detailed engineering design tasks	29
4. IMPLEMENTATION TIME	Error! Bookmark not defined.
5. OUTCOME AND PLAN OF DOCUMENT HAND-OVER.....	38
6. REQUIREMENTS FOR CONSULTANT EXPERIENCE AND CAPACITY	39

Deleted: 26

Deleted: 26

Deleted: 27

Deleted: 27

Deleted: 28

Deleted: 37

Deleted: 37

Deleted: 38

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

6.1. Requirements for qualifications of the Consultant 39

6.2. Requirements on qualifications of key experts 39

7. ESTIMATION OF COSTS FOR IMPLEMENTATION OF CONSULTANCY SERVICES 48

7.1. Basis for making consultancy estimates 48

7.2. Estimated consultancy costs 50

8. COORDINATION AND SUPERVISION 50

9. IMPLEMENTATION ARRANGEMENT Error! Bookmark not defined.

10. SUPPORTS FROM THE CLIENT 52

10.1. Responsibilities of the Consultant 52

10.2. Responsibilities of the project owner. 52

Deleted: 38

Deleted: 38

Deleted: 47

Deleted: 47

Deleted: 49

Deleted: 49

Deleted: 50

Deleted: 50

Deleted: 50

Deleted: 51

Formatted: Highlight

Formatted: Highlight

ABBREVIATED TERMS

GOV	Government of Vietnam
ADB	Asian Development Bank
SBV	State Bank of Vietnam
ADF	Asian Development Fund
ARP	Agriculture Restructuring Policy
CPO	Central Project Office
DWR	Directorate of Water Resources
CMD	Construction Management Department
DARD	Department of Agriculture and Rural Development
HVC	High-value crop
IMC	Irrigation Management Company
MARD	Ministry of Agriculture and Rural Development
MoF	Ministry of Finance
MPI	Ministry of Planning and Investment
PMU	Project Management Unit
PPC	Provincial People’s Committee
PPMU	Provincial Project Management Unit
ToR	Terms of Reference
DMF	Design and Monitoring Framework
IWR	Irrigation water requirements
O&M	Operation and Maintenance
PAM	Project Administration Manual
PPTA	Project Preparatory Technical Assistance
RP	Resettlement Plan
TA	Technical Assistance
USD	U.S. Dollar
WEAT	Water-efficient application technology
WEIDAP	Water Efficiency Improvement in Drought-Affected Provinces Project

Deleted: Management

Deleted: tion

Deleted:

Formatted: Highlight

Formatted: Highlight

1. BACKGROUND OF WEIDAP/ADB8 PROJECT

- Project name in Vietnamese: “Nâng cao hiệu quả sử dụng nước cho các tỉnh chịu ảnh hưởng bởi hạn hán”

- Project name in English: Water Efficiency Improvement in Drought-Affected Provinces.

Deleted:

Deleted: (WEIDAP/ADB8 project).

- Financing institution: Asian Development Bank (ADB).

- Central Project Executing Agency: Ministry of Agriculture and Rural Development.

- Project scope: Upgrade and modernize irrigation systems in Khánh Hòa, Ninh Thuận, Bình Thuận, Đắk Lắk and Đắk Nông provinces.

Formatted: Highlight

- Project implementation time: From 2018 till 30/6/2026

Formatted: Highlight

1.1. Rationale of WEIDAP/ADB8 project

Deleted: s

Despite all advancement in science and technology, agriculture remains a sector much dependent on natural conditions. Meanwhile, with global climate changes in recent years, climatic and hydrologic events in the country are being changed against “normal” rules of nature. Extreme climatic events such as storms, floods and droughts occur with increased irregularity, intensity and probability, causing troubles for agriculture production and damages to other economic sectors. In addition, water demands for daily life, industry and services have increased. The processes of urbanization and industrialization as well as changes in food consumption, which encourage farmers to grow different types of crops, have affected the ability to fully meet water demands. This requires local authorities to improve their irrigation systems to achieve better efficiency and sustainability to afford multi-purpose water supply; to rebuild on-farm infrastructures following “large field” modality; to develop efficient climate-smart and climate-resilient agriculture production models; and to strengthen water user groups.

The South Central and Central Highlands in Vietnam are regions with relatively high poverty rate and slow economic growth, and incomplete irrigation systems; farming zones depend on natural water resources and often affected by droughts, salinity intrusion and thus agriculture production is unstable. The number of irrigation works in the area is quite high but most of them are works that have not been invested completely, their operation efficiency is only 60-75% of the designed capacity. In order to improve the efficiency of water supply, it is required to upgrade and modernize the irrigation infrastructure and apply water-saving

Formatted: Highlight

irrigation technologies and improve irrigation management. At the same time, diversifying adaptive farming models with increasingly scarce water resources can help increase people's income, ensure food security in the face of population growth and climate change. benefits and supply water sources for living, industry, fisheries, tourism services, maintenance, ecological environment improvement and hydropower generation.

In order to improve the irrigation services for agricultural potential areas such as the Central Highlands and South Central, it is required to invest in important infrastructure, especially diversified irrigation works in terms of scale and technology to throughout take advantage of water sources for many different types of terrain and crops. This not only helps improve rural infrastructure for production but also gradually responds to the domestic water supply for local people. Socio-economic development combined with social policies, which contribute to the successful implementation of poverty reduction and irrigation development combined with natural disaster prevention and mitigation programs. The project will contribute to meet the strategic objectives of sustainable development and implement agricultural and irrigation restructuring in order to modernize and industrialize in agricultural and rural development, and achieve a number of criteria for new rural areas.

Commented [HNĐ2]: Refer to ADB rrp and MOU Inception Mission

On 28/4/2016, Prime Minister approved the Project Preparation Technical Assistance to prepare for WEIDAP project, which receives a loan of 110 million USD from ADB. The Project will be implemented in 5 provinces most heavily affected by drought and water shortage in the South Central and Central Highlands, including Ninh Thuận, Khánh Hòa, Đắk Lắk, Đắk Nông and Bình Thuận.

Decision no. 561/QĐ-TT dated 18/5/2018 by PM approving investment policy for “Water Efficiency Improvement in Drought Affected Provinces Project”.

Decision no. 1815/QĐ-TT dated 24/12/2018 by PM approving revised investment policy for “Water Efficiency Improvement in Drought Affected Provinces Project”.

Decision no. 2416/QĐ-BNN-HTQT dated 22/6/2018 by Minister of MARD approving Feasibility Study of Water Efficiency Improvement in Drought Affected Provinces Project financed by ADB.

Formatted: Highlight

Formatted: Highlight

Decision no. 2417/QĐ-CTN dated 25/12/2018 by President of Vietnam on signing of Loan Agreement and Grant Agreements for Water Efficiency Improvement in Drought Affected Provinces Project.

Loan Agreement (loan no. 3745-VIE(COL)), Grant Agreements (grants no. G0630, G0631 – VIE) signed between The Socialist Republic of Vietnam and Asian Development Bank and Project Agreements signed between Provincial People's Committees (PPCs) of participating provinces and ADB.

1.2. Objectives of WEIDAP/ADB8 project

Commented [HNĐ3]: Refer to ADB rrp and MOU Inception Mission

The Project aims to improve water use efficiency for the provinces most affected by the drought in 2014-2015 through the modernization of irrigation infrastructure to serve crops and plants of high value in a flexible way in order to increase agricultural benefits which contribute to the restructuring of agriculture, new rural development and environmental protection.

Commented [HNĐ4]: should be replaced by "climate resilience and water productivity in agriculture, and increase incomes by supporting farmers in growing high-value crops such as coffee, peppers, grapes, apples, dragon fruits, and mangoes through modernizing eight irrigation systems in five drought-affected provinces: Binh Thuan, Dak Lak, Dak Nong, Khanh Hoa, and Ninh Thuan".

Output 1: Strengthened Irrigation Management Services

Irrigation management services strengthened will support policy and institutional development measures to improve climate resilience of agriculture by strengthening irrigation management taking into consideration social and gender dimensions in all relevant activities (footnote 13). Specifically, the project will support: (i) irrigation water allocation and delivery services including: (a) surface and ground water assessments; (b) an irrigation water sharing and allocation framework; and (c) provision of a real-time decision support system for farmers on optimizing crop water application; and (ii) maintenance of irrigation systems including: (a) development of asset inventory and management database for each irrigation system supported by the project; (b) development of a systematic asset maintenance schedule with a rigorous approach to maintenance funding based on asset condition assessments; (c) development of a pricing framework for water charges; and (d) assessment of options for engaging third parties in the O&M of irrigation systems.

Commented [HNĐ5]: Where ?

Output 2: Modernized irrigation infrastructures developed

This output will modernize eight irrigation subprojects in the five provinces to provide water on-demand to farmers cultivating HVC and reduce vulnerability to climate change. The underlying principle of all systems is to provide a higher level of service—more flexible, reliable and accessible supply of water—to farmers than they receive at present. The infrastructure works broadly fall into three categories:

Commented [HNĐ6]: Correct ???

Formatted: Highlight

Formatted: Highlight

Formatted: Highlight

(i) pressurized pipe systems taking water from canals or reservoirs, and supplying hydrants located at a reasonable distance from a farmer's field, such that the farmer can connect directly using a hose. Basic supervisory control and data acquisition systems will facilitate operations and monitoring of flows throughout the system; consultation with male and female farmers will be conducted from which outputs will be incorporated in the design and implementation of activities; (ii) main system modernization including canal lining, control structure, balancing storage and installation of flow control and measurement devices with remote monitoring; and (iii) new and improved weirs which will replace farmer constructed temporary weirs and provide storage from which farmers can pump to irrigate HVCs. Other works include upgrading culverts and farm roads, to facilitate improved management of irrigation systems.

Output 3: Efficient on-farm water management practices adopted

This output will focus on improving on-farm water productivity in the subproject command areas, to improve resilience to climate change. Water productivity assessments conducted under output 1 will help benchmark water productivity standards for different crops under different agro-ecological conditions and be the basis for advisory services (information and training) to farmers on improving on farm water management to cope with climate variability. Male and female farmers will be consulted and will receive technical advice on identifying and developing appropriate micro irrigation systems that meet their individual requirements. They will be linked up with private sector suppliers and be provided training in O&M for micro irrigation systems.

2. INTRODUCTION TO SUB-PROJECTS IN BÌNH THUẬN

2.1. Sub-project: Irrigation canal ĐuĐủ - TânThành, HàmThuận Nam district, BìnhThuận province.

2.1.1. General information.

- Sub-project name: Irrigation canal ĐuĐủ - TânThành, HàmThuận Nam district, BìnhThuận province, under WEIDAP/ADB8 Project.
- Financing Institution: ADB.
- Executing Agency: BìnhThuận Provincial People's Committee (PPC).
- Project Owner: Department of Agriculture and Rural Development.

Commented [HNĐ7]: Vietnamese

Commented [HNĐ8]: Vietnamese

Deleted: OF

Commented [HNĐ9]: Vietnamese

Commented [HNĐ10]: Full name ???

Deleted: .

Formatted: Highlight

Formatted: Highlight

Commented [HNĐ11]: Vietnamese

Formatted: Highlight

Formatted: Highlight

- Implementing Agency: Provincial Project Management Unit (PPMU) of WEIDAP project in BinhThuan.

- Implementation time: From 2018 till 30/6/2026.

Formatted: Highlight

- Sub-project scope: Construct irrigation pipeline for 1960ha of crop lands (mostly dragon fruits) in TânLập commune ofHàmThuận Nam town, TânThành commune andTânThuận commune of HàmThuận Nam district, BìnhThuận.

Commented [HNĐ12]: System?

2.1.2. Sub-project objectives and tasks

- Objectives

+ Improve water efficiency of irrigation works in the sub-project areas that service 1960ha of crop land with high-value crops (HVC) with flexibility (e.g. irrigation water more or less on demand for dragon fruits and vegetables) in Thuận Nam town, TânThuậnand TânThành communes, HàmThuận Nam district.

+ Modernize irrigation systems for climate change adaptation, following modality that most developed countries have adopted; directly support implementation of Agriculture Restructuring Scheme; improve environmental quality and address frequent water shortage due to drought; improve transportation infrastructure in the area.

Commented [HNĐ13]: ???

- Tasks

+ The sub-project will ensure irrigation water supply for 1960ha of crop land (mostly dragon fruits), improve environmental quality and address serious water shortage in the sub-project areas.

+ Modernize irrigation systems to ensure flexibility, meeting demands of water users and affordability of beneficiary farmers in 5 participating provinces.

Formatted: Highlight

+ Mitigate salinity intrusion in the sub-project areas through reduction of groundwater extraction for irrigation.

+ Improve transportation infrastructure in the area.

2.1.3. Sub-project Investment scope and activities

- Sub-project location

Formatted: Highlight



- Investment scope: Construct gravity water pipeline system in the sub-project area, including:

Deleted: s

+ Construct intake to get water from Tân Lập reservoir at a flow rate of around $Q_{tk} = 1.1 \text{ m}^3/\text{s}$.

+ Construct water pipeline Tân Lập – Tân Thành which irrigates 1960ha of crop land (dragon fruits and other HVCs); total length is 33km; install manifold hydrants along the pipeline so that farmers can get water from maximum distance of 500m, at $Q_{tk} = 1.097 \text{ m}^3/\text{s}$

- + Build transportation infrastructure in the sub-project areas; total $L = 30.6 \text{ km}$.
- + Install SCADA to facilitate operation and management of irrigation systems.
- + Construct admin building at start point of the pipeline.

2.1.4. Proposed works and costs estimated on basis of feasibility study

- Grade of works: Agriculture and rural development works, grade IV.

- Total investment cost: 348,821 million VND

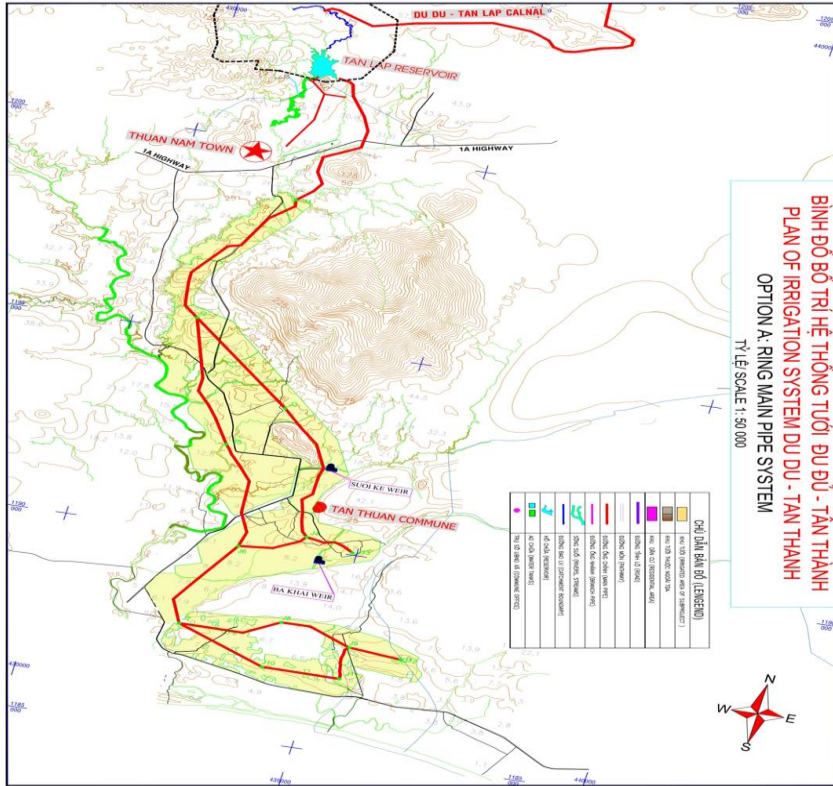
(In words: Three hundred forty eight billion and eight hundred twenty two millions Vietnam dong)

Formatted: Highlight

Formatted: Highlight

2.1.5. Proposed detailed engineering design (DED) options

Deleted:



Construct intake to get water from Tân Lập reservoir into a buried pipeline. The pipeline is designed as combination of loops and lines with an outlet pressure at hydrants of at least 2.5m, and ideally 10m (1 bar) or as approved. Note: a reasonable pressure at the hydrants will allow farmers to connect their hoses to the hydrant-manifolds without pumping.

Deleted: (2,5÷10)m

The pipeline provides irrigation for 1960ha of crop lands (dragon fruits and other HVCs) at $Q_{tk}=1.097 \text{ m}^3/\text{s}$.

Total length of the pipeline is 32,649.71 m (distribution rate of 16,65m pipeline/ha). The pipeline is integrated with road for management and operation.

Design parameters:

- + Irrigation probability (agreed for the Project):85%
- + Flow probability, design water level of works on rivers:P=2%

Formatted: Highlight

- + Checking probability: $P=1\%$
- + Probability of maximum flow for calculating flow diversion: $P=10\%$
- + Coefficient of basic loads combination: $nc = 1.1$
- + Coefficient of special loads combination: $nc = 0.95$
- + Coefficient of reliability: $kn = 1.15$
- + Coefficient of working condition: $m = 1.0$
- + Safety coefficient of slope stability in basic cases: $[K]= .15$
- + Safety coefficient of slope stability in special cases: $[K]=1.05$

Key technical specifications according to selected options

1. Intake receiving water from TânLập reservoir:

Construction location is at ancillary dam of TânLập reservoir; key technical specifications are as follows:

- + Design flow $Q_{tk} = 1.10 \text{ m}^3/\text{s}$.
- + Upstream intake: $L = 9.25 \text{ m}$, bottom elevation $+40.00 \text{ m}$, made from concrete and masonry stones $1 \times 2 \text{ M}200$.
- + Intake body: Pre-cast centrifugal duct with $\phi 120 \text{ cm}$, $L = 12 \text{ m}$, bottom elevation $(+40.00 \div +39.50) \text{ m}$.
- + Balancing tank: Built behind intake body, measuring $B \times L \times H = (2,3 \times 3 \times 6,25) \text{ m}$, bottom elevation $+39.00 \text{ m}$, made from $\text{M}250$ reinforced concrete and 1×2 stones.
- + Regulatory gates: Flat gates, form-steel frame, sheet-steel surface, operated with manual crank $V10$.

2. Water pipeline:

Construct irrigation water pipeline made of HDPE pipes installed underground; total length is $32,649.71 \text{ m}$, supplying water to irrigation areas through manifold hydrants. Key pipeline specifications are shown in Table 1.

Table 1. Key technical specifications of water pipeline

Name	Length (m)	Diameter (mm)	Flow rate(l/s)	Irrigation area (ha)
R1-J1	3,946.46	1000	1,097.60	Deliver water for the entire pipeline
J1-J2	3,831.00	900	1,023.55	261.61
J2-J3	2,744.37	800	588.83	187.38

Formatted: Highlight

Name	Length (m)	Diameter (mm)	Flow rate(l/s)	Irrigation area (ha)
J3-J4	3,563.40	710	244.93	243.31
J2-J5	3,318.92	500	129.72	226.65
J5-J6	2,716.31	450	468.43	185.47
J4-J6	1,227.17	560	307.75	83.79
J6-J7	2,355.91	630	351.68	160.88
J7-J8	1,800.00	400	104.12	122.78
J8-J9	1,344.55	355	62.40	91.98
J7-J10	1,784.13	450	142.72	121.82
J10-J11	1,338.48	400	82.97	91.44
J11-J9	847.15	315	15.18	57.85
J9-J12	920.79	200	17.39	62.82
J4-J13	911.07	200	17.56	62.22
Total	32,649.71			1,960

3. Works/ Devices along water pipeline:

Construct 260 works along the pipeline to flush out slurry and to release air in the pipe, regulate water flows, supply water to irrigation areas, discharge floods safely over/ under the pipelines, facilitate road transportation, etc. These works include; 17 siphons and washout valves, to flush out slurry, 28 (or more) air valves to release air, 09 shut-off valves, 179 water supply hydrant-manifolds, complete with water volume measurement meters, constant flow valves/ limiters and on-off control valves, 17 siphons crossing creeks, and 10 culverts crossing roads. These works are made from M200 & M250 reinforced concrete and 1x2 stones, M75 mortar masonry stones, precast concrete ducts, HDPE pipes.

Deleted: ing

Deleted: hydrants

Deleted: hydrants to blow off

Deleted: s

4. Management and construction access road:

On top of the pipeline, an access road will be built for construction and management purposes; total road length is 30,592.01m; cross slope I = 2%; on both sides of the road are 0.4m-wide water trenches. Structural composition: Dirt road; road surface is 4.5m wide, filled with a 25cm-thick layer of selective grade-3 soil. Key road specifications are shown in table 2:

Table 2. Technical specifications of management and construction access road

Formatted: Highlight

Formatted: Highlight

Road route	Length (m)	B _{base} (m)	Location
R1-J1	3,946.46	5.90	Left side of pipeline
J1-J2	2,621.00	5.90	Left side of pipeline
J2-J3	2,744.37	5.90	Left side of pipeline
J3-J4	3,562.85	5.90	Left side of pipeline
J2-J5	3,318.92	5.50	Right side of pipeline
J5-J6	2,716.31	5.50	Right side of pipeline
J4-J6	1,227.17	5.50	Left side of pipeline
J6-J7	2,355.91	5.50	Left side of pipeline
J7-J8	1,798.20	5.50	Left side of pipeline
J8-J9	1,346.35	5.50	Left side of pipeline
J7-J10	1,784.13	5.50	Right side of pipeline
J10-J11	1,338.48	5.50	Right side of pipeline
J9-J12	920.79	5.50	Left side of pipeline
J4-J13	911.07	5.50	Left side of pipeline
Total	30,592.01		

5. System admin building:

Grade IV building, built on an area of 157.5 m² (L= 21m, B= 7,5m), located at headword of TânLập reservoir. The building has reinforced concrete columns and pillars, foundation made from rough stones, walls made from ducted bricks, support beams made from box steel, roofed with metal sheets shaped as tiles.

6. SCADA equipment:

Supervisory Control And Data Acquisition (SCADA) system: Basic design includes identification of sensors, meters, automatic recorders, remote terminal units (RTU). SCADA system will remotely supervise: water flows and levels in reservoir and headwork tanks; pressures and flow rates at key nodes of the pipeline, and flows at hydrants along the pipelines. A control hub will be housed and furnished with required equipment such as computers, servers, Internet connection and 3G Universal Mobile Telecommunication System (UMTS) or the newer 4G/5G and necessary software, databases.

Commented [HNĐ14]: = System

Deleted: s

Commented [HNĐ15]: Refer to Item 72 in the Guidelines for Detailed Engineering Design

Deleted: s

Deleted: supply

Deleted: ; operational parameters of pumping stations; and associate pumping station operation with water levels in headwork tanks, pressures along the pipeline

Formatted: Highlight

Formatted: Highlight

2.1.6. Total investment cost, funding sources and financial arrangements

2.1.6.1 Investment cost

- According to the Memorandum of Understanding in 3/2016, the sub-project will finance investment items from headwork to delivery points to supply irrigation water to WUGs. In particular, cost items supported by the project include:

- Land acquisition and compensation:

+Permanent land acquisition;

+Temporary land acquisition during construction;

+Loss of properties on land including structures, buildings, trees, crops etc.;

+Supports for resettlement and livelihood restoration;

+Cost of making resettlement plans (including compensations and supports);

+Cost of implementing resettlement plans;

+Other costs as stipulated in laws and regulations.

- Costs related to construction preparation (site clearance) and civil works as stipulated in laws and regulations.

- Costs related to water level gauges/ meters, pipelines, pumps, substations and control devices in pumping stations etc.

- Project management costs from project preparation, implementation until project completion, commission and handover for operation.

- Payments to consultants recruited during project preparation and implementation, including surveys, designs, reviews, supervision and inspections...

- Costs related to UXO (Unexploded Explosive Ordinances) clearance, civil works insurance policies, surveys for structural deformations, audit, reviews, approvals of investment budget final accounting, eligible fees and charges etc.

- Contingencies including physical contingencies and price contingencies during construction time.

- Cost of Output 3 implementation (Efficient on-farm water management practices adopted)

- Cost of shared activities in 05 provinces.

No.	COST ITEMS	AFTER TAXATION	FUND ALLOCATION	
			ODA fund	Counterpart fund
A	Output 2	331,403,840,704	262,824,121,443	68,579,719,262
I	Land acquisition	24,173,000,000		24,173,000,000
II	Civil works (CPXD)	218,345,132,806	198,495,575,278	19,849,557,528

No.	COST ITEMS	AFTER TAXATION	FUND ALLOCATION	
			ODA fund	Counterpart fund
III	Equipment (CPTB)	16,500,000,000	15,000,000,000	1,500,000,000
IV	Project management	3,599,535,399		3,599,535,399
V	Consultant services	12,975,730,677	2,467,837,169	10,507,893,509
VI	Other costs	19,480,906,978	13,833,859,138	5,647,047,840
VII	Contingencies	36,329,534,844	33,026,849,858	3,302,684,986
B	Shared activities for 5 provinces	5,847,750,000	4,661,250,000	1,186,300,000
C	Output 3	1,271,250,000	1,158,250,000	113,000,000
D	Interests	10,297,854,661	10,297,854,661	
	Total investment cost	348.820.695.365	278,941,476,104	69,879,019,262
	Total investment cost (rounded)	348.821.000.000	278,942,000,000	69,879,000,000

(In words: Three hundred forty eight billion and eight hundred twenty two millions Vietnam dong)

2.1.6.2 Funding sources

- Loan from Asian Development Fund in Asian Development Bank (ADB);
- Vietnam Government Counterpart fund include provincial state budget (Bình Thuận province) and central state budget.

a. Loan:

- Official Development Aids (ODA) loan from Asian Development Bank is used for project implementation. An ODA loan of 12,253,108 USD (equivalent to 278,942,000,000 VND), accounting for 80% of total investment cost, will cover costs of DED, civil works and equipment installation.

- Usage of ODA fund is based on commitments and memorandums of understanding (MoU) between the Government of Vietnam (GoV) and the Financing Institution, on demand for capital and reciprocal capacity of Binh Thuan province, on financial conditions of the Financing Institution, with reference to the International Development Association (IDA), of which ADB is a member.

b. Counterpart fund:

- The counterpart fund by GoV from provincial state budget is about 3,069,580 USD (equivalent to 69,879,000,000 VND), accounting for 20% of total investment cost, will cover costs of land acquisition and resettlement support, sub-project management, construction consultant services.

- The provinces participating in the Project will formulate, appraise and approve medium-term investment plans and commit to allocate sufficient fund.

2.1.6.3 Financial arrangements

- The subproject is a part of WEIDAP project that has been agreed by the Government so the financial arrangements of the subproject will comply with the project's financial arrangements regulated by the Government.

- Provincial People's Committee of Bình Thuận province is the investment decision maker. The subproject will be responsible for allocating provincial state budget to cover cost items in counterpart fund categories: land acquisition, compensation, support and resettlement, consultancy and subproject management. The subproject uses loan through state allocation and on-lending to implement activities that strengthen institutions and policies, develop technical and economic norms; construct and install pipeline, establish water delivery clusters which connect to individual water users.

Therefore, financial arrangements for the sub-project is proposed as follows:

▪For the loan amount:

Total loan amount (ADB) is 12,253,108 USD = 278,942,000,000 VND;

In which:

+ Allocation as central state budget 70% of total loan amount, equivalent to 195,259,033,273 VND.

+ On-lending by provincial government 30% of total loan amount, equivalent to 83,682,442,831 VND.

▪For the counterpart fund:

Counterpart fund from provincial state budget is 3,069,580 USD = 69,879,000,000 VND.

2.2. Sub-project: Upgrade and modernization of Trà Tân reservoir irrigation system, Đức Linh district, Bình Thuận province.

2.2.1. General information.

- Sub-project name: Upgrade and modernization of Trà Tân reservoir irrigation system, Đức Linh district, Bình Thuận province.

- Financing Institution: Asian Development Bank (ADB).

- Executing Agency: Bình Thuận Provincial People's Committee.

- Sub-Project Owner: Department of Agriculture and Rural Development.

- Implementing Agency: PPMU of WEIDAP project in Bình Thuận.

Formatted: Highlight

- Implementation time: From 2018 until 30/6/2026.
- Sub-project scope: Construct irrigation system for 1090ha of HVCs such as pepper, cashew, organic vegetables in Đức Linh district, Bình Thuận province.

Deleted: s

Deleted: s

2.2.2. Sub-project objectives and tasks

- Objectives
 - + Improve water efficiency of Trà Tân reservoir with structural and non-structural investments that support HVCs (peppers, cashews...) in Trà Tân, Tân Hà and Đông Hà communes of Đức Linh district.
 - + Modernize irrigation systems for climate change adaptation, following modality that most developed countries have adopted; directly support implementation of Agriculture Restructuring Scheme;
 - + Support finalization of some criteria in New Rural areas Development program; create conditions for scale-up of water-saving irrigation technologies in Đức Linh district.

Commented [HNĐ16]: ???

- Tasks
 - Ensure reliable irrigation water resources for 1090ha of crop lands in Trà Tân, Tân Hà and Đông Hà communes of Đức Linh district (including 140ha of rice, 600ha of pepper, 350 ha of high-yield cashew).

Deleted: s

Deleted: s

2.2.3. Sub-project investment scope and activities

- Sub-project location



Formatted: Highlight

- Investment scope:

+ Gravity irrigation system

Concrete lined main canal: L= 7.5km; made from M200 reinforced concrete and 1x2 stones; rectangular cross-section; canal embankments are integrated with rural roads; 38 structures on canal.

Upgrade and line 06 primary canals and 01 over-graded (VC) canal (N2, N3, N5, N7, N13 and VC6), develop 05 new primary canals (N4, N6, N9, N11 & N15); total length is 9,176.43 m; made from precast assembly concrete sections; rectangular cross-section; and build 52 structures on canal.

+ Pumped irrigation system

✓ Pumping station: Construct 01 pumping station with 03 pump sets (01 of which is on standby mode); located at upstream of main dam of Trà Tân reservoir; pump capacity is 442.5 m³/h each; pump water head is 30m; length of suction pipe is 10.5m; length of discharge pipe is 430m, made of HDPE.

✓ Admin building: Grade IV building; floor area 18m²; reinforced concrete columns and pillars; foundation made from rough stones; walls made from ducted bricks, wall braces and roofs made from M200 reinforced concrete and 1x2 stones.

✓ Storage tank: Storage capacity is 1000m³; enclosed with fences having reinforced concrete pillars, brick footings and B40 steel meshes.

✓ Electric Sub-station and 3-phase power lines: 01 sub-station and 40m 3-phase power line supplying electricity to the pumping station for pumps and for lighting and domestic usage by managers and operators working at the pumping station.

+ Main supply pipeline: HDPE gravity pipeline system leading from the reservoir tank, L= 3,960.8 m, diameter D= (100 ÷ 450) mm, installed underground. On the left side of the pipeline, construct a 2m-wide access road with crossfall i = 2%; road surface is made from M200 concrete and 1x2 stones, underlined with a thin layer of nylon.

+ Provide/ install 50 devices/ structures along the pipeline to measure flow rate, flush out slurry and release air in the pipe, regulate water, supply water to irrigation areas: 01 master flow meter at the storage tank, 04 wash out valves to flush out slurry, 45 water supply hydrant-manifolds, compete with control valve, volumetric digital flow meter, and flow limiter to ensure 5.0 l/s is provided at each hydrant. These civil works are made from M200 reinforced concrete and 1x2

Formatted: Highlight

Deleted: Harden

Deleted: works

Deleted: harden

Deleted: blocks

Deleted: works

Deleted: s

Deleted: with

Formatted: Highlight

Deleted: Construct

Deleted: works

Deleted: hydrants

Deleted: manifold

Deleted: s

Formatted: Highlight

Formatted: Highlight

stones, mortar masonry stones, while the pipes are HDPE of appropriate class and size,

Deleted: pipes

+ SCADA equipment: Procure and install SCADA equipment, along with associated software for monitoring, supervision, control and data acquisition, which facilitate system operation and management.

2.2.4. Proposed works and costs estimated on basis of feasibility study

- Grade of works: Agriculture and rural development works, grade IV

- Total investment cost: 151,514million VND

(In words: One hundred fifty one billion and five hundred fourteen million Vietnam dong)

2.2.5. Proposed detailed engineering design (DED) options

The sub-project works provide irrigation for 1090ha of crop lands growing HVCs such as peppers, cashews and organic vegetables.

Design parameters:

+ Irrigation probability of grade-III works: P=85%

+ Design irrigation rainfall probability: P=85%

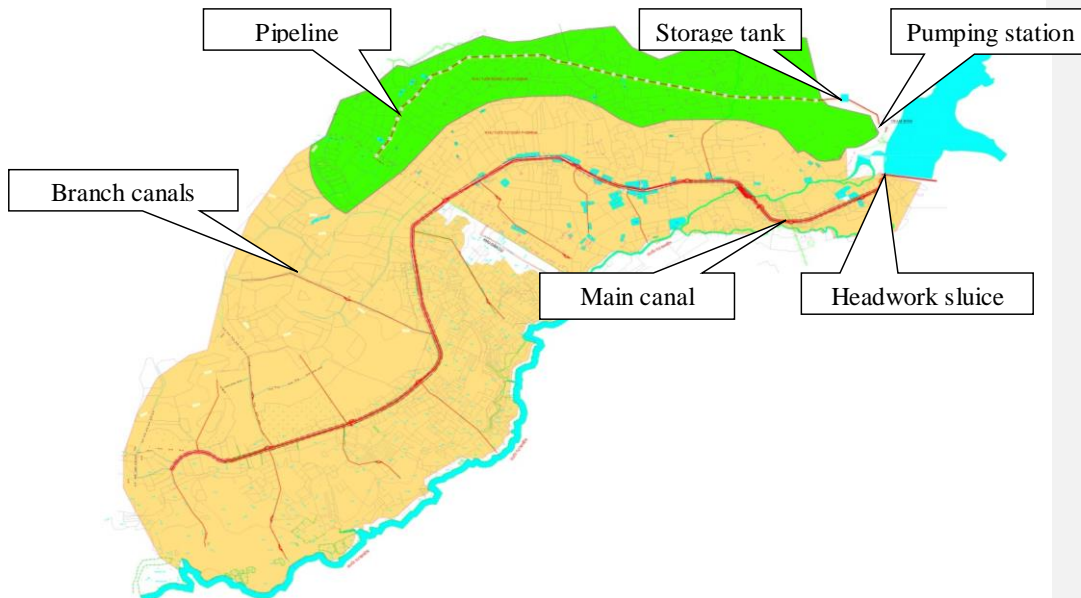
+ Design drainage rainfall probability: P=10%

+ Probability of maximum flow for calculating flow diversion: P=10%

+ Coefficient of working condition: $m = 1.0$

Key specifications of selected option:

Formatted: Highlight



1. Gravity irrigation system

-Upgrade, **concrete line** existing main canal of Trà Tân reservoir: Total length is 7,483.29 m made from M200 cast-in-situ reinforced concrete and 1x2 stones; rectangular cross-sections; canal embankments are integrated with rural roads. Key specifications are shown in Table 1:

Deleted: harden

Table 3. Key specifications of main canal of Trà Tân reservoir

No.	Section	L (m)	Q_{tk} (m/s)	B_k (m)	H_k (m)	i
1	K0+036.96 ÷ K0+099.96	63.00	1.20	1.80	1.70	0.0002
2	K0+099.96 ÷ K0+140.52	40.56	1.18	1.80	1.70	0.0002
3	K0+140.52 ÷ K0+155.85	15.33	1.18	1.80	1.70	0.00028
4	K0+155.85 ÷ K0+455.50	299.65	1.15	1.80	1.70	0.00028
5	K0+455.50 ÷ K0+988.15	532.65	1.14	1.80	1.70	0.00028
6	K0+988.15 ÷ K1+287.49	299.34	1.14	1.80	1.70	0.00028
7	K1+287.49 ÷ K1+372.69 (Existing canal bridge)	85.20	1.14	2.00	1.60	0.0020
8	K1+372.69 ÷ K1+588.72	216.03	1.14	1.80	1.70	0.00018

Formatted: Highlight

Dự án nâng cao hiệu quả sử dụng nước cho các tỉnh bị ảnh hưởng bởi hạn hán tỉnh Bình Thuận
WEIDAP/ADB8

Formatted: Highlight

No.	Section	L (m)	Q _{tk} (m/s)	B _k (m)	H _k (m)	i
9	K1+588.72 ÷ K1+629.82	41.10	1.08	1.80	1.70	0.00018
10	K1+629.82 ÷ K1+773.11	143.29	1.08	1.80	1.70	0.00018
11	K1+773.11 ÷ K1+975.49	202.38	1.06	1.80	1.70	0.00018
12	K1+975.49 ÷ K2+228.68	253.19	1.05	1.80	1.70	0.00018
13	K2+228.68 ÷ K2+622.16	393.48	1.01	1.70	1.60	0.00018
14	K2+622.16 ÷ K3+451.71	829.55	0.96	1.70	1.60	0.00018
15	K3+451.71 ÷ K4+107.83	656.12	0.88	1.70	1.60	0.00018
16	K4+107.83 ÷ K4+937.14	829.31	0.88	1.70	1.60	0.00018
17	K4+937.14 ÷ K5+069.48	132.34	0.73	1.50	1.50	0.00018
18	K5+069.48 ÷ K5+424.18	354.70	0.52	1.50	1.50	0.00018
19	K5+424.18 ÷ K6+070.40	646.22	0.47	1.30	1.20	0.00018
20	K6+070.40 ÷ K6+095.38	24.98	0.41	1.30	1.20	0.00018
21	K6+095.38 ÷ K6+377.91	282.53	0.39	1.30	1.20	0.00018
22	K6+377.91 ÷ K6+465.63	87.72	0.34	1.10	1.10	0.00018
23	K6+465.63 ÷ K6+681.32	215.69	0.33	1.10	1.10	0.00018
24	K6+681.32 ÷ K7+250.95	569.63	0.29	1.10	1.10	0.00018
25	K7+250.95 ÷ K7+520.25	269.30	0.09	0.80	0.80	0.00018
	Total	7,483.29				

-Works on main canal of Trà Tân reservoir:

+ Upgrade existing canal bridge from K1+287.49 to K1+372.69.

+ Construct 38 new structures along main canal to remotely measure flow rates, automatically regulate water levels, safely discharge cross drainage flows, facilitate vehicle access, including 03 flow rate gauges, 03 automatic regulatory works, 17 intakes at begin points of primary canals and over-graded canals, 02 intakes integrated with culverts under roads, 01 intake cluster integrated with culverts under roads, 01 weir, 03 spillways, 03 culverts under roads, 06 crude bridges over canals; main structural composition are M200 reinforced concrete, 1x2 stones and precast centrifugal ducts.

Deleted: works

Deleted: floods

Deleted: transportation

+ Upgrade, concrete line and develop new primary canals and over-graded canals: 06 existing primary canals and over-graded canals (N2, N3, N5, N7, N13 và VC6), develop 05 new primary canals (N4, N6, N9, N11, N15); total length is

Deleted: harden

Formatted: Highlight

9,176.43m; made from precast assembly concrete sections; rectangular cross-section; and 52 structures on canals. Technical specifications and number of works on canals are shown in Table 2:

Table 4. Technical specifications of primary canals and over-graded canals, and number of works on canals

No.	Canal	L (m)	Q _{tk} (m/s)	B _k (m)	H _k (m)	i	Works on canals
1	N2	498.16	0.07	0.60	0.60	0.00029	03
2	N3	492.30	0.04	0.50	0.50	0.00029	02
3	N4	1,557.94	0.20	0.80	0.80	0.00029	05
4	N5	584.40	0.04	0.50	0.50	0.00029	04
5	N6	778.10	0.10	0.70	0.70	0.00029	05
6	N7	1,022.13	0.08	0.60	0.60	0.00029	05
7	N9	1,055.10	0.16	0.80	0.80	0.00029	09
8	N11	822.30	0.06	0.60	0.60	0.00029	04
9	N13	755.10	0.05	0.50	0.50	0.00029	05
10	N15	950.90	0.09	0.70	0.70	0.00029	05
11	VC6	660.00	0.01	0.50	0.50	0.00010	05
	Total	9,176.43					52

2. Pumped irrigation system

- Pumping station:

+ Construct 01 pumping station with 03 pump sets (01 of which is on standby mode); located at upstream of main dam of TrầTân reservoir; pump capacity is 442.5 m³/h each; pump water head is 30m; length of suction pipe is 10.5m; length of discharge pipe is 430m, made of HDPE.

+ Admin building: Grade IV building; floor area 18m²; reinforced concrete columns and pillars; foundation made from rough stones; walls made from ducted bricks, wall braces and roofs made from M200 reinforced concrete and 1x2 stones.

+ Storage tank: Storage capacity is 1000m³; enclosed with fences having reinforced concrete pillars, brick footings and B40 steel meshes.

+ Electric sub-station and 3-phase power lines: 01 sub-station and 40m 3-phase power line supplying electricity to the pumping station for pumping, lighting and domestic usage by managers and operators working at the pumping station.

-Main supply pipeline from reservoir:

Formatted: Highlight

Deleted: block

Deleted: works

Deleted: S

Deleted: s

Formatted: Highlight

Formatted: Highlight

HDPE pipeline with L= 3,960.8 m, diameter D= (100 ÷ 450) mm, installed underground. On the left side of the pipeline, construct a 2m-wide access road with crossfall i = 2%; road surface is made from M200 concrete and 1x2 stones, underlined with a thin layer of nylon.

-Works on pipeline:

Install 50 devices/ structures s, along the pipeline to measure flow rates, flush out slurry and release air from the pipe, regulate water flows, supply water to irrigation areas: 01 master flow meter at the storage tank, 04 wash out valves to flush out slurry, and 45 water supply hydrants-manifolds, each with a fixed 5 l/s design discharge. Each hydrant has a ball (or gate) valve and a digital (ultrasonic) flow meter, and supplies a manifold to which each farmer can connect their hoses. Valves and cheap (local) read meters may be provided for each farmer along the manifold offtake for charging of farmers according to volume of water use. A constant flow valve (flow limiter) may be provided at each hydrant to ensure 5.0 l/s flows. These civil works are made from M200 reinforced concrete and 1x2 stones, mortar masonry stones, while the pipes shall be HDPE.

Deleted: Construct

Deleted: works

Deleted: in

Deleted: hydrants

Deleted: manifold

Deleted: .

Deleted: pipes

Commented [HNĐ17]: = system

3. SCADA equipment

Supervisory Control And Data Acquisition (SCADA) system: Basic designs include identification of sensors, meters, automatic recorders, remote terminal units (RTU). SCADA system will remotely monitor/ control: water flows and levels in reservoir and the headwork tank; pressures and flow rates at key nodes of the pipeline system, and hydrants flows, and operational parameters of the pumping station. Also, remote monitoring of water levels and flows in the canal system. A control hub will be housed and furnished with required equipment such as computers, servers, Internet connection and 3G Universal Mobile Telecommunication System (UMTS) or the newer 4G/ 5G and necessary software, databases.

Deleted: supervise

Deleted: s

Deleted: s

Deleted: supply

Deleted: along the pipeline;

Deleted: s

Deleted: ; and associate pumping station operation with water levels in headwork tanks, pressures along the pipeline.

Commented [HNĐ18]: Refer to Item 72 in the Guidelines for Detailed Engineering Design

2.2.6. Total investment cost, funding sources and financial arrangements

2.2.6.1 Investment cost

- Land acquisition and compensation:
- +Permanent land acquisition;
- +Temporary land acquisition during construction;
- +Loss of properties on land including structures, buildings, trees, crops etc.;
- +Supports for resettlement and livelihood restoration;

Formatted: Highlight

- +Cost of making resettlement plans (including compensations and supports);
- +Cost of implementing resettlement plans;
- +Other costs as stipulated in laws and regulations.
- Costs related to construction preparation (site clearance) and civil works as stipulated in laws and regulations.
 - Costs related to water level gauges/ meters, pipelines, pumps, substations and control devices in pumping stations etc.
 - Project management costs from project preparation, implementation until project completion, commission and handover for operation.
 - Payments to consultants recruited during project preparation and implementation, including surveys, designs, reviews, supervision and inspections...
 - Costs related to UXO (Unexploded Explosive Ordinances) clearance, civil works insurance policies, surveys for structural deformations, audit, reviews, approvals of investment budget final accounting, eligible fees and charges etc.
 - Contingencies including physical contingencies and price contingencies during construction time.
 - Cost of Output 3 implementation (Efficient on-farm water management practices adopted)
 - Cost of shared activities in 05 provinces.

No.	COST ITEMS	AFTER TAXATION	FUND ALLOCATION	
			ODA fund	Counterpart fund
A	Output 2	140,189,913,707	113,600,801,944	26,589,111,763
I	Land acquisition	5,900,000,000		5,900,000,000
II	Civil works (CPXD)	97,171,908,029	88,338,098,208	8,833,809,821
III	Equipment (CPTB)	3,828,000,000	3,480,000,000	348,000,000
IV	Project management	1,750,971,133		1,750,971,133
V	Consultant services	6,915,067,830	1,499,349,259	5,415,718,571
VI	Other costs	8,741,290,766	5,844,558,160	2,896,732,606
VII	Contingencies	15,882,675,949	14,438,796,317	1,443,879,632
B	Shared activities for 5 provinces	5,847,750,000	4,661,250,000	1,186,500,000
C	Output 3	1,271,250,000	1,158,250,000	113,000,000
D	Interests	4,505,145,339	4,505,145,339	
	Total investment cost	151.814.059.045	123,925,447,283	27,888,611,762

No.	COST ITEMS	AFTER TAXATION	FUND ALLOCATION	
			ODA fund	Counterpart fund
	Total investment cost (rounded)	151.814.000.000	123,925,000,000	27,889,000,000

(In words: One hundred fifty one billion and five hundred fourteen million Vietnam dong)

2.2.6.2 Funding sources

- Loan from Asian Development Fund in Asian Development Bank (ADB);
- Vietnam Government Counterpart fund include provincial state budget (Bình Thuận province) and central state budget in project preparation stage.

a. Loan:

- Official Development Aids (ODA) loan from ADB is used for project implementation. An ODA loan of 123,925,000,000 VND will cover costs of DED, civil works, equipment installation, insurance policies etc.

- Usage of ODA fund is based on commitments and MoU between the Government of Vietnam (GoV) and the Financing Institution, on demand for capital and reciprocal capacity of Binh Thuan province, on financial conditions of the Financing Institution, with reference to those of International Development Association (IDA), of which ADB is a member.

b. Counterpart fund:

- The counterpart fund by GoV from provincial state budget is about 27,889,000,000 USD, will cover costs of land acquisition and resettlement support, sub-project management, construction consultant services.

- The provinces participating in the Project will formulate, appraise and approve medium-term investment plans and commit to allocate sufficient fund.

2.2.6.3 Financial arrangements

- The subproject is a part of WEIDAP project that has been agreed by the Government so the financial arrangements of the subproject will comply with the project's financial arrangements regulated by the Government.

- Provincial People's Committee of Binh Thuận province is the investment decision maker. The subproject will be responsible for allocating provincial state budget to cover cost items in counterpart fund categories: land acquisition, compensation, support and resettlement, consultancy and subproject management. The subproject uses loan through state allocation and on-lending to implement

activities that strengthen institutions and policies, develop technical and economic norms; construct and install pipeline, establish water delivery clusters which connect to individual water users.

Therefore, financial arrangements for the sub-project is proposed as follows:

▪**For the loan amount:**

Total loan amount (ADB) is 123.925.000.000VND;

In which:

+ Allocation as central state budget 70% of total loan amount, equivalent to 86,747,500,000VND;

+ On-lending by provincial government 30% of total loan amount, equivalent 37,177,500,000 VND.

▪**For the counterpart fund:**

Counterpart fund from provincial state budget is 27,889,000,000 VND

3. OBJECTIVES AND SCOPE OF CONSULTANCY SERVICES

3.1. Objectives:

Preparing the detailed engineering design for the Du Du Irrigation Sub-project in Tan Thanh, Ham Thuan Nam District, Binh Thuan Province; Upgrading and modernizing the irrigation system of Tra Tan lake, Duc Linh District, Binh Thuan Province under the Project of water efficiency improvement for drought-affected provinces - WEIDAP/ADB8.

- Design consultancy services are required to support PPMU in Binh Thuan Province to carry out the survey, make detailed engineering design documents for the above subproject.

- The topographic and geological survey will be carried out right after the decision to approve the construction survey technical plan is available, at which time the consultants will review all survey documents of topography, geology, hydrology and Investment Project Report (FS) for calculating and checking technical parameters for detailed engineering design.

- The Detailed engineering design Document - The cost estimate will be completed and submitted to the project owner after 90 days from signing of the contract.

- Scope of work: for the consultants, will include but is not be limited to the following to ensure that all survey and design requirements will the proposed schedule and sub-project approval without objection by ADB:

Commented [HNĐ19]: Need to emphasize how they relate or contribute to the overall project objectives/ other outputs...

Formatted: Highlight

+Investigating and collecting the planning of sectors related to the construction of project's work items;

+The selected altitudes and coordinates must be suitable with VN2000 national elevation and coordinates;

Formatted: Highlight

+Selecting the routes, scales, technical solutions, structural solutions, technologies and types of construction materials to build technical works with good quality and reasonable prices;

+The architecture is suitable with the regional landscape and environment;

+Determining the land area to be occupied (permanent, temporary) and work construction landmarks;

+Handing over the ground control points, height control points and landmarks of construction to the project owner and the construction contractor;

Formatted: Highlight

+Preparing detailed design reports, cost estimates according to current regulations;

+Coordinating with the project owner in submitting the design document and cost estimates for approval until they are approved.

3.2. Detailed tasks of the consultants

Commented [HNĐ20]: Should be for each Subproject

Deleted: Duties

The consultants shall consider the technical designs in the feasibility study stage to: (i) evaluate and identify modifications/solutions to improve them; (ii) identify what data need collecting/surveying; (iii) preparing detailed engineering designs; (iv) updating changes in detailed engineering designs into resettlement and environmental management plans.

3.2.1. Survey tasks

- Collecting data of hydro-meteorology and topography and surveying soil

Depending on the specific conditions of the subproject, carrying out additional topographic and geological surveys, engineering hydrogeological survey and collecting other data. All work must comply with the relevant technical standards, regulations and norms.

- Assessing the existing documents.

- Collecting documents.

Data collection is an important task, helping consultants get enough data to analyze and calculate in order to provide reasonable solutions when conducting surveys, detailed engineering design of constructions.

Formatted: Highlight

3.2.2. Detailed engineering design tasks

The steps of construction design, components, contents of technical design documents - construction drawings must comply with the provisions of the current design regulations and laws.

a. Basis for developing the tasks of detailed engineering design

QCVN 04-02: 2010/BNNPTNT- National technical regulation on components, contents of technical design documents and design of construction drawings for irrigation works;

Regulation QCVN 04-01: 2010/BNNPTNT on promulgating the National Technical Regulation on components and contents of investment reports, investment projects and economic-technical reports of works.

QCVN 04-05: 2012/BNNPTNT- National technical regulation on irrigation works - major design regulations;

TCVN 8223: 2009 Irrigation works. The main provisions on topographic measurement, identification of canal hearts and structures on canals;

TCVN 8224: 2009 Irrigation works. The main provisions on the terrain control grid;

TCVN 8225: 2009 Irrigation works. The main provisions on the terrain height control grid;

TCVN 8226: 2009 Irrigation works. The main provisions on cross-sectional surveys and topographic plans of scales from 1/200 to 1/5000;

TCVN 8477: 2010 Irrigation works. Requirements on components and volume of geological surveys in project formulation and design stages;

TCVN 8478: 2010 Irrigation works - Requirements on components and volume of topographic survey in project formulation and design stages;

Road survey standards 22TCN 263-2000.

Vietnam Regulation 04-2009/BTNMT National regulation on development of coordinate grid.

Code for topographic maps at scales of 1/500 to 1/5000 (outdoor section), code 96 TCN 43-90. Published by the Bureau of Geodesy and Cartography in 1990.

Topographic map symbols with scale of 1: 500, 1:1000, 1:2000, 1: 5000 of the General Land Administration published in Hanoi in 1995.

TCVN 8217-2009: Land for construction of irrigation works - Classification.

TCVN 8352-2012: Construction land - Static penetration test method.

TCVN 8720-2012: Land for construction of irrigation works - Methods of sampling, packing, transporting and preserving samples.

TCVN 8868- 2011: Testing to determine the shear strength of non-cohesive non-drainage soil and cohesive - drainage soil stuck to three-axis compression equipment.

TCVN 9140-2012: Irrigation works - Requirement to preserve drill rig samples in the geological survey of works.

TCVN 9153-2012: Construction soil – Methods of correcting soil sample testing results.

TCVN 9155-2012: Irrigation works - Technical requirements of drilling machine in geological survey.

TCVN 9437: 2012 - Construction geological exploration drilling.

TCVN 9363-2012: Geotechnical survey for high-rise buildings.

TCVN 9351-2012: Construction land - Field test method - Standard penetration test (SPT).

TCVN 2683-2012: Construction land - Methods of taking, packaging, transporting and preserving samples.

TCVN 4195: 2012 - Construction land - Methods of determining density in laboratory.

TCVN 4196: 2012 - Methods of determining humidity and dehumidification in laboratories.

TCVN 4197: 2012 - Methods of determining yield and plasticity limits in laboratories.

TCVN 4198-2014: Construction land. Methods of analyzing particle composition in laboratories.

TCVN 4199: 2012 - Methods of determining shear strength in flat cutting machines in laboratories.

TCVN 4200: 2012 - Methods of determining compressibility of subsidence in laboratories.

TCVN 4202: 2012 - Methods of determining the volume in laboratories.

14TCN 4-2003 "Composition, content, volume of survey, exploration and calculation of hydro-meteorology in the stages of project formulation and design of irrigation works".

Formatted: Highlight

Decree No. 46/2015/ND-CP dated 12/5/2015 of the Government on quality management and maintenance of construction works.

Pursuant to the Ministry of Industry's Decision No. 2362/QD-NLKD dated September 17, 2003 on measuring and connecting survey altitudes of electricity works.

TCVN 10380: 2014 Rural roads - Design requirements.

TCVN 8423: 2012 Standards of irrigation works - Irrigation pumping stations, water drainage - Requirements for designing of hydraulic works.

TCVN 9141: 2012 Standards of irrigation works - Irrigation pumping stations, drainage - requirements of design of dynamic and mechanical equipment.

TCVN 4118: 2012 Irrigation works - Irrigation systems - Design technical requirements.

TCVN 8218: 2009 - Hydraulic concrete - Technical requirements.

TCVN 2622: 1995 on fire prevention and fighting for houses and constructions - design requirements.

Decision No. 451/QD-BXD dated May 23, 2017 of the Ministry of Construction announcing guidelines for measuring the quantity of work construction.

Design standard TCXDVN 33: 2006 on Water Supply - Pipeline Network and Works.

Guidelines for Detailed Engineering Design for the subproject under the WEIDAP Project (September 2017).

Deleted: e

Deleted: d

Deleted: guidelines

Pursuant to Decision No. 1745/QD-UBND and 1744/QD-UBND dated July 6, 2018 of the People's Committee of Binh Thuan Province on approving the Feasibility Study Reports of 02 Construction investment sub-projects under the Project "Water efficiency improvement for drought-affected provinces" (WEIDAP/ADB8).

Pursuant to Decision No. 2416/QD-BNN-HTQT dated June 22, 2018 of the Minister of Agriculture and Rural Development on the feasibility study report of the project "Water efficiency improvement for drought-affected provinces" (WEIDAP/ADB8).

Design standards and current design regulations.

Formatted: Highlight

b. Requirements for calculation of hydrology and water resources

Formatted: Highlight

Formatted: Highlight

+ Checking and redoing all calculations on water balance, irrigation needs of current and future crops that can be grown in the project area under normal conditions and climate change.

+ Analyzing and evaluating the hydro-meteorological features of the proposed project site, discussing the difficulties and advantages of hydro-meteorological conditions for research, construction, operation and management of public works.

+ Assessing the capacity of water supply at sources, including flow, water quality, etc. over time and their potential adverse impacts on downstream when the works are put into operation.

+ Making other hydrological calculations necessary to prepare the design, inspection and safety of the items.

c. Requirements for hydraulic calculations

Hydraulic calculations are made for the proposed engineering structures, pumping station, pipelines and hydraulic pressure dams, canal system, and related structures to determine/confirm the dimensions of the structures as well as to evaluate technical options/solutions to improve/modify the feasibility design.

Deleted: s
Deleted: s

d. Requirements for the design of irrigation works

-Re-checking and correcting the level of structures, design criteria and design standards of approved structures in previous stages;

-Validating optimization of the tasks and structural measures identified in the investment project;

-Carrying out additional design works to improve/complete the engineering works determined to be feasible: In the case of adjustments and additions necessary for the project's structural tasks and measures, it is necessary to recalculate and redetermine the requirements for structures to make sound justifications for such adjustments and additions:

-For the proposed technical solutions, it is necessary to research and find ground treatment measures suitable to geological conditions, size selection and structural measures according to the principle of maximum use of local materials and easy construction;

-Designing and precisely arranging main facilities, including pump station, electric supply arrangement, low-voltage transmission lines, intake tanks, lifting main pipe line, header tank, irrigation gravity pipe system from the header tank, canals, inlet structures, roads, and related structures according to the landscape

Deleted: s
Deleted: power stations,
Deleted: suction
Deleted: and header pipes, dams
Deleted:
Deleted: s
Deleted: pipes
Formatted: Highlight

Formatted: Highlight

architecture planning the structures and the irrigation system in the subproject work area;

Deleted: of roads, dykes and embankments

-Considering 2-3 options of the premises in the subproject area to select the optimal location based on the site structure selected in the investment projects:

+ Basis of selection: Structure characteristics, natural and social conditions, management requirements, etc.

+ Selecting the location for design;

+ Arranging the overall layout of the structure according to each site's options;

+ Ability to recover land and resettle (if any);

+ Determining the basic dimensions of structures;

+ Making calculations and analysis to select the optimal structure location.

- Selecting and approving the best technical options: The technical options will be presented to and approved by the relevant agencies, the Ministry of Agriculture and Rural Development, and then will set up detailed design. Based on the approved basic design in the investment project, adjusting and supplementing the project's duties and construction measures (if any), and the optimal structured sites selected, for focal public pump station works: Based on the approved structural items of the investment project, adjusting and adding to the project's structural tasks and measures (if any) and optimal structural locations selected, to calculate and select the optimal size and structure of the works, detailed structural components and items, and select the optimal solution for ground treatment.

- Calculating and calibrating the optimal size of the structures to ensure that sediments will not be deposited in the piping during use to avoid clogging and allow future convenient operation and maintenance; studying the structures of the main constructions, cooperating with electronics and mechanical experts to select and arrange equipment, then based on which to select the optimal forms of the remedial measures for structures and foundations of main constructions.

- Surveying the locations of taps and placing them at appropriate locations/intakes and advising households on the design options to ensure the best

Convenient water supply: the location of the intake hose should be determined according to the actual number of households / lots to ensure that farmer groups know the details of the design by which the most accurate adjustment can be made.

Formatted: Highlight

- Checking to correct the scale and basic size of the structures, calculate the stability of the structures.

- Calculating the stability and structure of pump houses, suction tanks, propellers, transfer tanks, management house, roads and other auxiliary facilities.

e. Requirements for roads and management stations

- Determining the cross section for the roads according to rural road standards - Design requirements: TCVN10380-2014.

- Carrying out inspection to examine the current state of the route to serve the design requirements on the following principles:

+ The route must meet the favorable connection with the existing roads and work items, serve project management and operation.

+ Considering the full use of the existing roads, construction service roads to upgrade and expand them to meet the design requirements before new construction.

+ Making full use of locally available materials (or local materials) to put into the roadbed and structures.

- Regarding the compaction of the roadbed, the permissible settlement of the roadbed must ensure the current standards.

- Intersections at forks and crossroads should have a curved radius in accordance with the standards to ensure visibility for vehicles.

- System of marker posts, road marking paints, guardrails, detailed drawings of metal structures (if any).

Requirements for management stations

+ Identifying the main items, service areas to meet management requirements

+ Reasonable station location, convenient to connect with the main works.

+ Designed in accordance with local architecture and regional landscape meeting the requirements.

f. Requirements for mechanical design

Specifying the requirements for calculating and selecting the structure of lifting equipment including the location, size and structure of the lifting equipment for each structure; calculating lifting force, lowering and placing lifting equipment for works;

Requirements for electrical design

It is necessary to calculate the project's electrical load (pump stations, managers), loads for construction works (the entire site) as a basis for requesting

Formatted: Highlight

power sources and connection points, and working with the local Electricity Company to locate connection points, voltage levels and lengths of power lines to operate and manage the project and provide electricity for construction.

Designing and calculating the main structures and establishing premises and records of power supply lines for the work of pumping stations, including transmission lines and substations.

Designing low voltage system including main electrical connection diagram; schemes of control, measurement and protection of motors to open and close the pump stations, the principle diagram of the monitoring system and communication system, lightning protection and grounding system.

h. Requirements for SCADA system

Deleted: scada

Operation control system is an indispensable part of the pump house, which will provide the operator with operating parameters of the pumps during operation so that the parameters can be adjusted to suit the requirements of flow rate or pump water column, assessing the operating status of the pumps. A basic system consists of a pump and a control panel (scada).

Formatted: Highlight

Commented [HND21]:

Commented [HND22]:

Commented [HND23]: IT IS NOT the SCADA concept

Formatted: Highlight

The basic requirements of the system

All information about operating the pump station through PLCs/ RTUs controller is located inside the electrical cabinet.

The control panel is equipped with a soft starter to minimize pump starting current and increase pump protection.

In the cabinet, there are devices to monitor the power consumption of the pumping system.

The transmission and reception of information from the pump station through information processing PLCs and sending it to the mobile phone number of the registered manager is carried out in digital form through the use of the services of telecommunication networks.

Commented [HND24]: Not only ???

The transmission and reception of information from the pump station through information processing PLCs and sending it to the mobile phone number of the registered manager is carried out in digital form through the use of the services of telecommunication networks.

The cabinets must be equipped with features to protect against damage caused by natural disasters: Direct lightning protection system and surge protection

Formatted: Highlight

system to ensure that the system operates stably and normally in the event of a thunderstorm and local lightning as well as lightning spread from other places

1. Requirements of construction organization design and construction methods

- Optimal method of exploitation and transportation of construction materials
- Main construction methods
- Construction quality control measures
- Fire and explosion prevention, and labor safety
- Environmental protection during construction.
- Transportation in and outside the site
- Auxiliary facilities (workshops, camps) and electricity, water supply systems, communications for construction and on-site activities.

- Total construction ground
- General construction progress
- Providing the main materials and equipment for construction
- Map of navigation and construction by year
- Measures to stop the flow (specifications and volume of materials ...)
- Method of structural construction
- Planning and using construction materials
- Other necessary drawings

Requirements for total cost estimates

The consultants are responsible for studying the local basic construction unit price, the basic construction cost norms, the state and provincial policies and regulations on current capital construction, implementing the summary sheets of quantities and detailed forecasts, and preparing cost estimates for structures and estimated total costs.

1. Requirements for development of manuals/rules of operation and maintenance

Developing the processes of operating, managing, exploiting, maintaining and protecting the structures, including:

- Manual on O&M;
- Detailed scope of protection and management;

Details of the structures and architecture of the works in service of work operation, management and protection;

- Details of the monitoring and control network;

- Details of the communication system;
- Exact quantity and volume of equipment and developing the operation management system;

m. The content of detailed engineering design

Dossiers of detailed engineering designs must be prepared in accordance with relevant standards, industry standards and other relevant State regulations and procedures, and WEIDAP guidelines for detailed engineering designs.

Main reports and other documents: The composition and volume of the reports must comply with the national technical regulations on the composition, contents of technical design documents and detailed engineering designs of the public irrigation works QCVN 04-02: 2010 BNN-PTNT.

Languages of documents and reports: Vietnamese and English

1) Main reports

2) Other documents:

- Terrain report: Complying with terrain standards Geological reports: Complying with geological standards

- Meteorological and hydrological balance reports: complying with the standards of hydrometeorological and water balance

- Structural design reports
- Mechanical design reports
- Electric design reports
- Reports on construction organization and measures
- Reports on operation and maintenance rules

3) Drawings

- Site geological engineering drawings: complying with the regulations of composition and volume of geological survey in the planning and design stages of the project.

- Structural drawings
- Structure design drawings: displaying the entire contents of a detailed design of the structures, including the location, size, details of the elements, equipment layout, construction measures, and measures to protect the ecological environment, operate, manage and maintain the structures. Design drawings must show fully and accurately the details to allow actual construction at the construction site according

Formatted: Highlight

to design requirements; faithfully reflect the contents of the approved basic designs; present clearly, scientifically and for easy understanding in the specified format.

- Mechanical design drawings
- Electric design drawings
- Construction organization design drawings

Commented [HNĐ25]: These belong to

4. IMPLEMENTATION TIME

Consultancy services for the topographic, geological surveys, engineering and detailed engineering works of the subproject are expected to begin after approval of both FS and Subproject reports. The contract implementation time is 90 days (03 months). The Consultant's technical proposal will include an action plan with the expected project team members and schedule of mobilizing experts and support staff.

Commented [HNĐ26]: Not enough ???

5. OUTCOME AND PLAN OF DOCUMENT HAND-OVER

The consultants are responsible for defending the design products before the project owner, the evaluation consultants and relevant agencies, and finalizing and delivering the assigned products.

The results of consultancy services must fully display the contents and composition of the survey documents, detailed engineering designs according to current regulations. Design documents must be clear, accurate, complete, of required quality and approved by competent authorities. The number of submitted documents is 09 sets in Vietnamese, including the following basic components:

- Volume 1: Detailed engineering design notes;
- Volume 2: Main reports;
- Volume 3: Specialized reports: Hydrological and irrigation calculations; construction design; mechanical design; electrical design; organization of construction and construction measures;
- Volume 4: Topographic survey reports (notes, drawings and appendices)
- Volume 5: Geological survey reports (explanatory notes, drawings, experiments, drill oocyte samples, drill oocyte images ,)
- Volume 6: Work design drawings;
- Volume 7: Project construction cost estimates;
- Volume 8: Technical construction instruction reports;
- Volume 9: Operation and maintenance flowchart.

Formatted: Highlight

Formatted: Highlight

Design consultants are responsible for translating design documents into English at the request of the project owner. It is not necessary to translate all the documents but only the documents to serve the requirements of donors and stakeholders.

Note: Please enclose with the USB recording the contents of the detailed engineering design documents and data + the original documents of the construction survey (including all data from volumes 1 to 9 above).

6. REQUIREMENTS FOR CONSULTANT EXPERIENCE AND CAPACITY

6.1. Requirements for qualificationsof the Consultant

Commented [HNĐ27]: Consulting firm

-The Consultant must be a unit with full legal status and business registration suitable to the scope of work; have appropriate certificate of construction activity capability as prescribed;

Commented [HNĐ28]: Kindly consider Section 7 of the Comments on draft TOR for detailed engineering designs (Dak Lak province)

-Satisfy the conditions of eligibility as prescribed by the Bidding Law.

-If the contractor is a partnership, each partnership member must satisfy the requirements as for an independent contractor corresponding to the work undertaken.

6.2. Requirements on qualifications of key experts

-The Consultant must mobilize qualified and experienced experts in the proposed fields and one of them will be appointed Project Manager to coordinate and implement the subproject. Note that if the positions do not overlap with respect to time, one expert may assume multiple positions. The minimum requirements on the number, qualifications and experience of key experts are as follows:

Table 22: Requirements on qualifications and experience of the consultants

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
1	Design Manager (Project manager)	01	- Having university degree majoring in irrigation works, preferably a master's degree specialized in irrigation works; Having a valid irrigation work designing practice	Managing the coordination of consultants, connecting with PPMU and stakeholders in organizing the implementation of the Subproject:	03

Formatted: Highlight

Formatted: Highlight

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			certificate. - Having over 15 years of working experience in the field of irrigation engineering design consultancy; - Having experience in conducting consultancy on design of 05 irrigation works with the role of Design chief or manager; - Having experience in leading or managing projects or designing ODA projects. - Priority is given to experience in consulting services in similar geographical areas.	- Being responsible for organizing the production, ensuring the progress and quality of reports and products, and coordinating with relevant agencies and consultants supported by ADB. - Supervising and evaluating the performance of the consultants; Supporting PPMU in coordination with MARD and WB in the implementation and approval of detailed engineering design. - Preparing and taking responsibility for the progress and quality of the works and products of the consultant services. - Guiding the collection and updating of documents related to the subproject	

Formatted: Highlight

**Dự án nâng cao hiệu quả sử dụng nước cho các tỉnh bị ảnh hưởng bởi hạn hán tỉnh Bình Thuận
WEIDAP/ADB8**

Formatted: Highlight

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
				prepared by other consultants. - Providing guidance and technical review proposed by member consultants on survey, detailed engineering design of component projects under the subproject. - Carrying out author supervision at the request of the project owner.	
2	Design chief	02	- Having university degree majoring in irrigation works, preferably a master's degree specialized in irrigation works; Having a valid irrigation work designing practice certificate. - Having over 15 years of working experience in the field of irrigation engineering design consultancy; - Having practical experience in conducting design consultancy for 05 irrigation works with the role of Design	- Managing design in compliance with the progress and quality of the reports and products. - Guiding the collection and updating of documents related to the subproject prepared by other consultants. - Providing guidance and technical review proposed by member consultants on survey, detailed engineering design of	03

Commented [HND29]: Experience on using "EPANET" or WaterGEMS ???

Formatted: Highlight

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			chief; - Priority is given to experience in consulting services in similar geographical areas.	component projects under the subproject. - Coordinating and supporting Project manager in author supervision in accordance with regulations.	
3	Hydrographic and hydraulic expert	02	- Having university degree specialized in irrigation works; preferably having a master's degree in hydrology. - Having over 15 years of working experience in the professional field. - Having participatory experience in 03 irrigation projects as a hydro/hydraulic expert; - Priority is given to experience in consulting services in similar geographical areas.	- Being responsible for conducting activities of collecting data and information and performing related calculations and hydrological and hydraulic calculations of the works. - Summarizing and preparing specialized hydro-and hydraulic reports.	03
4	Water expert	04	- Having university degree specialized in irrigation works; preferably having a master's degree in irrigation; having a practicing certificate for designing irrigation projects.	- Doing field work, analyzing documents, assessing the construction status. - Proposing and synthesizing structural and non-structural	03

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			<ul style="list-style-type: none"> - Having over 10 years of working experience in the field of irrigation engineering design consultancy; - Having participatory experience in 2 similar projects with the role of a hydro/engineering expert; - Having participatory experience in 02 projects of irrigation works as a construction expert; - Priority is given to experience in consulting services in similar geographical areas. 	<ul style="list-style-type: none"> solutions, analyzing and evaluating overall stability, designing and calculating work items. - Participating in making detailed engineering design of the subproject, formulating plans to organize the construction and making reports on specialized hydraulic engineering. - Coordinating and supporting Project manager in author supervision in accordance with regulations. 	
5	Structural expert	04	<ul style="list-style-type: none"> - Having university degree specialized in irrigation works; preferably having a master's degree in irrigation; having a practicing certificate for designing irrigation projects. - Having over 10 years of working experience in the field of irrigation engineering design 	<ul style="list-style-type: none"> - Analyzing and evaluating work stability, calculating structure of work items. - Coordinating hydraulic experts to establish computation appendices and design notes. 	03

Formatted: Highlight

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			consultancy; - Having participatory experience in 02 consultancy projects on design of irrigation works with a role of calculating structural design; - Priority is given to experience in consulting services in similar geographical areas.		
6	Expert in making technical instructions, setting up maintenance procedures	02	- Having university degree specialized in irrigation works; preferably having a master's degree in irrigation; having a practicing certificate for designing irrigation projects. - Having over 10 years of working experience in the field of irrigation engineering design consultancy; - Having participatory experience 02 similar projects with the role of an expert in making technical instructions, setting up maintenance procedures; - Having participatory experience in 02 projects of irrigation	- Doing field work, collaborating with other experts in assessing the status of the work, analyzing relevant documents. - Coordinating with the Project Manager and other experts in formulating technical instructions and work maintenance procedures - Coordinating and supporting Project manager in author supervision in accordance with regulations.	03

Formatted: Highlight

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			works as a construction expert; - Priority is given to experience in consulting services in similar geographical areas.		
7	Mechanical expert	02	- Having university degree in mechanical engineering; preferably having a master's degree in mechanical engineering; having appropriate design practice certificate. - Having over 05 years of working experience in the field of design consultancy for irrigation/hydroelectric projects. - Having participatory experience in 02 similar projects as a mechanical expert	- Proposing and synthesizing solutions for designing mechanical structures of works. - Participating in detailed engineering design of the subproject, making plans and reporting on mechanical engineering.	03
8	Electromechanical expert	02	- Having university degree in electromechanics; preferably having a master's degree in mechanical engineering; having appropriate design practice certificate. - Having over 05 years of working experience in the field of design consultancy related to	- Proposing and synthesizing solutions for designing electromechanical component of works. - Participating in detailed engineering design of the subproject, making plans and reporting on	03

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			electromechanics. - Having participatory experience in 02 similar projects as a mechanical designer or electromechanics expert.	electromechanics.	
9	Economic experts, estimation expert	02	- Having university degree in economics/irrigation engineering; preferably having a master's degree in economics/irrigation works; having valuation engineer practice certificate. - Having over 10 years of working experience in the field of cost estimation, economic analysis, project effectiveness evaluation. - Having participatory experience in providing consultancy services in similar geographic areas.	- Reviewing Decrees, Circulars and Norms applied to the subproject. - Collecting and reviewing estimated data from the subproject's designs. - Taking charge of and calculating construction cost estimates.	03
10	Topographic survey expert	02	- Having university degree in geodesy and cartography; have a topographic practice certificate. - Having over 10 years of working experience in construction surveying and surveying.	- Taking chief charge of topographic surveys. - Preparing technical survey plans, topographic survey records as prescribed. - Formulating and handing over	03

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			<ul style="list-style-type: none"> - Having participatory experience in 02 similar projects as a topographic survey expert; - Having participatory experience in providing consultancy services in similar geographical areas. 	<ul style="list-style-type: none"> control landmarks. - Carrying out explanation upon request. 	
11	Geological survey expert	01	<ul style="list-style-type: none"> - Having university degree in engineering geology; having a geological survey practicing certificate. - Having over 10 years of working experience in the field of geological survey, construction surveying. - Having participatory experience in 02 similar projects as a geological survey expert; - Having participatory experience in providing consultancy services in similar geographical areas. 	<ul style="list-style-type: none"> - Taking chief charge of field geological surveys. - Making technical survey plans, geological survey records as prescribed. Proposing measures to treat foundations, bodies and roofs that cause project instability. - Carrying out explanation upon request. 	03
12	Support staff	10	<ul style="list-style-type: none"> - Having university degree in appropriate majors. - Having more than 5 years of experience in conducting surveys, surveys, data collection, community consultations, 	<ul style="list-style-type: none"> - Supporting key experts in field surveys, information gathering, community consultation, quantitative and qualitative 	03

S. N	Expert	Quantity	Required qualifications and experience	Tasks	Implementation time (months)
			designing irrigation works, supporting the implementation of consultancy tasks; - Priority is given to officials who have participated in the implementation of a similar project	information processing. - Supporting key experts in the detailed engineering design and cost estimation. - Providing support related to administrative procedures, accounting, transactions, report synthesis. - Providing support related to editing, printing, document publishing.	

Total number of people: 35

Total months: 36

7. ESTIMATION OF COSTS FOR IMPLEMENTATION OF CONSULTANCY SERVICES

7.1. Basis for making consultancy estimates.

- Decision No. 79/QĐ-BXD dated February 15, 2017 defining the norms of project management costs and construction investment consultancy;

- Circular No. 219/2009/TT-BTC dated November 19, 2009 of the Ministry of Finance stipulating a number of spending norms applicable to projects/programs funded by Official Development Assistance (ODA). Circular No. 192/2011/TT-BTC dated December 26, 2011 of the Ministry of Finance on amending and supplementing a number of articles of Circular No. 219/2009/TT-BTC;

- Circular 02/2015/TT-BLĐTBXH dated 12/01/2015 of the Ministry of Labor - Invalids and Social Affairs stipulating salaries for domestic consultants as a basis for estimating the bidding package for providing consultancy services on the form of time-based contract using state capital.

- Circular No. 05/2016/TT-BXD dated 10/3/2016 of the Ministry of Construction guiding the determination of labor unit prices in construction investment cost management;
- Circular No. 40/2017/TT-BTC of the Ministry of Finance dated April 28, 2017, stipulating business trip allowances and conference costs applicable to state agencies, public and non-business units, political organizations, socio-political organizations and associations using state budget funds;
- Circular No. 01/2017/TT-BXD dated February 06, 2017 of the Ministry of Construction guiding the determination and management of construction survey costs;
- The norm of work construction estimate - the Construction Survey part announced together with Decision No. 1354/QD-BXD dated December 28, 2016 of the Minister of Construction;
- Work construction unit price of Binh Thuan province promulgated under Decision No. 1340/QD-UBND dated May 16, 2016 of Binh Thuan People's Committee;
- Decision No. 69/2013/QD-UBND dated December 27, 2013 of Binh Thuan People's Committee promulgating the price list for goods transportation by cars in Binh Thuan province.
- Decision No. 640/QD-BGTVT dated April 4, 2011 on classification of roads for calculating road freight in 2011;
- Decision No. 2584/QD-UBND dated 11/11/2010 of Binh Thuan People's Committee on classification of district roads managed by Binh Thuan Department of Transport in 2010;
- Decision No. 08/2017/QD-UBND dated February 24, 2017 of the Provincial People's Committee on promulgating the Regulation on decentralization of management of work construction investment projects for works using state capital in Binh Thuan province;
- Decision No. 32/2017/QD-UBND dated October 19, 2017 of the Provincial People's Committee on amending and supplementing a number of articles of the Regulation on decentralization of management of work construction investment projects for works using state capital in Binh Thuan province, issued together with Decision No. 08/2017/QD-UBND dated February 24, 2017 of the Provincial People's Committee;

- Decision No. 1134/QĐ-BXD dated October 8, 2015 of the Ministry of Construction on announcing the norm of losses to determine the price of machine shift and constructional equipment.

- Unit price of materials is taken from the announced price of construction materials of Binh Thuan Department of Construction. For materials not included in the material price announcement, refer to the market price of materials;

Government policies and regulations.

7.2. Estimated consultancy costs

No.	Item	Đu đủ Tân Thành	Trà Tân	Total
I	Survey cost	3.028.637.000	921.594.535	4.130.231.535
1	Funding for topographic and geological surveys	2.753.306.000	837.813.214	3.591.119.214
2	Survey Contingency Expenses	275.331.000	83.781.321	359.112.321
II	Expenses for designing construction drawings			5.775.873.220
1	Funding for making construction drawing design - cost estimation			5.448.937.000
2	Design contingency cost			326.936.220
III	Total cost of survey and designing			9.906.104.755

Commented [HNĐ30]: Use US – English number formats

8. COORDINATION AND SUPERVISION

The Consultant must report to the project owner on monthly progress and prepare documents and attend meetings and seminars on relevant content at the request of the Client.

The Consultant will coordinate with project implementation consultants and other stakeholders such as CPO and ADB. Specifically, discussions/milestones tests (MS) are required (as outlined in the WEIDAP guidelines). The Consultant should work closely and provide the necessary data, data and reports to project

Formatted: Highlight

Formatted: Highlight

implementation consultants and other stakeholders during the implementation. The Consultant must participate in meetings and discussions with relevant agencies at central and local levels.

The Consultant should work closely with community representatives (traditional and non-traditional) to ensure information collection during the research phase and accurately assess the impacts of the subproject as well as the issues related to environmental and social protection policies.

Commented [HNĐ31]: Several of these should belong to the Scope of work

9. IMPLEMENTATION ARRANGEMENT

During the task implementation, the Consultant will report directly to PPMU. PPMU will be responsible for providing the Consultant with contact information of other agencies upon request.

The Consultant must organize on its own the implementation of the subproject. All relevant estimated costs must be anticipated in the bidding documents and there will be no change in the total cost when signing the contract.

All costs related to fieldwork and the data needed to meet the technical requirements of this consulting work should be fully considered in the proposal. Topographic and meteorological data must be proposed during the bidding process to ensure that the job is completed within the estimated total cost. For this purpose, the Consultant must estimate the workload and the corresponding costs as there will be no change in the total cost of the subproject after signing the contract for any reason.

The Consultant will pay for all expenses related to travel and accommodation (including field trips) to the entire consultant team during the contract period. The Consultant will also pay for all support staff (administrative staff, translators, office secretaries, accountants) and field staff to perform the work for all data collection activities.

Technical reports and consulting products will be provided as described in the distribution part. The project owner will accept the subproject only when the subproject implementation consultants agree with the consulting products and ADB issues a no objection letter.

Formatted: Highlight

10. SUPPORTS FROM THE CLIENT

10.1. Responsibilities of the Consultant

- Conducting construction consultancy in accordance with the agreed content and volume of work and complying with the regulations on application of Vietnamese and ADB standards and criteria;
- Submitting documents and reports to the project owner within the required time limit of ToR;
- Ensuring mobilization and arrangement of personnel, self-arrangement of offices and vehicle in service of travel;
- Ensuring that all contractor work performed under contracts is in accordance with the laws of Vietnam.
- Implementing and being responsible for the quality of its consulting products.
- Participating in meetings related to construction consultancy products when requested by the project owner during the implementation process, ensuring compliance with the regulations of MARD, PMU, PPC as well as the Donor (based on the Decision on approving the feasibility study report of the project and the subproject) proposing to the project owner to supplement the missing contents under the Decision;
- The Consultant must commit that at the request of the project owner, the contractor will appoint a representative with sufficient competence and capacity to handle the remaining problems at any time at the request of the project owner.
- Complying with the instructions and requirements of the project owner, except those instructions or requirements contrary to the laws or impossible to be implemented.
- The contractor must not disclose any confidential or proprietary information related to the consulting work, contract or work activities without the project owner's prior consent and prior written approval.
- The Consultant is responsible for researching and applying applicable standards and regulations to the subproject. In case of lack of such standards, they must refer to corresponding foreign standards and be subject to agreement of the project owner. A number of main regulations and standards expected to be applied

10.2. Responsibilities of the project owner.

- The project owner shall provide the consulting contractor with the completed feasibility study reports and other relevant legal documents.

- Creating the best possible conditions for the contractor to perform the consultancy work;
- Supporting, creating conditions for the contractor to have access to the works, the field;
- Providing necessary documents at the contractor's proposal for the contractor to perform the consultancy work. The project owner is responsible for the accuracy and completeness of the documents provided by him;
- Considering the contractor's requests and proposals related to the performance of consultancy work and approving them within a reasonable time so as not to delay the construction consultancy implementation;
- Paying the contractor the contract price in accordance with the regulations,
- Replying in writing to the contractor's requests or recommendations;
- Appointing qualified and professional individuals suitable to each job to work with the contractor specified in the project owner's specific decisions.

To clarify the information in this Term of reference, please make contact with the following information:

- +Investor: Department of Agriculture and Rural Development of Binh Thuan province
- +Investor Representative: Improving water efficiency for drought-affected provinces (WEIDAP/ADB8) - Binh Thuan province
- +Address: 04 Hai Thuong Lan Ong - Phan Thiet City - Binh Thuan Province
- Phone: (0252) 3822515

APPENDIX

** Du Du - Tan Thanh irrigation canal, Ham Thuan Nam district, Binh Thuan province*

Workload of topographic and geological surveys:

S.N	WORK ITEM	UNIT	QUANTITY
-	<i>Route length</i>	m	32,652
1	Measuring for controlling of altitude, technical leveling, topographic level 3	Km	32.65
2	Surveying and mapping terrestrial maps at the scale of 1/1000 (at the same level of 1m), topographic level 3: $(32652 * 2 * 50/10000-22)/100$	100ha	3.0452
3	Measuring and drawing cross-section along the terrestrial route, level 3 terrain: 32652/100	100m	326.52
4	Measuring and drawing cross-section of the land line on land, grade-3 terrain: $(32652/50 * 1,2) * 2 * 7.5/100$ (temporarily calculating 20% of terrain piles)	100m	117.55
5	Measuring and mapping inland terrain at the scale of 1/200 (at the same level of 1m), topographic level of 3: 22 works, each work is 1 ha wide	ha	22.0000
6	Setting red boundary markers, planning boundary markers, level-3 terrain: 32652/100 * 2	landmarks	653.00
7	Planting the heart of the irrigation route marks, level 3 terrain	landmarks	50

** Upgrading and modernizing the irrigation system in Tra Tan lake, Duc Linh district, Binh Thuan province.*

Workload of topographic survey:

S.N	WORK ITEM	UNIT	QUANTITY
-----	-----------	------	----------

I	Measuring and mapping the plan of pump stations, tanks, underground overflow at the location of the gutters and regulating lakes at the end of the main canal (0.5ha + 0.5ha + 0.35ha + 2.2ha = 3.55ha)		
I.1	Ground and height control grid		
1	Change road level 2. Level II terrain	point	7
2	Technical leveling. Terrain level. Level II	km	1.75
I.2	Measuring and mapping the plan of construction site locations		
3	Terrestrial map, scale 1/200, contour line of 0.5m. Level II terrain	ha	3.55
II	Propulsion pipeline + medium-voltage electricity line of pump station (450m + 350m = 800m)		
4	Measurement and drawing of vertical sections on land Grade II	100m	8
5	Technical leveling. Level II terrain	km	0.8
III	Setting up landmarks		
6	Heart positioning (Including 40 S points on the main canal route + the beginning and ending points of the route)	point	42
7	Setting landmarks	landmarks	38
8	Installing landmarks of land clearance	landmarks	66

Geological survey work volume:

S.N	WORK ITEM	UNIT	QUANTITY
	Main pipeline of pump station (300m/pit, 3.0m deep) + Plant, suction tank (3 10m-deep holes) + Storage tank (3 5m-deep holes)		
1	Rotary drilling pumps washed with on-land sample tubes, the depth of borehole from 0m to 30m, rock and soil grade I - III	m	57.3
2	Rotary drilling pump washed with a sample tube on land, the depth of the borehole from 0m to 30m, and rock and soil grade IV-VI	m	26.7

3	Water supply pumping in service of rotary drilling pumps washed on land (when water must be supplied to bores away from water sources at more than 50m or higher than the water intake at $\geq 9m$), the depth of borehole is from 0m to 30m, soil and rock level I - III	m	57.3
4	Water supply pumping in service of rotary drilling pumps washed on land (when water must be supplied to boreholes away from water sources at $> 50m$ or higher than the water intake at $\geq 9m$), the depth of borehole is from 0m to 30m, soil and rock level IV - VI	m	26.7
5	Standardized penetration test (SPT), soil and rock grade I-III	time	12
6	Standardized penetration test (SPT), soil and rock grade IV-VI	time	3
7	The experiment to identify nine common mechanical and physical criteria of the whole soil sample	sample	12
8	Experiment to determine mechanical and physical properties of rock samples	sample	3