Initial Environmental Examination

December, 2014

VIE: INTEGRATED RURAL DEVELOPMENT SECTOR PROJECT IN THE CENTRAL PROVINCES (Additional Financing)

SUBPROJECT: LINING NORTHERN BA BAU MAIN CANALS OF BA BAU RESERVOIR IRRIGATION SYSTEM, BINH THUAN PROVINCE

Prepared by Central Project Management Unit – Agriculture Project Management Board - Ministry of Agriculture & Rural Development for the Asian Development Bank

CURRENCY EQUIVALENTS

(as of 15 September 2014)

Currency unit	–	Vietnamese Dong (VND)
VND 1.00	=	$0.0000472
$1.00	=	VND 21,175

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected persons
CEP	Commitment on Environmental Protection
CPC	Communal People's committee
CPMU	Central Project Management Unit
DARD	Department of Agriculture and Rural Development
DONRE	Department of Natural Resources and Environment
DPC	District People's Committee
EIAR	Environmental Impact Assessment Report
EMDF	Ethnic Minority Development Framework
EMP	Environmental Management Plan
DARD	Department of Agriculture and Rural Development
FPD	Forest Protection Department
IEE	Initial Environmental Examination
IPM	Integrated Pest Management
IRDPCP	Integrated Rural Development Project in Central Provinces
LIC	Loan Implementation Consultant
MONRE	Ministry of Natural Resources and Environment
PC	People's Committee
PPC	Provincial Peoples Committee
PPMU	Provincial Project Management Unit
RF	Resettlement Framework
SIR	Subproject Investment Report
TPC	Town People's Committee
UXO	Unexploded Ordnance

WEIGHTS AND MEASURES

km	–	Kilometer
kg	–	Kilogram
ha	–	Hectare
m	–	Meter

NOTE

In this report, "$" refers to US dollars.

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1. INTRODUCTION

1. The Integrated Rural Development Sector Project in the Central Provinces (IRDPCP) is being implemented through a sector loan from the Asian Development Bank (ADB). The Ministry of Agriculture and Rural Development (MARD) is the executing agency for the sector loan.

2. Due to the success of the project, ADB proposes to provide Additional Financing of $70 million for a second phase of the project, which will be implemented in 6 of the original 13 provinces. The IRDSPCP 2nd phase is located in 6 provinces in central Viet Nam and has involved construction of medium scale rural infrastructure of the following types:

    (1) Irrigation, drainage and flood control infrastructure including river embankments, sluices and salinity intrusion control structures;
    (2) Rural roads including bridges and culverts.

3. As part of IRDPCP 2nd phase, Lining Northern Ba Bau main canals of Ba Bau Reservoir irrigation system Subproject will be constructed in Ham Thanh Commune of Ham Thuan Nam District and 2 communes are Ham Thanh (Ham Thuan Nam District) and Ham Hiep (Ham Thuan Bac District) are beneficiary areas

4. This Initial Environmental Examination/Commitment on Environmental Protection (IEE/CEP) document has been prepared to meet the environmental safeguards requirements of the ADB[1] and GOV[2]. The IEE/CEP contains the following information:

    (i) Section I Introduction

    (ii) Section II contains a description of the subproject;

    (iii) Section III contains a description of environmental conditions in the vicinity of the subproject;

    (iv) Section IV contains a describes potential environmental impacts of the subproject;

    (v) Section V contains the environmental management plan including mitigation measures, monitoring system and cost estimation for the implementation of Environmental Monitoring System;

    (vi) Section VI contains activities description on community consultation and subproject disclosure;

    (vii) Section VII contains conclusion and recommendation including summarization of main impacts and typical mitigation measures in the subproject's implementation.

[1] ADB SPS 2009

[2] Law on Environment Protection (Revised) 2006; Decree 29/2011/NĐ-CP dated April, 18th 2011 and circular No. 26/2011/TT-BTNMT dated July, 18th 2011

2. PROJECT DESCRIPTION

Table 1. General information of subproject

DATA ITEM	SUBPROJECT DATA
GENERAL INFORMATION	
Subproject Name	Lining North Ba Bau canals of Ba Bau Reservoir irrigation system Subproject, Ham Thuan Bac District
Subproject Type	Irrigation
Project owner	Department of Agriculture and Rural Development, Binh Thuan Province
Address of Project owner	17 Thu khoa huan Road, Phan Thiet City, Binh Thuan Province
Name and Title of Head of Project owner	Vu Xuan Huynh Title : Director
Telephone, fax and email details of Project owner	0913883083 huynhthuyloi@yahoo.com.vn
Name of Environmental Officer of PPMU	Nguyen Hong Truong
Telephone, fax and email details of PPMU Environmental Officer	0917230379 hongtruongqlda@gmail.com
SUBPROJECT DESCRIPTION	
New project or rehabilitation project	Lining and Upgrading and improvement
Technical standard for irrigation canal	
Design Irrigation Frequency	P = 85%
Surface and underground water	Surface water
Identification of water source	Ba Bau Reservoir.
Water source used for living or not?	Yes. The main canal is upgraded for irrigation purpose and supplementing water for Cam Hang reservoir to aim supplemental domestic water supply for Phan Thiet City
Area to be irrigated	
Purpose of Northern Ba Bau Main Canal Lining and Upgrading	To ensure 1,100 ha to be irrigated sustainably, extending 100 ha of cultivated land in 2 communes : Ham Thanh of Ham Thuan Nam District and Ham Hiep of Ham Thuan Bac District Supplementing irrigation for Cam Hang Reservoir to extend 250 ha of cultivated land (mostly dragoon fruit land), supply water for rivers, streams in the subproject area in dry season to breed cattle and poultry in downstream

DATA ITEM	SUBPROJECT DATA
Length of upgraded canal	Total length of upgrading main canal: 12,414 m to be concreted and upgraded (not included 572.50 m of main canal have concreted in the started canal section)
The width and depth of upgrading canal	Cross surface is rectangular with dimension of W x H = 6.0 m x 1.5 m
Structures on canal	5 regulated sluices 3 bridges over canal 10 non- motorcycle bridges 4 spillway Upgrading of Song Linh dam & spillway
The width and length of management road	Length of management road: 540 m from Km 0+14.70 m ÷Km 554.70 m Wide: 7.0 m
Climate change: Is the Project area subject to hazards such as climate changes? If yes climate change is expected to result in more intense but less frequent rainfall events and longer dry seasons and water capture systems may not be designed to accommodate these changes.	According to "Report on Climate Change Scenarios of Vietnam, MONRE-2011", with medium emission scenarios (B2): By the end of the century, annual rainfall would increase by about 2 to 7% in most of the regions. In South Central, including Binh Thuan, forecast is an increase 3 to 5 % (1.5 % for Binh Thuan). In general, the dry season rainfall would decrease and rainy season rainfall would increase. In dry season, rainfall decrease 4-10 % for the South Central Region. However, the subproject will increase the water supply capacity to meet demands of water users through upgrading of main canal and branch canal, so that could reduce loss of water due to using existing earth canal, hopefully it resist with decrease of dry season rainfall. Addition, design of dry season rainfall for the subproject agricultural area should consider carefully about decrease of dry season rainfall due to this climate change.
CONSTRUCTION ACTIVITIES	
Construction commencement date (month/year)	Expect Jan 2015
Construction completion date (month/year)	Expect Dec 2017
Number of construction workers	Approx. about 200 workers (average)
Construction camp required (Yes/No)	Yes. worker-based camps/ rent local people houses
Construction in rainy season (Yes/No)	In case of favorable weather conditions
Number and conditions construction vehicles and equipment	Estimated + Excavators: 8 units;

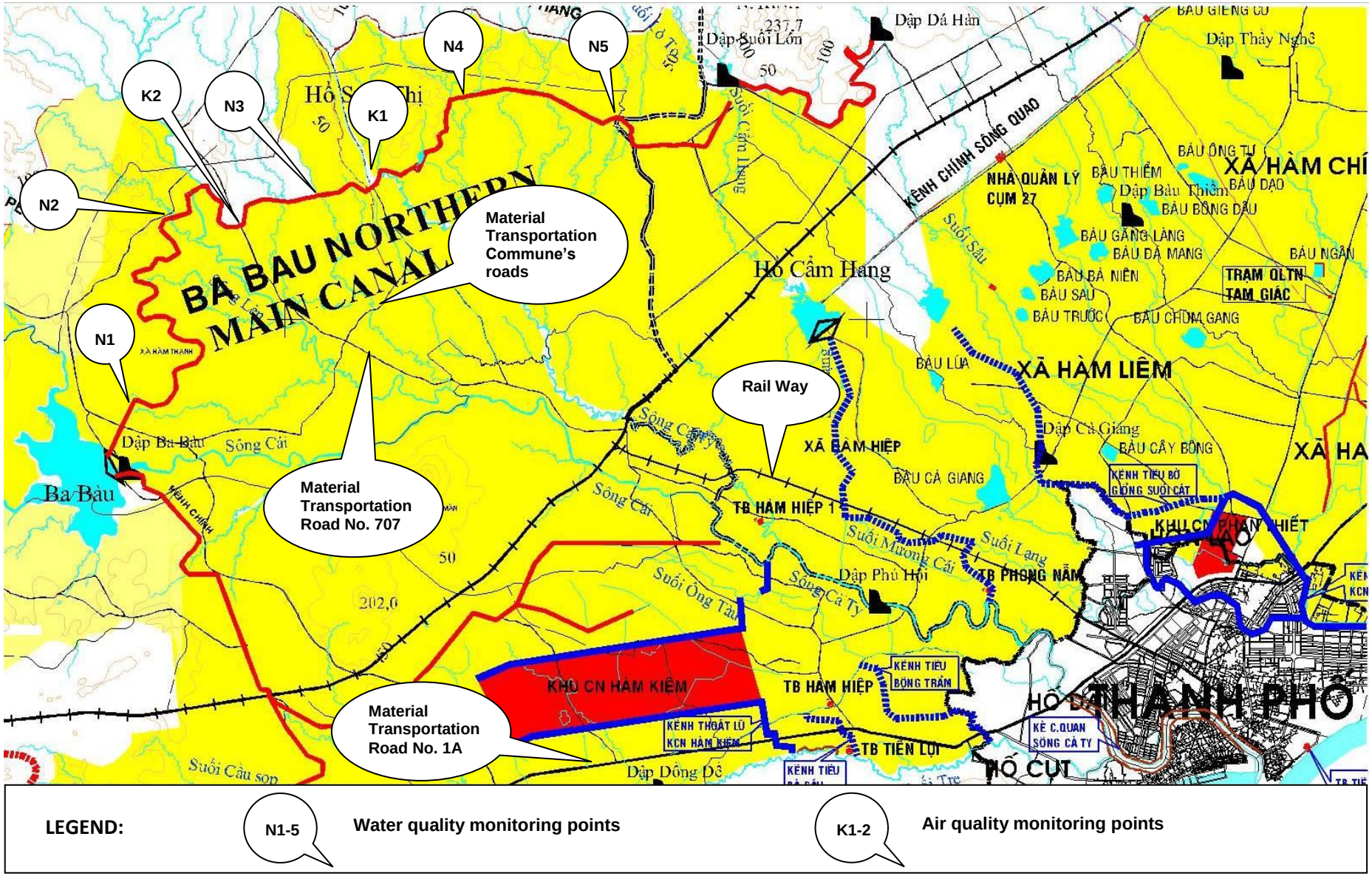
DATA ITEM	SUBPROJECT DATA
	+ Bulldozers: 10 units; Dump-trucks 5 tons : 12 units; Concrete compactors of all kinds: 06 units; + Water pumps: 04 units; Generators: 02 units; Water spraying vehicles: 01 unit; + Oil trucks: 01 unit + Cutters, benders: 04 units + Concrete mixing machines: 8 units;
Location and square of disposal site and sources of materials	Permanent disposal site: Disposal sites to be in hollow areas along Bac Ba Bau main canal in Ham Thanh commune – Ham Thuan Nam District & approved by Ham Thanh CPC Temporary gathering site: Temporary material will be located at the CPC 's yard, public house or renting house in local sites; Sources of materials: Sand will be provided by service which exploits in Ba Bau sand grounds in Ba Bau river with 15 km from the project site that has been operated under the permission of local authorities of Ham Thuan Bac district. Soil: will be exploited from hills in Ham Tri which are reserved for construction of local infrastructure. Soil exploitation area is pre-planned by Ham Thuan Bac district and communal authorities. Other construction material (steel, cement …) will be provided from services in Ham Thuan Bac central district.
Quantity of excavated soil & filling soil	Excavated soil of all types : 77,998 m^3 Filling soil of all types : 37,307 m^3 Balance : - 40,691 m^3 Discarded soil quantity: 15,600 m^3 (about 20% of excavated soil) Discarded soil will be dumped at hollow areas along Bac Ba Bau main canal in Ham Thanh commune – Ham Thuan Nam District & approved by Ham Thanh CPC and dumped at local peoples gardens far from the Site about 300 - 500 m
Balancing and management measures for excavated/excess soil	The excavated soil will be used for backfill of management / production road along the canal system
Quantity of construction materials	Item / Unit / Quantity Stone / m^3 / 198.40 Sands / m^3 / 227.72 Macadam / m^3 / 337.84 Steels / kg / 482,863.47 Formwork / m^2 / 65,631.37
OPERATION AND MAINTENANCE ACTIVITIES	
Design Capacity at main canal: (m^3/s)	Design Capacity: 2.8 m^3/s

DATA ITEM	SUBPROJECT DATA
Subproject irrigated area (ha)	Total 1,100 ha to be irrigated sustainably, extending 100 ha of cultivated land in 2 communes : Ham Thanh of Ham Thuan Nam District and Ham Hiep of Ham Thuan Bac District
Cycle of water treatment	*Water source in the upgraded main canal*: No. Water source from Ba Bau reservoir has been using for irrigation purpose without any treatment activities because of its sufficient quality for irrigation. *Supplemental water souse for Cam Hang reservoir*: to aim supplemental domestic water supply for Phan Thiet City will be treated by Phan Thiet Water Treatment Plant to meet the standards for domestic water supply
Periodically time for maintenance activities	Every year
Responsibility for Operation and Maintenance	Maintenance activities as well as their financial preparation will be implemented by Binh Thuan Irrigation Management Company (in specific is its branch company: Ham Thuan Bac Irrigation Enterprise); Communes as Ham Chinh & Ham Lien are in charge of tertiary canal system maintenance; Supporting structure maintenance will be examined after harvesting season, before and after disaster. Main structure will be checked every year to ensure canal system operation, by irrigation enterprises, district and communes;
Maintenance activities	The agency is responsible for operation and maintenance works after completion (i) Regular operate and maintain: Carry out regularly to minimize broken for works, including: drainage canal heart, do clearance, repair temporary broken, maintain exhaust and paint for mechanical equipment (ii) Periodically operate and maintain Carry out for broken and downgraded section to restore works item. Displace mechanic items and repair broken, carry out dredging and maintain canal side. Frequency: twice/ a year (iii) Operation and maintenance in case of emergency: carry out repair for broken and downgraded items. Carry out check, propose technical method and cost for repairing based on current regulation of State.
RESETTLEMENT AND LAND ACQUISITION [3]	
Number of Affected households	Total land acquisition : No
Number of severely affected person	Nil
Number of APs that must relocate	Nil

[3] This data is obtained from Resettlement Plan

DATA ITEM	**SUBPROJECT DATA**	
Total land area to be acquired	Temporary: Nil	Permanent : : Nil
Agricultural land area to be acquired (ha)	Temporary- : Nil	Permanent : : Nil
Forestry land area to be acquired (ha)	Temporary-Nil	Permanent -Nil
Garden land to be acquired (ha)	Temporary-Nil	Permanent -Nil
Aqua-cultural land to be acquired (ha)		
Residential land to be acquired(ha)	Temporary-Nil	Permanent -Nil
Other land to be acquired (ha)		
SUBPROJECT COST		
Total subproject cost (VND and $USD)	**84,617,564,846 VND ; 4,029,408** USD (at 1 USD= 21,000 VND) (from SIR)	

Figure 1: Map of the proposed lining Bac Ba Bau Canal of Ba Bau Reservoir 's irrigation canal system



LEGEND: N1-5 **Water quality monitoring points** K1-2 **Air quality monitoring points**

3. DESCRIPTION OF EXISTING ENVIRONMENT

Table 2. Environmental baseline

DATA ITEM	SUBPROJECT DATA
PROJECT LOCATION	
Commune(s):	Ham Thanh, Ham Hiep Communes (included beneficiary area is Ham Hiep Commune)
District:	Ham Thuan Bac & Ham Thuan Nam
Province:	Binh Thuan
NATURAL ENVIRONMENT CONDITIONS	
Air quality	Subproject area is agricultural land, air quality is good in general The subproject region presents its rural characteristics including agricultural production activities and local agricultural services, no construction activities, the emission sources mostly is from commune transportation activities, There is no sign of high dust pollution. In dry season, dust is generated from vehicles running on local earth road
Noise and vibration	Because of rural area, noise and vibration is very low, Noise is mainly from agricultural production activities such as in harvesting season, from market places in the morning or in the late afternoon that can be considered acceptable in rural area.
Climate and natural disasters	The subproject is located in a tropical monsoon area with two seasons: the dry season begins from November to April of next year; the rainy season begins from May to October. Every year there are about 2-5 storms causing flooding, affecting agricultural production, damage to crops, roads, affecting the socio-cultural and educational activities .
Topography and soils	The Ba Bau reservoir and main canal area located in the northern high mountain area of Binh Thuan Province. Elevation of Irrigation areas varies gently from 46m to 22m. Left side is mainly Song Mong protective forest, right side is mainly bare hill and vacant land and agricultural production land. Irrigation area topography makes favorable conditions for gravity irrigation and cultivated land extension Thick fertile soil layer is a main characteristic in the region above the basalt stone layer, facilitating cultivation productivity. There is neither salinity nor aluminum intrusion problems in the area.
Water bodies	There are two main rivers: Cai Phan Thiet and La Nghi rivers are main surface water source of Ham Thuan Bac District. Rivers and streams in the subproject area are small, drought in dry season. Main water sources for agricultural production from Ba Bau reservoir, Suoi Thi No1 & No2 reservoirs and Song Mong reservoir
Groundwater	Groundwater is at shallow layers, typically between 2-4m from the ground surface. Groundwater levels vary from season to season, from 2.0 – 4.0 m in dry season or 2.0m in rainy season. Currently, groundwater is mainly used for domestic purpose and small business in the form of wells and has not been used for agricultural

DATA ITEM	SUBPROJECT DATA
	production.
Water quality	Water quality at Ba Bau Reservoir is still good, value of most parameters such as pH, DO, TSS, COD are within allowed limit compared to QCVN 08:2008/BTNMT –Column A2 (use for domestic water supply purpose), TSS, Cl^- ,BOD_5 are within allowed limit compared to QCVN 08:2008/BTNMT –Column B1-B2 (use for irrigation purpose); Total Oil & grease, Pd, Cd are not detected. (*Source: Environmental Monitoring Center of Binh Thuan Province, the first period in 2014*) Water quality of Ba Bau reservoir's main canal is not available but through field survey, there has been no sign of pollution by lubricating oil, sediment or rubbish in the canals
Flooding	Flooding often occurs twice a year (mainly flood from September and October). However, the subproject canal is along the mountain slope which has high terrain, so it is not affected by flooding situation.
Terrestrial flora and fauna	*Terrestrial flora*: mainly rice field and fruits, dragon fruit and vegetables gardens in residential areas. Along the canal bank, mainly coconut, bushes …but no valuable and rare trees are identified in this area. *Terrestrial fauna:* - Wild animals live on field, including some reptile kinds (python, snake), small beasts like rats, etc.. - Domestic animals like buffalo, cow, pig, chicken, ducks, etc. Terrestrial flora and fauna in subproject area are not listed in Vietnam's Red Data Book.
Aquatic flora and fauna	Aquatic product include freshwater fish in canal and ponds .; Aquatic flora and fauna in subproject area are not listed in Vietnam's Red Data Book.
Protected areas	There is no protected area in the subproject area.
SOCIAL ECONOMIC CONDITIONS	
UXO	Canal have been constructed based on the existing route, currently, there is no possibility of UXO.
Land use	Land is mainly used for agriculture development; According to Ham Thanh commune's Statistic Book Total land area of Ham Thanh commune : 11,290.5 ha, of which Agricultural land: 4,607.49 ha (occupy 40.08%); Forest land: 4,282.06 ha (occupy 37.9%); Rural residential land: 1,835.24 ha (occupy 16.3%); vacant land: 0 ha (occupy 0 %); other land : 565.71 ha (occupy 5.01%)
Nearest residential land	Upgrading canal goes through residential land of Ham Thanh commune. Nearest distance is about 60 – 80 meters.
Rural infrastructure	Rural infrastructure in the Subproject area included: telecommunication system, market, and medical centre…. Commune roads in subproject area are concreted and connected to Provincial Road 707 and National Highway No1A No existing infrastructure such as electric power poles, communication works, underground pipelines, other public facilities that can be affected

DATA ITEM	SUBPROJECT DATA
	by the canal and by canal construction activities
Agriculture and aquaculture	▪ Agriculture: mainly rice, dragon fruit, sugar cane, watermelon, beans and other vegetable crops. ▪ Aquaculture: fish raising following garden-pond-cage model
Population	Total population of the subproject area in 2013 is 19,662,people of which 7,018 people in Ham Thanh Commune and 12,644 people in Ham Hiep Commune (*Source: Ham Thuan Bac & Ham Thuan Nam District's Statistic Book 2012*)
Ethnic minorities	There are 4 ethnic groups living in the subproject area : Hre, Cham, Tay, Gia Rai, only occupy 1.5 % of total population of the subproject area
Livelihoods	The main employment of the community is agriculture production, mainly dragon fruit & rice. Main incomes of 80 - 90% of the local population are come from agriculture production & dragon fruit . The average income is VND 13 to 15 million dong/person/year for the subproject area
Physical and cultural heritage	No physical and cultural heritages are locating within subproject area
Public health	The Subproject communes having a medical station are 100% and there are 2 commune medical stations in the whole subproject area. In general, the quality of medical examination and treatment, also of medical equipment and material facilities is improved In 2013, water borne illnesses were dominated by Diarrheal , Dengue fever and Dysentery, Sore Eyes, Sore throat

4. ENVIRONMENTAL IMPACT SCREENING

Table 3. Environmental impact screening

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
Pre-Construction Stage Impacts					
Environmentally responsible procurement and SEMP preparation					Environmental requirements in biding documents and civil work contracts will take importance role to fully reflect environmental protection cost of the civil works and engage the environmental responsibilities of civil contractors. Any missing of environmental management cost will create high risks of implementing mitigation measures during the construction phase due to lack of resources and capacity. Thus, environmental protection cost and responsibility need to involved at the beginning. A Site Environmental Management Plan (SEMP) will help the contracts deeply understanding on environmental requirement and preparing detail/specific mitigation action on the site, therefore, the an appropriate SEMP will help to implement actual mitigation measures and identify any unanticipated environmental impacts and propose additional mitigation measures.
Construction materials management plan					Materials Management Plan (MMP) detailing arrangements to be made to facilitate the timely production and supply of construction materials to avoid impacts due to unnecessary stockpiling outside the Project site.
Spoil and Waste Disposal Plan					Waste Management and Spoil Disposal Plan is prepared for storage, treatment, transport and disposal of solid and liquid wastes, hazardous materials, hazardous wastes and excavation spoils. Ensuring disposal of excavation spoils will not cause negative visual impacts. The plan will also provide details of a trip ticket system to ensure that contractors dispose excavation spoils in approved areas. Such system will be designed so that the

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					PPMU and construction supervisors could readily monitor the volume and disposal site of excavation spoils, and to ensure that the total volume of spoils disposed will not exceed the maximum capacity of disposal site (landfill). Domestic waste collection and management also need to set plan during this phase to avoid missing implementation resources and ensure sanitation issues on the site
Disturbance of UXO	No				The canal is upgraded from existing alignment. The subproject is located in rural area, consisting of agricultural cultivation area, existing residential area. Thus, there is no possible of UXO
Impacts on households from loss of residential or agricultural land	No				There is no household requiring relocation in the subproject.
Construction Stage Impacts					
Erosion or sedimentation caused by during clearing or earthworks	Yes	Minor	Negative	Temporary	In the work of excavating and filling the canal embankment, construction of the facilities on the canal (culvert transferring water to branch canal, flood spillway) if excavated soil is not collected then siltation will be occurred, obstruct the water transmission capacity from the main canal to branch canal The excavated soil will be used for upgrading of management/ production/ interior field road along the canal system Contractor is responsible for waste soil management Soil from excavation of canal construction, canal bank fill (water inlet, lateral spillway) not collected causing sedimentation in the canal bed, preventing water flow from main canal into the branches; sedimentation may affect the

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					rice/ dragon fields of the local peoples; Location: along the 12,414 m of main canal; at location of culvert to branch canals, rice/dragon fruit fields closed by the canal; Objects • Rice/ dragon fields closed by the subproject canals • Local peoples in beneficiary area Impact level: Minor due to excavated volume soil is designed to fill embankment and managed/ production road. Impact duration: about 24 months;
Polluted soil due to leakage of oil and other chemical substances.	Yes	Minor	Negative	Temporary	In the process of pumping for dry foundation holes for the canal construction and other works on the canal, oil and grease leakage will generate water pollution. Location: at the subsection of canal under construction along the 12,414 m of main canal to be upgraded Objects • The subproject canal's water quality • Local peoples in the beneficiary project area Impact level: Machine oil and grease pollution on the canal and facilities is insignificant as: (i) construction activities are mainly manual, small number of construction machines (see project description); (ii) construction activities are scattered on a 12,414 m of the length of main canal; thus, the oil and grease leakage is insignificant; Impact duration: about 24 months;

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
Generate a big quantity of dredged soil which can be reused	Yes	Minor	Positive	Temporary	Excavated soil of all types: 77,998 m^3 Filling soil of all types: 37,307 m^3 About 80% of excavated soil of all types: 62,398 m^3 can be reused for re-filling embankment and management road Discarded soil quantity: 15,600 m^3 (20% of excavated soil) Discarded soil will be dumped at hollow areas along Bac Ba Bau main canal in Ham Thanh commune – Ham Thuan Nam District & approved by Ham Thanh CPC and dumped at local peoples gardens far from the Site about 300 - 500m Thus, most of excavated soil, which can be reused and will not impact on environment. Location: along the 12,414 m of main canal to be upgraded Objects: Local peoples in the subproject area Impact duration: about 24 months;
Impacts from temporary storage site for construction materials, including: dust, noise.	Yes	Minor	Negative	Temporary	- Stone, sand will be stored near Ba Bau river where uncultivated land to minimize affecting on living residents; - Steel, cement, bitumen will be stored at commune PCs, other public buildings or in houses. -Transportation of material will generate noise, dust which affect local residents along transportation road (PR 707, NH 1A, inter- commune road..) Total quantity of materials needed for construction is estimated as: Stone: 198.40 m^3 Sand: 227.72 m^3 Macadam: 337.84 m^3 Steel: 482,863.47 kg Location: Temporary material store sites, material transportation roads

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					Objects: • Local residents along transportation roads • Local residents living around temporary material store sites Impact level is minor because (i) the volume of construction works is not high; (ii) there is no residential along the construction routes; Impact duration: estimated 24 months
Other impacts in quarries for construction material on dust, noise, working safety and water or soil pollution by exploitation activities:	Yes	Minor – Moderate	Negative	Temporary	Construction material transportation to the construction site will affect the local roads in the Subproject two communes. Location *Soil*: will be reused from excavated soil. *Sand:* will be exploited in Ba Bau sand grounds in Ba Bau river, 15 km from the project site that has been operated under the permission of local authorities of Ham Thuan Bac district. *Gravel:* will be exploited in Ba Bau area, 10 km from the project site *Macadam:* will be bought at Ham Kien Quarry, about 33 km from the project site *Stone:* will be bought at Ta Zon Quarry, about 46 km from the project site All Gravel, Macadam, Stone have been operated under the permission of local authorities of Ham Thuan Bac district. *Other construction material* (cement, iron, steel) will be provided from services in Phan Thiet City, about 10-15 km from the project site Objects: • PR 707, NH1A, inter-district & inter-commune roads in the Subproject twelve communes

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					• Local peoples around quarries • The subproject workers • Water quality of water bodies near the quarries • Soil quality of borrow areas Impact level: Materials will be bought from sources, which are licensed and confirmed by the environmental regulations. So only impact could be from dust and noise during the transport of materials from quarries to construction sites. Dust and noise will not be seriously affected because (i) loading capacity of vehicles is less than 10 tons, (ii) communal roads are almost structured of concrete with the width of 3.5 – 5.0m for higher bearing-capacity. Impact duration: 24 months
Pollution of river, stream, canal, aquatic environments or underground water from wastes, chemicals or waste water	Yes	Minor	Negative	Temporary	In the process of pumping out water to dry foundation holes for the canal construction and other works on the canal, oil and grease leakage will generate water pollution. Location: along the 12,414 m of length of main canal to be upgraded Objects: • The subproject canal's water quality • Aquatic environments • Groundwater quality around the subproject canals Impact level: Insignificant because: (i) The construction is mainly implemented manually, the number of construction machines is small; (ii) the construction is scatted along the canal, thus the concentration of the uncontrolled waste, oil and grease leaking is not remarkable;

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					Impact duration: 24 months
Making sensitive flora disappeared and deteriorated	No				The construction sites are in existing agricultural lands, mostly rice & dragon fruit plant land
Dust and exhaust emission from construction equipment and machinery	Yes	Minor	Negative	Temporary	Location: along the 12,414 m of length of main canal to be upgraded Objects: • The subproject workers • Local people in the subproject area Impact level: Minor ▪ Construction activities on canal do not cause dust or exhaust, because (i) used only light weight and small machinery, such as Truck 5 tons, Excavator 0.4-0.8 m^3, Compactor 9 tons, Bulldozer 75CV (ii) the quality of machine has been registered, controlled and maintained periodically. ▪ Dust and noise is mainly from transportation process of construction material. (iii) There is no residents area living along construction routes. Impact duration: Estimate 24 months
Noise from construction machine	Yes	Minor	Negative	Temporary	Location: along the 12,414 m of length of main canal to be upgraded Objects: • The subproject workers • Local peoples in the subproject area Impact level: is minor, because (i) Number of vehicles, construction equipment

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					and machinery is not remarkable, therefore, noise level will be under allowed limit level; (ii) There are no resident's areas living along construction routes. Impact duration. Estimate 24 months
Increase flooding time and area	No				Canals will take the function of irrigating water for cultivation areas and take no function of drainage; therefore the drainage of the area will not be affected by construction activities;
Effects on infrastructure works like communication cables and drainage system, etc.	No				Bac Ba Bau main canal will be constructed/upgraded following the existing route and will not affect the infrastructure works; However, some trees and barb wire fence, beton pillar for dragon fruit to be affected by the subproject. In addition canal construction through dragoon fruit areas may have effects on dragoon fruit productivity of farmers living in the Subproject Communes ;
Employment or livelihood benefits from employment of local people	Yes	Significant	Positive	Temporary	Local labours (have professional skills and simple labour) will be employed for construction; their livelihood/living standard will be remarkably improved thanks to extra works Location: project area and adjacent areas in Ham Thanh Commune –Ham Thuan Nam District (Bac Ba Bau main canal & facilities on canal located only in Ham Thanh Commune; Ham Hiep commune is beneficiary area from the subproject) Objects: • Local peoples in the subproject area Impact duration: about 24 months

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
Effects on social aspect due to workers at site	Yes	Minor	Negative	Temporary	Location: At camps and in nearby residential areas in Ham Thanh commune Objects: • Local peoples in the subproject area Impact level The presence of workers from other regions may cause social evil such as gambling, theft, drug, prostitution, etc. or conflict appears between construction workers and local people. However, these impacts are insignificant because workers will be registered with local police to manage labours from other places & strict management of Contractor Impact duration: estimate 24 months;
Risks to public or construction worker health or safety	Yes	Minor	Negative	Temporary	Objects &Main risks: • Construction machines and equipment are arranged along the canal, obstructing the travelling of the residents and endangering the traffic, especially at nights; • There will be the risk of unsafe traffic conditions on the commune road, especially at intersection with residential road. • Dust and noise from material transport will have impacts on daily life of residents living in the subproject area; • There will be the risk of site incidents due to the improper use of equipment and machines; Location: residential areas along the transport road (PR 707, NH1A, inter-commune road…) and near the canal construction area; Impact level: the above risks are insignificant because (i) the contractor will

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					control the arrangement of equipment on site; (ii) travel demand on road along the canal is not high (iii) material transport will be carried out in day time to avoid the rest of residents; (iv) the contractor will conduct training courses on labour safety for workers prior to the subproject commencement; Impacted duration estimate 24 months;
Effects on nearby heritage items such as graves, pagodas etc.	No				There is no cultural heritage, tomb, and pagodas close to construction site;
Effect on nearby stone and sand exploring areas, including: dust, noise, land pollution caused by exploring activities	No				All the materials will be supplied from licensed sources
Risks of natural calamity	Yes	Minor	Negative	Temporary	Location: along the 12,414 m of length of main canal to be upgraded In subproject may be happen flood and storm, most in October and November. Storm and flood often causes flooding Objects: • Local peoples in the subproject area • The subproject canals Impact level Natural calamity will have serious affects on resident life as well as economic growth in the region. However, directly impacts subproject on canals is minor because its position in dragon fruit & paddy field, not directly suffered from

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					river Impact duration: estimate 24 months
Solid waste generated from construction activities or camp	Yes	Minor	Negative	Temporary	Location: Worker Camp and construction site. Domestic wastes including solid waste and wastewater in construction camp could cause water and air pollution along canal Objects: • Air quality in & around worker camps • Water quality of water bodies near by worker camps • Workers living in the camps Impact level is minor as Contractor will collect and manage waste and small scale worker camps Impact duration: estimated 24 months
Affect irrigation water supply system for agriculture production	Yes	Minor	Negative	Temporary	Lining and upgrading of 12,414 m of Bac Ba Bau main canal requires dry construction area, meaning of stop water flow in the existing canal. There will be a conflict between water demand for agriculture and construction demand during dragon fruit & rice cultivation period and construction time; Location: 12,414 m of Bac Ba Bau main canal and downstream dragon & rice cultivation area; Objects: • Rice/ dragon fields irrigated by the subproject canals • Local peoples/farmers using water supply by the project canals Impact level: Irrigation schedule could be changed flexibly to construction time, namely construction time will be dry season: from Jan to May, this time is

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					Spring-winter rice crop but dragon fruit crop. The contractor will build divert canal to transfer water directly to rice field or dragon fruit field by pumping. Therefore this impact could be mitigated and impact level is considered at small level; Impact duration: As per crop water supply schedule and construction time; expected within 10 months
Impacts in operation stage					
Vegetables and trees areas will be flooded due to water filling/ storing and operation of irrigation canal	No				i) Completion of 12,414 m of Bac Ba Bau main canal and auxiliary works in canal will ensure irrigation capacity of 1,100 ha , extending 100 ha of cultivated land in 2 communes : Ham Thanh of Ham Thuan Nam District and Ham Hiep of Ham Thuan Bac District; Supplementing irrigation for Cam Hang Reservoir to extend 250 ha of cultivated land (mostly dragoon fruit land) ii) Regulation Sluices on Bac Ba Bau main canal have adjusting valves to control the water level; Therefore, there will be no risk of flooding situation on cultivation areas.
Excessive exploitation of surface water and groundwater will make water supply capacity cannot catch up with demands and/or cause conflicts among households	No				i) Reasonably exploit water source following approved design assignments (irrigation capacity has not reached the maximum rate as designed capacity (total 1,450 ha); ii) Further increase the water supply capacity to meet demands of water users, especially 100 ha of cultivated land in 2 communes: Ham Thanh & Ham Hiep communes, 250 ha of cultivated land, of which mostly dragoon fruit land in Cam Hang reservoir's irrigation area which has not been supplied with water for a long time from the project site; iii) Accordingly, conflicts among households will be remarkably reduced;

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
Water quality is changed due to salinity intrusion, aluminiferous water or sedimentation	No				i) The area is not affected by seawater or tide, so it is not affected by salinity intrusion or alumiferious; ii) Sediment of the canal bed is dredged and the canal is upgraded by concrete instead of the earth canal, so that the water quality will not be polluted by sediment.
Water is exploited at sensitive ecological places/or reservation areas	No				i)There is no sensitive ecological areas or protection areas in the subproject area; ii) Water source for irrigation is taken from Bac Ba Bau main canal of Ba Bau Reservoir which was built primarily to serve a purpose of agricultural water supply
Changing living conditions and/or public health thanks to improved water supply	Yes	Significant	Positive	Permanent	Location: beneficiary area in Ham Thanh & Ham Hiep Commune Objects: Local peoples in beneficiary area Scope: Living conditions and standard is improved thanks to providing of enough water for intensive cultivation demands in agriculture
Productivity is improved by increase of irrigation capacity	Yes	Significant	Positive	Permanent	Location: beneficiary area Ham Thanh & Ham Hiep Commune Scope: the cultivation area is increase, water supply is initiative; productivity and output are increased; Objects: Local peoples in beneficiary area
Cultivation habits will be	Yes	Significant	Positive	Permanent	Location: beneficiary area in Ham Thanh & Ham Hiep Commune Scope:

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
changed due to the turning of land use for agriculture purposes					agriculture area is increased (mainly dragon fruit & rice need to be irrigated sustainably) thanks to supplying sufficient water, land structure will be changed following extensive cultivation, cultivation productivity increase Objects: Local peoples in beneficiary area
Leaching nutrition from soil or salinity of soils due to excessive irrigation (not following irrigation regimes and specifications);	Yes	Minor	Negative	Permanent	There is not statistics or research in the area regarding the percentage loss of nutrients. Actually, the rate of soil nutrient loss is very small due to the cultivation in the plain with small slope that can not cause drift of soil when it rains or excessive irrigation. After the irrigation canal is complete, the regulating system will be facilitated and more flexible, hence, the land will not lose nutrients due to excessive irrigation; Location: beneficiary area in Ham Thanh & Ham Hiep Commune Objects: • Soil quality of Cultivated land • Local peoples in beneficiary area Impact level: is small due to application of advanced technology in agriculture;
Soil erosion or scouring of streams or canals	No				The canal is reinforced by concrete so that soil erosion and land slide will not occur;
Affecting water quality due to the increased quantity of fertilizer or pesticide or chemical substances or waste water	Yes	Minor	Negative	Permanent	Location: Benefit area: 1,450 ha Impact level: is small due to application of advanced technology in agriculture; Scope After upgrading the irrigation system, the cultivated area will increase about 350 ha. Consequently, the quantity of pesticides or chemical fertilizers will be

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					increased. The amount of pesticides on field surface and drainage system will affect the quality of agricultural land and irrigation water, possibly groundwater. The risk will increase if the management of pesticides is not reasonable. Location: Benefit area: 1,450 ha in Ham Thanh & Ham Hiep Commune Objects: Water quality of the subproject canal & others water bodies around the subproject area Impact level: is small due to famer will be trained & applied IPM method
Congested canals cause flooding situation	Yes	Negative	Minor	Permanent	In case of improperly operation and regulation of the culvert system, water will cause overflows and broke the canal. In addition, waste, weed growing on the branch canal can reduce water transmission capacity of the primary canal; Objects: • The subproject canals • Local peoples in beneficiary area Location: along the 12,414 m of length of main canal, at culvert gates
Risks caused by natural calamity	Yes	Minor	Negative	Permanent	Natural calamity will have serious affects on resident life as well as economic growth in the region. However, directly impacts on canal is minor because its position in dragon fruit paddy field, not directly suffered from river. Location : Houses, Cultivated area & infrastructures in the project area Objects: • Local peoples in the subproject area

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					• The subproject canals
Changing the service approaching ability of local residents thanks to building approaching road for the work	Yes	Significant	Positive	Permanent	540 m (from Km 0+14.70 m ÷Km 554.70 m) of length of management/ production road with 7.0 m of wide in connection with existing traffic road network will increase the approaching ability of local residents to services from markets, areas for commodity and agriculture product exchange, especially for dragon fruit Location: Subproject area Objects: Local peoples in beneficiary area
Affects on employment and livelihood	Yes	Significant	Positive	Permanent	Employment and jobs will be diversified thanks to the increase of project effectiveness; Location: Subproject area Objects: Local peoples in beneficiary area
Impacts on ethnic minorities	No	No	No	No	Ethnic minority groups only occupy 1.5 % of total population of the subproject area and living within beneficiary area; not affected by land acquisition or relocation
Increase solid waste in productive area	Yes	Minor	Negative	Permanent	Agricultural wastes after harvest or waste of production activities such as insecticide cover, dragon fruit & rice straw occurs popular. However, the canals are small and easily to clean by hand Location: Benefit area of 1,450 ha Objects

IMPACT	POTENTIAL IMPACT				BRIEF DESCRIPTION OF IMPACT LOCATION AND SCOPE
	YES / NO?	IS IT MINOR OR SIGNIFICANT?	IS IT POSITIVE OR NEGATIVE?	IS IT TEMPORARY OR PERMANENT?	
					• The subproject canals • Local peoples in beneficiary area
Encroachment land in canal side	No				The main canal sides area is consolidated with concrete and re-enforce concrete. So that encroachment of land in canal side for agriculture activities will not occur Location: along two sides of the subproject canals Objects: • Embankment of the subproject canals • Local peoples in beneficiary area

5. OUTLINE ENVIRONMENTAL MANAGEMENT PLAN (EMP)

5.1 Environmental Mitigation Plan

Table 4. Environmental mitigation plan

POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	COST
Pre-Construction			
Environmentally responsible procurement and SEMP preparation	▪ EMP is included in tender documents to ensure that mitigation measures are budgeted and to prepare the contractors for environmental responsibilities. ▪ Specify in bid document that Contractors shall engage capable and trained staff or site agent(s) to take responsibility for the environmental management and safety issues at the working level and to monitor the effectiveness and review mitigation measures as the sub project proceeds. Contractors recruit qualified staff to oversee implementation of environmental and safety measures specified in the EMP. ▪ Any recent recommendations and initiatives from DONRE or other local environmental authorities will be incorporated in the EMP and updated as necessary. ▪ Before contracting based on the requirements of the IEE, contractors should prepare SEMPs for implementation by contractors. Such SEMPs shall not be in conflict with any provisions of the EMP in the IEE: Waste Management and Spoil, Disposal Plan, Materials Management Plan, Drainage Management Plan, Erosion Control Plan, Tree-cutting and Replanting Plan, Temporary Transport Management Plan, Utilities and Irrigation Re-supplying Plan, Noise and Dust Control Plan, and Workers and Public Safety Plan	Design Consultant, PPMU, Contractor, Environmental Consultant	Included in the contract
Construction materials management planning	As planed in design documents, the main construction material will be taken from existing quarries as: ▪ Filled soil Soil: will be exploited from hills in Ham Tri, which are reserved for construction of local infrastructure. Soil exploitation area is pre-planned by Ham Thuan Bac district and communal authorities. ▪ Gravel: will be exploited in Ba Bau area, ▪ Macadam: will be bought at Ham Kien Quarry, ▪ Stone: will be bought at Ta Zon Quarry in accordance with the Decision No 1713/GP-UBND issued by Ham Thuan Bac DPC dated 03rd July 2007 ▪ All Gravel Macadam, Stone have been operated under the permission of local authorities of Ham Thuan Bac and Ham Thuan Nam district	Design Consultant, PPMU	Included in the contract

POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	COST
	In case that, above material sources will be change, an appropriate material management plan should include the following: ▪ Required materials, potential sources and estimated quantities available; ▪ Material supply manners: preferring to purchase from existing material quarries. ▪ Agreement with the local authorities ▪ Check with environmental permission/certification of the quarries to ensure that environmental impacts and mitigation measures have been considered by owners. ▪ Environmental recovery plan ▪ Material transportation manner plans and schedules		
Plan Spoil and Waste Disposal	▪ Re-use of waste materials & spoil disposal locations included in bid and contract documents. ▪ Select an properly treatment manners, preferred of for fill up the site of other projects activities/purposes ▪ Determine waste materials & spoil disposal locations. The expectation is that construction waste will be stored temporarily along the proposed road, domestic waste will be stored in rubbish bins and then will be collected and treated by the local authority at Ham Thuan Bac landfill and contractors will be responsible for paying the bill ▪ Agreement with the local authorities; ▪ Environmental recovery plan since construction activities completed ▪ Waste materials transportation manner plans and schedules ▪ Establishment of complaints management system for duration of the works.	Design Consultant, PPMU	Included in the contract
Effects on households from loss of residential or agricultural land	No households to be relocated & no land acquisition in this subproject		
Construction stage			
Erosion or sedimentation caused by during clearing or earthworks	▪ Install sediment dyke and/or sediment traps around the temporary excavated material area to collect sediment before it enters waterways. ▪ Construct temporary drainage canal for reducing affects on residential area; ▪ Minimize area of land clearance and duration of works within this area; ▪ Undertake progressive re -vegetation of land clearance areas ▪ Avoid clearing activities during the rainy season where possible	Contractor	Included in the Contract with the Contractor

POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	COST
Polluted soil due to leakage of oil and other chemical substances	▪ Store chemicals (lubricating oil, etc.) in safe area with impermeable containment and weatherproof roof; ▪ Use mobile sanitary toilets following regulations of Health Ministry and washing facilities at construction camps	Contractor	Included in the Contract with the Contractor
Impacts from temporary storage site for construction materials, including: dust, noise.	▪ Provide public information for local people on construction conditions; ▪ Minimize clearance and cut off crop and tree to reduce dust and noise at temporary material store ▪ Ensure that all machines are in good operation condition.	Contractor	Without marginal cost
Other impacts in quarries for construction material on dust, noise, working safety and water or soil pollution by exploitation activities	▪ In soil quarries, Contractor should follow environmental protection issues, including: - Working machines must be under periodically quality controlled; - Oil and other chemical pollutants from working machines should be strictly controlled and stored separately, avoiding leakages; - Workers should use protective equipment while working within the Site; - Fence should be erected surrounding the working area to prevent intrusion by cultivators, local people or animals; - Temporary earth drainage system and ditch should be formed to store waste water safely in rainy season to reduce turbidity before releasing water into cultivated area; - Water should be regularly sprayed within borrow areas to reduce dust generation; ▪ The contractor should select registered service providers with necessary licenses to supply construction materials such as sand and stone;	Contractor	Without marginal cost
Pollution of waterways, aquatic environment or groundwater due to rubbish, chemical substance or polluted soil	▪ Store chemicals (lubricating oil, etc.) in safe area with impermeable containment and weatherproof roof; ▪ Use mobile sanitary toilets following regulations of Health Ministry and washing facilities at construction camps ▪ Do not wash construction vehicles and equipment onsite to avoid pollution by lubricating oil from washing. ▪ Waste water and wasted lubricating oil should be controlled in accordance with relevant regulations on wastewater and hazardous wastes; ▪ Regularly collect and dispose-off the wastes	Contractor	Mentioned in contract with Contractor

POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	COST
Dust and exhaust fume from construction equipment and machinery	▪ Successive construction method should be used by contractor. Therefore impact arising can be reduced by this method will makes the tidy construction, minimize construction time. ▪ Cover all trucks carrying materials to or from the site; ▪ Ensure all construction vehicles and equipment is well-maintained.	Contractor	Included in the Contract with the Contractor
Noise from construction machine	▪ Ensure all construction vehicles and equipment are well maintained; ▪ Limit construction activities which can make noise in day time; ▪ Inform local communities of schedule and duration of construction works; ▪ Receive opinions and feedbacks from the community.	Contractor	Included in the Contract with the Contractor Local budget for community monitoring activities
Effects on social aspect due to workers at site	▪ Consult local authorized staff to prepare house renting plan for workers at the same local area; ▪ Consult local staff to consider the ability of renting house for workers instead of building camps; ▪ In case of camps at site, it is necessary to ensure that camps are maintained in good conditions; ▪ Provide training to workers on the way of communicating with local community, abiding laws and traditional customs and culture in the local area and implement education programs on sanitation/hygienic means and diseases through contact; ▪ Implement communication of prevention of HIV/AIDS and sexually transmitted diseases and dissemination on social evils like drugs, gambling, prostitution, violence, stealing, etc. ▪ Delivery condoms to workers	Contractor PCs at all level, bureau of social evil prevention, Center of HIV/AIDS prevention and Center of Contingency Medical/Committee of HIV/AIDS prevention at commune/ward levels and at other levels/ NGO	Included in the Contract with the Contractor Relevant programs under local budget such as HIV/AIDS and social evils prevention
Risks to public or construction worker health or safety	▪ Provide safety equipment to workers like mufflers, gloves, safety belt and train them in its use. Functional agencies always check and supervise works on labour safety of workers at site and residents within the construction area; ▪ Regularly implement working inspection to ensure working safety in the construction area;	Contractor Construction monitoring consultant Construction management	Included in the Contract with the Contractor

POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	COST
	▪ Secure construction site and restrict access by local community by arranging warning signs and fencing wall; ▪ Inform residents about possible incidents or risks during construction by louder speakers.	and Environmental management contractor	
Risks of natural calamity	▪ Ensure that subproject design will meet all safety standards on prevention of flooding, storms and other potential natural calamity; ▪ Binh Thuan Irrigation Management Company closely coordinate with Disaster Mitigation & Flooding Prevention Committee in the local area to timely find out assistance methods such as: fight with flooding, storm ect.	Designing Consultant, Binh Thuan Irrigation Management Company, Provincial Natural Calamity & Flooding Prevention Committee	Without marginal cost
Solid waste generated from construction activities or camp	▪ Establish temporary latrines which meet regulations of Health Ministry and supply enough water to camp. ▪ Discussing with local people and Government to choose the suitable waste dumping site when workers build camps; ▪ Collect solid wastes and temporary store at a safety place before transporting to disposal sites;	Contractor	Without marginal cost
Affect irrigation water supply system for agriculture production	▪ Construction of main canal should be implemented in dry season with application of construction and irrigation at same time. ▪ The Contractor should coordinate with irrigation authority (irrigation exploitation management enterprise), commune's irrigation staff and cultivation households in water supply area of Bac Ba Bau main canal and primary & secondary canal, which receiving water from this main canal to reach agreement on water supply time (when construction suspension), construction time (should be implemented at the time when irrigation activities are not done); ▪ Commune's irrigation staff, irrigation exploitation enterprise or relevant authorities should early inform households and contractor on water supply schedule so that they can make plan on their own initiative; ▪ PPMU and the Contractor should pay attention to mitigation measures to reduce damages or to implement compensation for arising impacts due to stop of water supply at cultivation area, etc ▪ To implement stop of water supply alternatively, e. g water supply for 10 days, construction for 15 days.	PPMU/ Contractor; Irrigation management enterprises of province, commune authorities and local residents in Ham Thanh commune in Ham Thuan Nam District	Included in the Contract with the Contractor

POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	COST
Operation stage			
Leaching nutritive substances or salinity of soil disappeared due to excessive irrigation	Coordinate with agriculture authority to ensure that farmers are trained on proper irrigation method;	Agricultural extension center of the province	Local budget
Affecting water quality due to the increased quantity of fertilizer or pesticide or chemical substances or waste water	▪ Coordinate with agriculture authority to ensure that farmers are trained on irrigation method; ▪ Solid waste from pesticide, insecticide as well as other substance such as herbicide should be stored in tanks at cultivation area before transport to disposal sites; ▪ Coordinate with Agriculture Extension Centre to ensure that farmers are trained on Integrated Pesticide Management (IPM).	DARD/ Agricultural extension center of the province	Local budget
Congested irrigation canal causes flooding	▪ Ensure that canal is regularly inspected and maintained. ▪ Ensure weed and other floating waste are periodically cleaned along the canal;	Binh Thuan Irrigation Management Company	Local budget
Risks of natural calamity	▪ Ba Bau Reservoir's irrigation system management unit must closely coordinate with Natural Calamity & Flooding Prevention Committee in the local area to timely find out assistance methods.	Binh Thuan Irrigation Management Company; Provincial Natural Calamity & Flooding Prevention Committee	Local budget
Increase solid waste in productive area	▪ Periodically collect waste in canal ; ▪ Establish rubbish collecting system; ▪ Enhance farmers' awareness about managing and collecting rubbish in field and canal through training.	Binh Thuan Irrigation Management Company	Local budget

5.2 Environmental Monitoring Plan

5.2.1 Environmental effects monitoring

1. Environmental effects monitoring is carried out to examine impacts of project in relation to ambient environmental conditions.

Table 5. Environmental effects monitoring plan

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
Construction stage						

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
Minimization of noise generation	Noise level	At nearest residential areas, from Bac Ba Bau main canal; Interchange points between Thon Ba Dan Hoa – Cau Ba Lieu inter-commune Road & upgraded Bac Ba Bau main canal; between PR 707 & upgraded Bac Ba Bau main canal; between transportation road & inter - commune	Observation and community consultation	Weekly or when community's feedback is raised	Construction	See the budget for EMP (annex)
				Once/ 3 months during construction or when community's feedback is raised	Construction Supervision Consultant (CSC)/ hold Environmental Supervision Consultant	Budget of PPMU
				Every 6 months during construction period or when community's feedback is raised	Monitoring consultant on environmental safeguard policies of LIC team	Included in separated contract with CPMU
Minimization of dust generation	Dust concentration	The same locations to Noise Monitoring	Observation and community consultation	Weekly or when community's feedback is raised	contractor	See the budget for EMP (annex)
				Once/ 3 months during construction or when community's feedback is raised	Construction Supervision Consultant (CSC)/ hold Environmental Supervision Consultant	Budget of PPMU
				Every 6 months during construction period or when community's feedback is raised	Monitoring consultant on environmental safeguard policies of LIC team	Included in separated contract with CPMU
Control of surface water	Sedimentation, rubbish, lubricating	At Downstream of upgraded main canal	Visual Observatio;	Once/ 3 months during	Construction Supervision Consultant	See the budget for EMP

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
quality	oil and solid waste	section, near construction site of sluice gates where transferring water to branch canals Total monitoring points: 5 points at 5 regulated sluice gates on main canal (transferring water from main canal to primary canal) 1 point at regulated sluice N2 1 point at regulated sluice N4 1 point at regulated sluice N6 1 point at regulated sluice N8 1 point at regulated sluice N10	Sampling and analysis	construction or when community' s feedback is raised	(CSC)/ hold Environmental Supervision Consultant	(annex)
				Based on requirement of water supply	Local people, Community monitoring committee Local irrigation staff (commune)	Province budget Without marginal cost
				Once every 6 months during construction or in case of at any time or in case of complaints of residents	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Control of irrigation capability	Meet irrigation demands following the agreed irrigation schedule	At 5 points of regulated sluice gates from the main canal to primary canal: N2, N4, N6, N8, N10	Consider dragon fruit /rice harvest time and discuss with local residents within subproject area	Once every 6 months during construction or in case of at any time or in case of complaints of residents	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
				Following regional cropping water demand	Local residents, Community Monitoring Board Irrigation official in local area (commune)	Local budget Without marginal cost
Labor safety and community safety	Number, use of labor equipment; signal system Obey for traffic law of	In construction area on road where carry material along residential areas of Ham	Observation and community consultation	Weekly or when community' s feedback is raised	Local people, Community monitoring committee	Without marginal cost
				Once every 3 months	Construction Supervision	Budget of PPMU

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
	transportation mean of construction material	Thanh commune		during construction or in case of essential time	Consultant (CSC)/ hold Environmental Supervision Consultant	
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Operation stage						
Using irrigation water	Conflicts during water source access as mentioned in report	At 5 points of regulated sluice gates from the main canal to primary canal: N2, N4, N6, N8, N10	Observation and community consultation	Once every 6 months in first 2 years of operation	DARD of province; Binh Dinh Irrigation Management Company; irrigation official of commune, households	Included in operation cost of Binh Dinh Irrigation Management Company
Surface water quality	BOD, DO, pH, TSS, Total colifom; fecal colifom, turbidity	Location: At 5 points of regulated sluice gates from the main canal to primary canal: N2, N4, N6, N8, N10	Observation and community consultation Or sampling methods following Vietnamese standard when receiving feedback from communities	Twice a year in two first years of operation (1 time in rainy season and 1 time in dry season)	DARD, Binh Dinh Irrigation Management Company;	Included in operation cost of Binh Dinh Irrigation Management Company
Waste management	Conditions on environmental sanitation within project area; temporary waste	Throughout subproject area	Observation and community consultation	Once every 6 months in first 2 years of operation	Binh Dinh Irrigation Management Company;	Budget provided following regulations at Decree No.115

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
	storage yard					
Periodical canal maintenance	Level of canal sedimentation and conditions of sluices, equipment and works on the main canal	Along the updated main canal	Field survey, community consultation	Once every 6 months in first 2 years of operation	DARD/ Binh Dinh Irrigation Management Company;	Local budget
Re-occupation of canal corridor	Occupation area, type of occupation (for planting trees or other purposes)	Along the upgraded main canals	Field survey, community consultation	Once every 6 months in first 2 years of operation	DARD/ Binh Dinh Irrigation Management Company;	Local budget

5.2.2 Environmental Compliance Monitoring

2. Environmental compliance monitoring is carried out to test compliance with operating procedures, technical standards and/or contractor specifications in the EMP.

Table 6. Environmental Compliance Monitoring

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
Construction Stage						
Control of soil erosion and sedimentation	Ensure that soil erosion and sedimentation will not occur in construction site	Throughout the construction site	Observation and community consultation	Weekly and after heavy rain events	Construction Management-and-Environmental Management Consultant Local Community Monitoring Boards	Without marginal cost Local budget
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Storage of materials	Condition of materials storage areas	Throughout the construction site	Observation and community consultation	Weekly	Construction Management-and-Environmental Management Consultant Local Community Monitoring Boards	Without marginal cost Local budget
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
Construction equipment and vehicles	Noise and exhaust generation; covering of trucks; oil/fuel leakage	Throughout construction site	Observation and community consultation	Weekly	Construction Management-and-Environmental Management Consultant Local Community Monitoring Boards	Without marginal cost Local budget
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Construction camp conditions	Cleaning waste treatment; general conditions	At all camps	Observation and community consultation	Weekly	Construction Management-and-Environmental Management Consultant	Without marginal cost
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Property access	Rehabilitate the possibility of temporary and fixed access	Affected assets: roads in commune and affected assets during construction	Observation and community consultation	Once during construction works and once after finishing construction	Construction Management-and-Environmental Management Consultant Local Community Monitoring Boards	Included in the Contract Local budget
				Once every 6 months during construction or in case of	Monitoring consultant on environmental safeguard	Included in separated contract with

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
				at any time if necessary	policies/LIC	CPMU
Waste treatment	Environmental sanitation at construction site and temporary waste storage area	Throughout construction site	Observation and community consultation	Weekly	Construction Management-and-Environmental Management Consultant Local Community Monitoring Boards	Without marginal cost Local budget
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Areas of standing water	Pond or standing water	Throughout construction site	Observation and community consultation	Weekly during rainy season	Construction Management-and-Environmental Management Consultant Local Community Monitoring Boards	Without marginal cost Local budget
				Once every 6 months during construction or in case of at any time if necessary	Monitoring consultant on environmental safeguard policies/LIC	Included in separated contract with CPMU
Operation stage						
Using irrigation water	Using matter	Households near canals	Observation and community consultation	Once every 6 months in first 5 years of operation	PPMU/Binh Dinh Irrigation Management Company;	Budget provided following regulations at Decree No.115

Mitigation Measure	Parameters	Location	Methods	Frequency	Responsibility	Cost
Soil erosion or land slide in canal	Conditions of canal; level of sludge in water	At sections which have not be rehabilitated	Observation	Once every 6 months in first 2 years of operation	PPMU/Binh Dinh Irrigation Management Company;	Budget provided following regulations at Decree No.115
Prevention of soil erosion and land slide in canal	Conditions of canal bank	At some representative locations in subproject area	Observation and community consultation	Once every 6 months in first 5 years of operation	PPMU/Binh Dinh Irrigation Management Company; ;	Budget provided following regulations at Decree No.115
Waste management	Conditions on environmental sanitation within project area; temporary waste storage yard	Throughout subproject area	Observation and community consultation	Once every 6 months in first 5 years of operation	PPMU/Binh Dinh Irrigation Management Company;	Budget provided following regulations at Decree No.115

5.3 EMP Implementation Arrangements

Table 7. EMP Implementation

Organization	Roles and Responsibilities		
	Subproject Preparation	**Subproject Implementation**	**Subproject Operation**
CPMU	Provide advice to PPMU Safeguards Officer on IEE/CEP and IEE/EIAR preparation Review and provide "no-objection" on IEE/CEPs or IEE/EIARs submitted by PPMUs	Provide advice to PPMU Safeguards Officer on EMP implementation during construction Monitor progress during construction Consolidate PPMU environmental reporting	Provide advice to PPMU Safeguards Officer on EMP implementation during first year of operation Monitor progress during first year of operation Consolidate PPMU environmental reporting
PPC	Sign-off on environmental assessment documents prior to submission for approval Approval of any subprojects requiring EIAR that are not subject to MONRE approval	Project owner with ultimate responsibility for environmental performance of subproject during construction	Project owner with responsibility for operation stage environmental performance including implementation of EMP during operation

Organization	Roles and Responsibilities		
	Subproject Preparation	**Subproject Implementation**	**Subproject Operation**
DONRE	Provide advice and guidance on environmental issues as required during subproject preparation	Monitoring implementation of EMP through their own internal monitoring system	Monitoring implementation of EMP through their own internal monitoring system
PPMU	Engage consultant and have overall responsibility for IEE/CEP or IEE/EIAR preparation and submission for approval Ensure staff are adequately trained in environmental issues	Responsibility for EMP implementation during pre-construction and construction Ensure that contract specifications and bid documents include environmental requirements Undertake inspections and monitoring of environmental issues during construction Coordinate environmental monitoring reporting to CPMU	Responsibility for EMP implementation during first year of operation Undertake inspections and monitoring of environmental issues during first year of operation Assist project owners to incorporate environmental requirements into infrastructure O&M procedures
District PCs	Approval of subproject CEPs in accordance with GOV legislative requirements	Monitoring implementation of EMP through their own internal monitoring system	Monitoring implementation of EMP through their own internal monitoring system
Environmental Monitoring Consultant under LIC team	n/a	Implement independent environmental monitoring at subproject area twice every 1 month. Monitoring results will be included in the report which will be sent to CPMU once a month.	n/a
District Subproject Support Teams (SST)	Assist in IEE/CEP preparation as required Assist PPMU to review bidding documents, contract documents, and tenders to ensure environmental issues are adequately addressed	Day to day supervision of contractors' in district including compliance with environmental management requirements Undertake environmental monitoring and coordination of local community environmental monitoring activities	Undertake environmental monitoring and coordination of local community environmental monitoring activities for first year of operation
Commune Supervision Boards (CSBs) and	Involvement in consultation and participation activities to identify and develop subprojects	Involvement in environmental monitoring activities under the direction of SSTs	Involvement in environmental monitoring activities under the direction of SSTs

Organization	Roles and Responsibilities		
	Subproject Preparation	**Subproject Implementation**	**Subproject Operation**
local community members[4]	Ability to comment on environmental assessment documentation upon disclosure		
Construction contractor	n/a	Prepare detailed Site EMP to meet the Subproject EMP general requirements Allocate adequate resources to meet the requirements and obligations of Site EMP	n/a

[4] CSBs have been established under Decree 80 Regulation for Participatory Investment Supervision. Article 8 of Decree 80 provides the community with opportunities to inspect compliance, monitor implementation and evaluate the results of investments in the commune, including environmental impacts.

5.4 Monitoring and Reporting System

Table 8. Monitoring and Reporting System

Project Phase	Type of Report	Frequency	Responsibility	Submitted To Whom
Construction	**EMP of subproject**	Once/ (first month since construction beginning)	Construction contractor	PPMU/CPMU
	EMP implementation report of subproject according to report sample approved by ADB	Quarterly	CSC (to hold Environmental Supervision Consultant)	CPMU
	EMP implementation report of province (syntheses of construction package) according to report sample approved by ADB	Quarterly	PPMU	CPMU
	EMP Compliance Report indicating compliance with subproject EMP and monitoring results	Once/ 6 month	CPMU/LIC	ADB/AFD/DONRE
	EMP completion report of each package/ subproject according to report sample approved by ADB	At completion of subproject	CSC (to hold Environmental Supervision Consultant)	CPMU
	Subproject completion Environmental Report indicating overall subproject environmental performance and EMP compliance	At completion of subproject	PPMU	CPMU

Project Phase	Type of Report	Frequency	Responsibility	Submitted To Whom
	Project completion Environmental Report indicating overall subproject environmental performance and EMP compliance	At completion of The whole Subproject	CPMU/LIC	ADB/AFD/DONRE
Operation	**EMP Compliance Report: Operation** indicating compliance with subproject EMP commitments during operation	6 monthly for first two years of operation. Ongoing frequency to be determined based on review after 2 years.	Project owner/ Binh Dinh irrigation works exploring company	ADB, DONRE, MONRE

5.5 EMP Budget

Table 9. EMP Budget

Item	Marginal Costs for Pre-Construction	Marginal Costs for Construction	Marginal Costs for Operation	Marginal Costs Sub-Total
Mitigation				
Compensation and land clearance	In a separated item on project compensation and resettlement	No	No	Included in other items
Monitoring				
PPMU's Internal monitoring	Included in management cost of PPMU	Included in the Contract with Contractor and CMC as well as in PPMU's management cost	Local and provincial budget	Included in contracts or other operation capital sources
Community monitoring	Not available (n/a)	Local budget (as in Decision No.80/2005/QĐ-TTg)	Local budget (as in Decision 80/2005/QD-TTg)	Local budget
Independent monitoring consultant on environmental safeguard policies	n/a	Included in a separate contract with CPMU	n/a	
Training on capacity	n/a		Local budget	n/a

Item	Marginal Costs for Pre-Construction	Marginal Costs for Construction	Marginal Costs for Operation	Marginal Costs Sub-Total
enhancement on environmental monitoring capability				
Public disclosure	Defined in consultancy contract on IEE		n/a	Public disclosure
TOTAL *(intensify the capability and public disclosure)*				

6. PUBLIC CONSULTATION AND DISCLOSURE ACTIVITIES

6.1 Description of Activities to Date

Table 10. Public consultation and public disclosure activities

CONSULTATION METHOD	DETAILS OF ACTIVITIES	
Correspondence and meetings with local authorities (District and Commune PCs, Commune Fatherland Front, Women's Union, Youth Union and others)	Date of correspondence	07 /07/ 2014
	Dates of meetings (if requested)	6/08/2014
	Minutes of meeting attached (Yes / No)	Yes
Public meetings	Date(s) held	6 /08/2014
	Location(s) held	PC's meeting hall of Ham Thanh Commune of Ham Thuan Nam District
	Invitees	Commune PCs, stakeholders, village heads, Young Communist League, Fatherland front, Farmer Association, Women Union of the communes.
	Methods of invitation	Letter, coordinate with Women Union to mobilize women's participation in meetings
	Agenda attached (Yes / No)	Yes
	Minutes of meeting attached (Yes / No)	Yes
	Number of participants	Total have 41 people Man: 31 people Women: 10 people (the list of participants will be closed in the minutes of consultation)

6.2 Outcomes of Public Consultation to Date

Table 11. Results of public consultation

Description of Issue Raised	By Whom?	Reference in IEE/CEP	Required Follow-up Actions?
Subproject design	District Agriculture Office, and local residents of Ham Thuan Commune, Ham Thuan Nam District	▪ The canal will follow the current alignment to mitigate land acquisition and other environmental impacts.The problem that people concerns are number and wide of the canal bridges must ensure to serve the local peoples' construction process cow, buffalo and people's passage and construction material carrying ▪ According to selected option for concretion of main canal only two side will be concreted. However, local peoples expected main canal bottom also should be concreted as main canal two sides to avoid water leakage and erosion of canal bottom	Ensure number and wide of the canal bridges will be designed in compliance with Technical Standards According to FS, option for concretion of two sides of main canal is selected & considered carefully and the subproject cost is limited, not enough to concretion both main canal's two sides and bottom
Dust or exhaust generated from construction machines	Fatherland Front & local peoples of Ham Thanh Commune, Ham Thuan Nam District	The mitigation measures prescribed in Section V	Apply mitigation measure
Traffic disturb when transporting material and constructing the production/management road,	Local people of Ham Thanh Commune, Ham Thuan Nam District	The mitigation measures prescribed in Section V	Apply mitigation measure
Affect water supply and agriculture production	Farmer union, Local peoples of Ham Thanh Commune, Ham Thuan Nam District	The mitigation measures prescribed in Section V	Contractor is requested to make sure of providing water supply demand of primary canals during construction by taking advantage of reasonable periods for water supply

Description of Issue Raised	By Whom?	Reference in IEE/CEP	Required Follow-up Actions?
			for dragon fruit and paddy and water cease for construction; Contractor; irrigation staffs (primary canals) and households having cultivated area in the project area should coordinate in harmony in order to ensure of information disclosure, construction schedule and water supply plan;
Recommendations to facilitate the employment for people in the construction period	People living in Ham Thanh Commune, Ham Thuan Nam District	The mitigation measures prescribed in Section V	Apply mitigation measure

6.3 Future Public Consultation Activities

Table 12. Proposed community consultation activities

Activity	Participants	Expected Outcomes	Schedule	Cost Estimate
Kick-off meeting prior to construction commencement	PPMU, the Contractor, CMC, community representatives at project area	Publicize construction contents, schedule and plan for water supply	1 week prior to construction commencement	Be estimated in EMP budget
Periodical meetings	Contractor, CMC and representatives of local authority, organizations and community at project area	Periodically check mitigation activities and arising problems Propose treatment alternatives and reach agreement on implementation	Once every month from construction commencement	Included in contract signed with parties

7. CONCLUSION AND RECOMMENDATIONS

a. Lining main canals of Ba Bau reservoir irrigation system subproject, , part of the IDRSPCP – Additional Financing Project will be implemented by Binh Thuan Province PPMU

b. Project environmental assessment implemented and main potential environmental impacts of subproject in construction stage

(i) Erosion or sedimentation caused by during clearing or earthworks

(ii) Dust and exhaust emission from construction equipment and machinery, material transport and material mixing. Pollution mainly occurred along transport route and at the construction site; it is necessary to have mitigation measures for negative impacts;

(iii) Noise pollution due to construction, motorbikes and material transport means;

(iv) Solid waste and liquid waste pollution from excavation, material mixing, residue of gasoline and lubricating oil from camps;

(v) Conflicts between agriculture (rice and dragon fruit) water supply for irrigation area and water supply stop

(vi) Traffic disturb when transporting material and constructing the management /production road/canal embankment

c. Main potential environmental impacts in operation stage

(i) Agriculture wastes (residue of vegetables, pesticide cover, straw of cultivation area) from the boundaries of the upgraded main canal have been focus at the canal bed, obstructing and polluting the flow;

(ii) Affecting water quality due to the increased quantity of fertilizer or pesticide or chemical substances or waste water

(iii) Risks of natural calamity due to Storm & flood occur during rainy season

d. Mitigation measures and construction monitoring for subproject, including the following main activities

(i) Reduce soil erosion, sediment, land slide due to excavation, it is necessary to restore the vegetation covers, implement site clearance like planting grass, trees for shadow,

(ii) Minimize soil/water pollution, exhaust pollution, rubbish, and chemical substances during construction by methods like using equipment and vehicles in good conditions; erecting tents and latrines for workers in conformity with standard; implement cleaning and dredging at polluted areas, excavate to create holes for burying rubbish. If necessary, communities at downstream should be informed about water quality changes,

(iii) Dust, smoke and noise from construction equipment and vehicles: reduce the time and construction area/ transport vehicles, construction materials must be covered by canvas; limit the noise from construction equipment at rush hours, at nights/labour safety devices for workers,

(iv) During exploitation process, management authority should disseminate and consult the local authority/water users to limit the excessive use of water; establish regulated procedures and detailed water supply plan; update information year by year to inform users, implement dissemination and training on scientific irrigation to the community for understanding and implementation,

(v) The Contractors do not transport materials at rush hours (6 am to 7 am; 11 am - 12 pm; 5 pm- 6pm) and to be supposed to slow down speed when transporting materials in the residential area and to plan construction signposts and speed limit signs

(vi) Avoid deteriorating soil/water quality by fertilizer and pesticide through coordination and involving in agricultural extension programs, water management with community participation etc.

Monitoring measures

(i) Contractor shall have methods and commitment on implementation of mitigation measures in aspects of both implementation location/mitigation measures/and frequency of implementation. Concurrently, the Contractor shall prepare detailed plan on environmental monitoring and mobilize enough manpower to meet general requirements and compulsory regulations on EMP.

(ii) During operation stage, Project Owner (Irrigation Management Unit of work operation) should implement periodical management on water quality following current standards of Vietnam.

(iii) PPMU should ensure that subproject design will meet all safety standards on prevention of flooding, storms and other potential natural calamity

(iv) PPMU Coordinate with Agriculture Extension Centre to ensure that farmers are trained on Integrated Pesticide Management (IPM).

5. Conclusion and recommendations

a) Investment and construction of Consolidation of 12,414 m length of the main canals of Ba Bau reservoir 's irrigation canal system is to promote the irrigation effectiveness of Ba Bau Reservoir, improve living standard and eliminate poverty for 2 subproject communes : Ham Thanh commune in Ham Thuan Nam District and Ham Hiep in Ham Thuan Bac District in beneficiary areas with population of 19,662 peoples and reducing natural calamity is an essential and urgent matter which helps bring significant economic effect and contribute to state-oriented agricultural and rural development.

b) The results of environmental study presents that negative impacts during project implementation could minimize through environmental management measures including monitoring programs. Negative impacts related to project is mainly from construction process and these impacts to be temporary and locally

c) Based on IEE, Consultants in F/S stage, PPMU would like to request functional Authority to give approval of IEE for Consolidation of 12,414 m length of the main canal of Ba Bau reservoir's irrigation canal system to create basis for next implementation steps, ensuring the implementation progress, effectiveness and benefits of the project./.

IEE/ CEP prepared by			
Signature:		***Signature:***	
Date:		***Date:***	

8. ANNEXES

- Current status of irrigation system and ambient environment
- Public consultation activities
- Data sources
- Environmental Monitoring Form

Annex 1: Current status of irrigation system and ambient environment & proposed environmental monitoring locations

Photo 1: Ba Bau Dam & Reservoir

Photo 2 Status of North Ba Bau main canal to be upgraded

Photo 3: Interchange points of Thon Ba Dan Hoa – Cau Ba Lieu inter-commune Road & upgraded Bac Ba Bau main canal - Air quality monitoring & water quality & Public Safety monitoring point

Photo 4: Intersection point of Province Road No 707 & upgraded Bac Ba Bau main canal; Air quality monitoring & water quality & Public Safety monitoring point

Annex 2. Public consultation activities

Public consultation contents

1. Participants: Safeguard policies consultants, local leaders (communal and district levels), affected households and other local people living near project area;

2. Objectives: Project disclosure and public consultation on potential environmental impacts and proper mitigation measures during project's implementation;

3. Meeting content

3.1. Safeguard policies consultants introduced on basic information on project, construction items and their parameters;

3.2. Main environmental impacts and their mitigation measures were defined as by safeguard policies consultants, including:

+ Environmental impacts, social impacts before construction, consist of popular impacts such as land occupy, plants and tree removal, UXO area determination and their mitigation measures;

+ Environmental impacts during construction implementation such as dust, noise, safety for transportation as well as safety for local people on traffic roads, other impacts on agricultural activities; water, soil pollution, etc. and their mitigation measures;

3.3. Collecting contribution from local people on other potential environmental impacts before construction implementation, during construction stage and on operation, maintenance stages;

3.4. Safeguard policies consultants introduced in general on Environmental System Management in Viet Nam that to be applied in this subproject such as responsibilities of DONRE, DARD, DPC, CPC, Construction Management Consultants, Contractors and especially local Community Environmental Management Board;

The details will be described in meeting minutes as written following. People's contribution on environmental impacts and mitigation measures were presented in detail at "Table 11. Public consultation results".

Meeting minutes at public consultation and lists of attendance in the public consultation meeting at Ham Thanh

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập – Tự do – Hạnh phúc

Hàm Thạnh, ngày 6 tháng 8 năm 2014

DỰ ÁN PHÁT TRIỂN NÔNG THÔN TỔNG HỢP

CÁC TỈNH MIỀN TRUNG - KHOẢN VAY BỔ SUNG

BIÊN BẢN HỌP THAM VẤN CỘNG ĐỒNG

Về các chính sách an toàn: Môi trường, Tái định cư, Giới và Dân tộc thiểu số

Tên tiểu dự án: Nâng cấp, hiện đại hoá hệ thống kênh Bắc Ba Bàu

Xã Hàm Thạnh, huyện Hàm Thuận Nam tỉnh Bình Thuận

I. Thành phần tham dự:

- Ông/Bà Đỗ Thị Nhàn, Chức vụ Chuyên gia Môi trường
- Ông/Bà Đoàn Văn Định Chức vụ Chuyên gia Tái định cư
- Ông/Bà Lê Thị Mộng Phương Chức vụ Chuyên gia Giới
- Ông/Bà Nguyễn Hồng Thường Chức vụ CBQL Ban QLDA tỉnh
- Ông/Bà Ng Thị Minh Huyền Chức vụ PCT UBND xã
- Ông/Bà Ng Phan Khoa, Chức vụ PCT Hội phụ nữ
- Ông/Bà....., Chức vụ.....

- Đại diện những hộ bị ảnh hưởng ..... người, trong đó .....nữ, chiếm....(%) , Dân tộc thiểu số.....người, chiếm....%

II. Nội dung

2.1 Các nội dung phổ biến:

- Cung cấp các thông tin về dự án như địa điểm, quy mô, các thông số kỹ thuật cơ bản ....

- Chính sách an toàn của dự án bao gồm: Chính sách về giới và sự tham gia của cộng đồng; Kế hoạch hành động giới; Chính sách môi trường, Chính sách Tái đinh cư và kế hoạch phát triển người dân tộc thiểu số.

2.2 Tham vấn cộng đồng:

- Tham vấn các vấn đề giám sát và tham gia của cộng đồng trong các giai đoạn chuẩn bị, thực hiện, vận hành tiểu dự án, các vấn đề về giới và lồng ghép giới, nhóm dễ tổn thương, hộ bị ảnh hưởng nặng...

- Tham vấn các vấn đề về môi trường, tác động môi trường tiềm năng của dự án bao gồm tác động lên môi trường tự nhiên và xã hội của khu vực dự án và những biện pháp giảm thiểu các tác động tiêu cực;

- Tham vấn các vấn đề về tái định cư, các tác động dự kiến, quyền lợi của người bị ảnh hưởng, các biện pháp giảm thiểu tối đa nhằm có ít tác động nhất đến người bị ảnh hưởng.

- Tham vấn nhu cầu đào tạo của các hộ bị ảnh hưởng.

III. Ý kiến thảo luận

III.1.Các vấn đề về giới, tham gia cộng đồng

Phụ nữ chưa được tham gia vào quản lý và điều hành các công trình thủy lợi. Phụ nữ đảm nhận gánh vác công việc gia đình. Công việc sản xuất nam và nữ có vai trò như nhau, phụ nữ đảm nhận việc buôn bán tạp hóa và thanh long.

Người dân sử dụng nước giếng đào, giếng khoan cho sinh hoạt vì thế phụ nữ bị bệnh phụ khoa, bệnh ngoài da.

Vấn đề: Một số điểm kết cấu tại cống đưa nước bị hư hỏng, xuống cấp vì thế cả nam và nữ phải mất thời gian lấy nước.

– Cả nam và nữ đều mong muốn dự án được thực hiện đúng tiến độ. Trong quá trình thực hiện đảm bảo sao cho không ảnh hưởng đến việc cung cấp nước cho sản xuất.

III. 2. Các vấn đề về môi trường

– Cần thông báo thời gian thi công và kết hợp với công ty quản lý khai thác công trình thủy lợi Ba Bàu đảm bảo cấp nước cho sản xuất nông nghiệp nói chung và cây thanh long nói riêng.

– Cần triển khai các biện pháp giảm thiểu bụi và tiếng ồn đặc biệt đối với khu dân cư.

– Nhà thầu cần có biện pháp để tránh ách tắc giao thông, tránh ảnh hưởng đến vận chuyển thanh long.

– Nhà thầu không được đổ vật liệu thải xuống các sông, kênh, mương và các khu vực trồng thanh long.

III.3. Các vấn đề về tái định cư và dân tộc thiểu số

Các bên tham gia thống nhất chủ trương thực hiện dự án.

Khi dự án triển khai, dự kiến chỉ ảnh hưởng tạm thời đến một phần diện tích đất nông nghiệp, phục vụ cho việc tập kết vật liệu, đường lán trại xây dựng.

Đại diện lãnh đạo xã và người dân yêu cầu các bên liên quan cần thực hiện đúng theo những quy định liên quan.

Các hộ dân đều nhận thức được rằng việc triển khai dự án mang lại nhiều lợi ích cho các hộ dân.

Tại xã Hàm Thạnh, không có hộ BAH là người dân tộc thiểu số.

IV. Kết luận

100% những người tham gia đều nhất trí thực hiện dự án.

Các vấn đề mà người dân quan tâm là nguy cơ gây ra ô nhiễm môi trường do xe vận tải vật liệu, cũng như tiếng ồn. Đồng thời người dân mong muốn được nhà thầu tạo điều kiện để làm việc tạo thu nhập cho cả nam và nữ.

Ban giám sát cộng đồng sẽ được tập huấn và tham gia giám sát về môi trường và chất lượng công trình.

Người dân mong muốn được tham gia vào thiết kế chi tiết để đảm bảo công trình phù hợp với hoàn cảnh địa phương. Đồng thời trong quá trình thi công phải thảo luận với dân để có được lịch thi công phù hợp không làm ảnh hưởng đến việc cấp nước sản xuất cho các hộ.

Cuộc họp các bên thống nhất và kết thúc vào lúc .....ngày.....tháng.....năm 2014

Đại diện cộng đồng

Đại diện UBND xã

KT. Chủ Tịch
Phó Chủ Tịch

Nguyễn Thị Minh Truyền

Đại diện Ban QLDA tỉnh

Đại diện tư vấn

Lê Thị Mộng Phương

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập – Tự do – Hạnh phúc

Hàm Thạnh, ngày 6 tháng 8 năm 2014

DỰ ÁN PHÁT TRIỂN NÔNG THÔN TỔNG HỢP CÁC TỈNH MIỀN TRUNG – KHOẢN VAY BỔ SUNG

DANH SÁCH ĐẠI BIỂU THAM DỰ CUỘC HỌP

(Tham vấn cộng đồng về chính sách an toàn: Môi trường, Tái định cư, Giới và Dân tộc thiểu số

Tên tiểu dự án: Nâng cấp, kiên cố hoá kênh Bắc Ba Bàu

Xã Hàm Thạnh, huyện Hàm Thuận Nam tỉnh Bình Thuận

STT	Họ và tên	Giới tính	Địa chỉ	Ký tên	Ghi chú
01	Lê Hữu Trọng	Nam	Dân Thuận		
02	Nguyễn Ngọc Anh	x	Dân Hòa		
03	Nguyễn Văn Sỹ	x	Dân Hòa		
04	Lê Văn Tâm	x	Dân Cường		
05	Cao Văn Hải	x	Dân Cường		
06	Nguyễn Đình Dũng	x	Dân Hòa		
07	Hoàng Thanh Tuấn	x	Ba Bàu		
08	Ng Duy Mạnh	x	Ba Bàu		
09	Phạm Xuân Dũng	x	Dân Thuận		
10	Lê Ngọc Sơn	x	Dân Thuận		
11	Huỳnh Văn Hiệp	x	Dân Thuận		
12	Phạm Ngọc Huyền	x	Dân Cường		
13	Lê Hữu Giới	x	Dân Cường		
14	Nguyễn Thanh Hải	x	Dân Cường		
15	Hà Quang Trần Tâm	x	Dân Cường		
16	Ng Minh Tân	x	Dân Cường		
17	Đinh Thanh Đinh	x	Dân Hòa		

STT	Họ và tên	Giới tính	Địa chỉ	Ký tên	Ghi chú
18	Bùi Ngọc Hùng	x	Ba Bàu		
19	Đinh Ngọc Lời	x	Dân Cường		
20	Võ Tấn Lực	x	Dân Cường		
21	Võ Thanh Long	x	Dân Cường		
22	Ng Văn Tú	x	Dân Cường		
23	Hà Ngọc Dũng	x	Dân Hòa		
24	Lê Thanh Hồng	x	Dân Hòa		
25	Ng Trọng Ninh	x	Dân Hòa		
26	Phạm Văn Được	x	Dân Hòa		
27	Ng Văn Đông	x	Dân Cường		
28	Dương Quốc Trung	x	Ba Bàu		
29	Đinh Tấn Em	x	Dân Cường		
30	Đinh Ngọc Đức	x	Dân Cường		
31	Phạm Thanh Hải	x	Dân Cường Thuận		
31	Trần Thị Thường	Nữ	Dân Cường		
32	Trần Thị Minh Hiếu	x	Ba Bàu		
33	Phạm Thị Ngọc	x	Ba Bàu		
34	Phạm Thị Dung	x	Dân Thuận		
35	Hoàng Thị Thúy	x	Dân Hòa		
36	Nguyễn Thị Em	x	Dân Thuận		
37	Nguyễn Thị Hồng	x	Dân Thuận		
38	Đặng Thị Trọng	x	Ba Bàu		
39	Ng Thị Sáu	x	Ba Bàu		
40	Nguyễn Thị Anh Hoa	x	Dân Cường		
41	Đinh Thị Loan	x	Dân Cường		

STT	Họ và tên	Giới tính	Địa chỉ	Ký tên	Ghi chú

Đại diện cộng đồng

Đại diện UBND xã

KT. Chủ Tịch
Phó Chủ Tịch

Nguyễn Thị Minh Truyền

Đại diện Ban QLDA tỉnh

Đại diện tư vấn

Photos of public consultation meetings

Photo 5: Public Consultation in Ham Thanh Commune, 6 Aug 2014

Photo 6: Public Consultation in Ham Thanh Commune, 6 Aug 2014

Annex 3. Data source

1- *SIR - Lining Northern Ba Bau main canals of Ba Bau Reservoir irrigation system subproject, Binh Thuan province*

2- *Annual statistic data, Ham Thuan Nam & Ham Thuan Bac District; 2013;*

3- *Environmental Monitoring Data for Air quality, water quality in Binh Thuan Province 2013, Binh Thuan Province's Center of Observation and Environmental Analysis, Data collection from beneficiary communities in 2013.*

Annex 4: Environmental monitoring forms

Environmental Compliance Monitoring Form for Construction Package

Part A: General Project Information

Subproject Name:_____

SIR Code:_____ Subproject Package #:_____ Activity Sector:_____

Province:_____ Districts: _____

Design and Supervision Consultant Firm:_____

Construction Company Name:_____ Contract Date: _____

Contract Amount:_____ Contract Duration (days)_____

Person Responsible: _____ Phone _____

PPMU EMO:_____ Phone _____

Part B: Monitoring checklist

Performance Indicator 1. Design and Preparations

The PPMU to complete 1-4 in conjunction with the subproject design consultant at the time the project is tendered. Date of Monitoring:_____

	Yes	No	Remarks
1. Have all UXO been cleared prior to commencement of construction?			
2. Does the subproject design meet applicable engineering safety and public health standards?			
3. Have the resettlement provisions been disclosed to the affected communities and compensation made to affected persons or households?			
4. For the applicable subproject type:			
a. Roads, embankments, irrigation works and coastal protection: does the design provide cross drainage to prevent flooding?			
b. Markets: does the design provide washing facilities and toilets in the market area?			

The construction Supervision consultant (CSC) to complete 5-10 with the PPMU and construction contractor at the time of start-up. Date of Monitoring:_____

5. Has the contractor prepared a Site EMP?			
6. Has the contractor posted a public notice regarding the nature, extent and cost of the project?			
7. Are locations for mixing plants sufficiently distant from houses, schools and hospitals?			
8. Are agreements in place with owners for temporary use of land for worker camps and construction yards?			
9. Have spoil disposal sites been selected in consultation with local authorities?			
10. Are official permits on record for quarry sites and borrow pits?			
Score (1-10; 10 total)			(%)

Performance Indicator 2. Worker Provisions

The CSC to complete 11-16 in conjunction with the PPMU and construction contractor following commencement of construction. Date of Monitoring:_____

	Yes	No	Remarks
11. Were local authorities consulted in the planning for the location of construction worker housing?			
12. Are supervisors or other site personnel trained in basic first aid emergency response measures?			
13. Are first aid kits readily available to workers at the job site along with instructions for use?			
14. Has the contractor or Inspector from the Department of Health undertaken an awareness program for communicable diseases/HIV-AIDS?			
15. Has the contractor provided safety equipment (hard hats, ear plugs, dust masks, safety boots and glasses) to workers and training in use?			
16. Are construction camps equipped with adequate water supply, sanitary toilets, washing facilities and facilities for waste collection and storage?			
Score (11-16; 6 total)			(%)

Performance Indicator 3. Biodiversity

The CSC should complete 17-21 in conjunction with the PPMU and construction contractor following commencement of construction. Date of Monitoring:_____

	Yes	No	Remarks
17. Does the project avoid encroaching on natural forests or wetlands?			
18. Does the project avoid adverse effects on flow of natural streams and water quality?			
19. Are worker camps located outside of forested areas and has the contractor restricted access of workers to forests, fishing and hunting?			
20. Does the contractor obtain fill materials only from pre-existing quarries, or from borrow pits within the strict limits of the construction zone?			
21. For irrigation sector projects, are effects on agricultural biodiversity limited through use of integrated pest management?			
Score (17-21; 5 total)			(%)

Performance Indicator 4. Community Based Monitoring

The CSC to complete 22 and 23 in conjunction with the PPMU and construction contractor following commencement of construction. Date of Monitoring:_____

	Yes	No	Remarks
22. Has the contractor posted a public notice regarding complaints from the community?			
23. Has there been a public consultation regarding construction, environmental impact, and the community complaints system?			
Score (22-23; 2 total)			(%)

Outcome of Public Consultation:

Date: _____ Location: _____

Topics covered in presentation: _____

_____

Comments from Attendees:

Performance Indicator 5. Community Values and Safety

Items 24 – 35 should be inspected quarterly. Date of Monitoring:_____

	Yes	No	Remarks
24. Is temporary access provided to adjacent properties as needed?			
25. Is permanent access to adjacent properties reinstated on completion of a segment of work?			
26. Are construction hours adjusted around houses, hospitals and schools to minimize disturbance?			
27. Does the contractor limit the scope of construction in progress to minimize community impacts?			
28. Are physical impacts on public infrastructure and service disruption minimized?			
29. Are materials transported on approved haul routes?			
30. Are construction equipments maintained in good condition?			
31. Do vehicles operate within legal speed limits?			
32. Are material loads traveling on public routes covered?			
33. Is dust suppressed by watering exposed surfaces?			
34. Has the contractor installed signs and lighting in vicinity of works on public roads?			
35. Is access to the construction site restricted to the public?			
Score (24-35; 12 total)			(%)

Performance Indicator 6. Hydrology/Water Pollution

Items 36 – 43 should be inspected quarterly. Date of Monitoring:_____

	Yes	No	Remarks
36. Are construction camps maintained in a clean and hygienic condition?			
37. Are oil, fuel and chemicals stored in enclosed areas (dyked or covered)?			
38. Is discharge of wastewater into water bodies used for water supply avoided?			
39. Is clearing activity suspended during rains?			
40. Does the contractor prevent discharge of concrete trucks to waterways?			
41. Have existing drainage patterns been maintained during construction?			
42. Are areas of standing water in the construction area drained and backfilled?			
43. Are sediment controls installed upslope of waterways?			
Score (36-43; 8 total)			(%)

Performance Indicator 7. Project Completion

Items 44 – 50 should be inspected prior to finalizing the construction works:
Date of Monitoring:_____

	Yes	No	Remarks
44. Have drainage fixtures, curbs, road shoulders and ditch slopes been finished out to prevent hazard to the public during use?			
45. Are ground surfaces in the project area graded to prevent water from collecting?			
46. Have all construction debris, tree cuttings, excess dirt, rubble and scrap been removed from the construction zone?			
47. Have all pits been filled in and graded to drain, underground tanks (including septic tanks) removed and holes backfilled?			
48. Are all waste products removed from the construction site, equipment yards and worker camps, including oil waste, scrap materials and equipment, building materials and domestic waste?			
49. Have all points of access (drives, walks) and utilities (water supply, power, communications) to public and private property been restored to original condition?			
50. Have all complaints by the local community and individuals been resolved by the Contractor?			
Score (44-50; 7 total)			(%)

Performance Tracking

Performance Tracking consists of three sections:

a. Performance Follow-up, where performance shortfalls noted in prior monitoring are listed and checked against current monitoring results.

b. Community Complaints, where issues raised by the affected community are registered, tracked and outcomes recorded.

c. Performance Indicator Results, where environmental performance against indicators are recorded.

Section 1: Performance Follow-up

Column 1	Column 2	Column 3	Column 4	Column 5
Performance variable (#) / Date Observed	Reason for negative rating	Was agency responsible notified? / Date	Was problem corrected before next monitoring?	Was performance indicator adjusted?

Section 2: Community Complaints

Column 1	Column 2	Column 3	Column 4	Column 5
Person Registering Complaint / Date	Summary of Complaint	Was agency responsible notified? / Date	Was problem corrected before next monitoring?	Was Person satisfied with Action?

Section 3: Performance Indicator Results

Project Name:_____ SIR No.:_____ Package #:_____Province:_____

Project Start Date:_____

	Startup	Rev.	Q1	Q2	Q3	Q4	Average	Completion	Rev.	Final
Recording Date:										
1. Design and Preparations										
2. Worker Provisions										
3. Biodiversity										
4. Community Based Monitoring										
5. Community Values / Safety										
6. Hydrology/Water Pollution										
7. Project Completion										

Submittal Date:_____ For Calendar Quarter: _____

Inspector:_____

(Signature)

Annex 5:

Environmental mitigation measure to include into bid documents Subproject of Ba Bau Reservoir Irrigation System

Sub-project Activity	Potential impacts	Proposed Mitigation Measure
Earthworks Concrete embankment Waste and material transportation	Noise and vibration generation	▪ Use modern and new construction machines and equipment to meet standards of exhaust, noise, and vibration as regulated by the Government. The Contractor needs to submit the Engineer documents proving that all construction vehicles, equipment, and machines are checked and meet requirements concerning noise and vibration generation of the current Vietnam standards as QCVN 26: 2010 for noise level and QCVN 27:2010 for vibration emitted by construction works; ▪ All noise and vibration generation activities shall be restricted to the hours of 22h – 6h and not to be undertaken on Sundays or public holidays at the location nearby residential area such as: residential areas in Ham Minh, Ham Cuong Communes; ▪ Regularly maintenance of construction machines; ▪ Provision noise protection equipment for worker; ▪ In case that, noise generation equipment need to run during night time and holiday time nearby the above sensitive objects, the detail schedule will be considered and approved by SC before could be applied; ▪ Local communities must be informed about construction schedules and time through informal public consultation or any local people meetings and notice board; ▪ Strictly implementing noise control measures as noted above through sampling and taking adequate corrective actions if needed.
	Dust and exhaust generation	▪ All excavated soil should be reused for leveling low areas where applicable such as excavated soil could be used for leveling existing sites for construction of access road surface; ▪ Excavation at site will be watered to maintain certain moisture levels, and to prevent or minimize dust dispersion. The watering activities have been proposed at least one per day during dry season in the residential areas, such as residential area in Ham Thanh Communes; ▪ The construction machineries and equipment have to comply with Decision No. 249/2005/QĐ-TTg dated 10/10/2005 of Prime minister, Regulation on Emission roadmap for road transportation vehicles; ▪ Cover the material storage, setting up appropriate of mobilize material to the site to ensure that material will not obstruct at the site and release dust; ▪ All material/waste storage shall be located at least 50 meters from any households and sensitive areas as mentioned above.; ▪ Trucks carrying construction waste are covered. All trucks used should have well fitted bodies and not be overtopped in loading to avoid soil scattering. Excavated sludge (if any) will be transported by specialized vehicles; ▪ Speeds shall be limited when the trucks pass residential areas to constrain dust flying in the wind, which affect health and daily activities of the people living along the roads. The certain section route will be identified by SPC. Speed limitation signs shall be

Sub-project Activity	Potential impacts	Proposed Mitigation Measure
		adequately installed within construction site and its regulation shall be remind to each driver by contractor; ▪ Soil scattered on the paved road and public road shall be removed immediately.
Sludge excavation, Worker camp establishment, Waste generation	Odour generation and in-sanitation condition	▪ Excavation activities must be carefully scheduled to avoid the rainy season in order to ensure drainage of runoff water as well as sanitation for both local residents and workers; ▪ It is strong recommended that any intervention actions on the channels, it should be dewatered and dried before implementing excavation activities to reduce odour generation and in-sanitation condition and avoid polluting surface water quality; ▪ Construction waste need to be transported by adequate manners to use for leveling purpose at hollow areas along Bac Ba Bau main canal in Ham Thanh commune; ▪ Domestic waste and garbage from construction site will be collected by hygienic manner. Provide dustbins at work site; ▪ Disposal of solid wastes into canals, stream, other watercourses, agricultural field and public areas shall be prohibited; ▪ Burning of construction and domestic wastes shall be prohibited. ▪ Toxic waste, if any, need to be collected, transported and treated according to the Circular No. 12/2011-BTNMT dated on 14/04/2011 of MONRE; ▪ Excavated sludge will be transported by specialized vehicles to avoid the leaking out of sludge on the transport routes; ▪ Before the construction activities completed, contractors have to carry out site clearance and environmental recovery, such as: + Transport of all unused materials from the site; + Remove all construction machine and equipment, temporary facilities, worksites; + Environmental recovery at the site such as provision of green trees, grass in both construction sites and disposal location in Ham Thuan and Ham Cuong Commune
Excavate activities and worker camp establish on sites…	Water quality impacts	▪ Worksite, camps, material storage areas and load/unload construction material/waste activities must be located far from watercourse to ensure that materials will not be disposed into water; ▪ Excavation activities of drain items must be scheduled to avoid rainy to reduce suspended maters in runoff water entering the surrounding water bodies and existing canals; ▪ Provide adequate facilities in the site including latrines, holding areas and garbage cans. Waste from latrines will be collected and treated properly through an economic contract with local environmental co-operatives/companies. ▪ Cover material storage areas when raining is needed. Temporary storage of construction and domestic waste on the sites will be no longer than 24 hours; ▪ The placement of washing instruments/vehicles next to the water bodies, existing canals (identified in Water quality impact section) will not allowed avoiding the leaching of waste, sludge, soil and oil contaminated water and maintenance activities will be banned on the sites in all construction drains; ▪ Equipping the dustbins and mobility septic tanks to work sites ((it is proposed that there will be 1 dustbin and 1 mobility septic tank for each site)

Sub-project Activity	Potential impacts	Proposed Mitigation Measure
Inappropriate soil pit practices and concrete station operation	Soil erosion, vegetation clearance and run off water at soil pit	- Prioritize the use of existing soil pit sites with suitable materials and update the list of soil pit monthly and report to PPMU and minimize impacts on other local resources; - Procure materials only from DONRE authorized soil pit and borrow sites; - Extraction of sand and gravel in river beds shall be prohibited except: (i) where this is no technically and economically feasible alternatives and (ii) provided specific mitigation measures are implemented to minimize impact on river morphology, water quality (e.g., turbidity) and aquatic ecosystems (e.g., reduced extraction during fish spawning period); - Checking the environmental protection commitment documents of soil pit, asphalt concrete stations since the Project will purchased construction material and hot concrete from these areas; - Monitoring the implementation of environmental protection measures at the soil pit and concrete stations; - Supervision the responsibility of environmental recovery activities at the soil pit areas and concrete stations.
Inappropriate construction waste management	Sludge and waste water spreading to surrounding cultivation area as well as air pollution to ambient environment	▪ All solid waste should be reused for leveling low areas where applicable; ▪ Construction waste shall to be transported by adequate manners to places under permission from Commune authorities in Ham Thanh Communes and dumped at local peoples gardens (an agreement between contractor and people will be made with approval from local authorities) ▪ Equip dustbins and mobility septic tanks to work sites ((it is proposed that there will be 4 dustbins and 2 mobility septic tanks provided at each construction site ; ▪ Domestic waste and garbage from worker camps need to be collected by hygienic manner through survive provision of Binh Thuan environmental co-operative; ▪ Disposal of solid wastes into canals, stream, other watercourses, agricultural field and public areas shall be prohibited; ▪ Burning of construction and domestic wastes shall be prohibited; ▪ Toxic waste, if any, need to be collected, transported and treated according to Circular No. 12/2011-BTNMT dated on 14/04/2011 of MONRE ▪ Before construction is completed, the contractor will move all construction wastes and unused materials from the site; ▪ Providing environmental protection measures at the soil disposal location include leveling, temporary drainage during rainy time, boundary edge provision, plantation and environmental recovery.
Use of hazardous substances and hazardous waste disposal	Air, soil and water contamination	▪ The storage area for all hazardous substances are located away from any water bodies in the project area such as irrigation canals, ponds… to avoid the leakage to water bodies ▪ Ensure that safe storage of fuel, other hazardous substances are agreed by PMU and have necessary approval/permit from DONRE and local authorities; ▪ Equipment/vehicle maintenance and refuelling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels; ▪ Fuel and other hazardous substances shall be stored in areas provided with roof as stated in TCVN 5507:2002- *Hazardous chemicals − Code of practice for safety in production, commerce,*

Sub-project Activity	Potential impacts	Proposed Mitigation Measure
		use, handling and transportation; ▪ Segregate hazardous wastes (oily wastes, fuel drums) and ensure that storage, transport and disposal shall not cause pollution; ▪ Ensure all storage containers are in good condition with proper labelling; ▪ Collected, transported and treated by contract with company which has a work permit for treating hazardous waste disposal according to the Circular No. 12/2011/TT-BTNMT on 14 April, 2011 of MONRE.
Transport vehicle activities Construction machinery operation Worker concentration	Community Disturbance and Traffic safety	▪ Place sign boards near construction sites to direct traffic means to slow down at the section close to Work site: ▪ Regulating the transport vehicle speed will not be over 20km when passing above areas; ▪ Construction materials shall be stored tidily at the required locations. ▪ Inform the community about construction schedule through informal public consultation or any local people meetings and notice board;
Poor management at worksites	Health and safety for the construction workers and the nearby community	▪ Constructor need to work with CS, PPMU to establish labour safe regulations on the sites required by law and by good engineering practice, which include: electric safety, operating equipment - general safety requirements, general safety requirements. ▪ Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee.. ▪ A first aid kit will be provided at each construction site to ensure patients can receive first aid timely before transporting them to the medical station/hospital ▪ It is mandatory for workers to attend training courses on labour safety before they are recruited to work for the project; ▪ Supervise period on compliance to labour safe measures of workers at project sites. ▪ Contractors ensure to provide safe drinking water to workers for daily uses. ▪ Construction site shall be provided with toilet/sanitation facilities ▪ Contractor shall readily provide and maintain lights, protection fences, signboards and wardens where necessary as requested by the Engineer or local authorities.
Excavation, transport activities	Impacts to public facilities	▪ Obtain the agreement with local authorities in using the transport routes, intervening the canals and if any downgraded observations due to project activities have been found, the contractors have to fully compensate; ▪ Providing the temporary irrigation canals or drainage canals during construction phases if any interventions will be made on these canals; ▪ Consultation and obtain the agreement from local authorities and local peoples on replacement of all affected canals on the fields; ▪ Record the status of the existing roads and canals before construction and make proper compensation for the damages if any. ▪ All public facilities should be fully compensated as its origin after

Sub-project Activity	Potential impacts	Proposed Mitigation Measure
		completion of construction works;
Earthworks and excavation activities	Impacts on surrounding agricultural land and infrastructure	▪ No construction materials and/or wastes fall into agricultural land; ▪ Providing the temporary irrigation canals or drainage canals during construction phases if any interventions will be made on these canals to ensure the water flows on all cultivation areas; ▪ Appropriate management of water pollution sources from construction activities to ensure that the construction will not pollute water and soil on all cultivation areas; ▪ Reinstate road surface and fix up damages caused to irrigation canals, water supply/drainage canals; ▪ All activities of contractor only allow within the acquired land areas.
Construction activities Concentration of workers and equipment	Social disturbance	▪ Excavated pond will be dewatered and fenced to reduce high risk for local peoples; ▪ Construction materials shall be stored tidily at the required locations. ▪ Install barriers (temporary fence) at construction areas to deter people access to the site. ▪ The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation) . ▪ Remain the light during the nigh time on all construction sites. ▪ Construction workers who are not local people must register temporary residents and obtain temporary residential certificate from local authority. ▪ Educate workers on appropriate behaviour for interactions with local community and risks of communicable diseases
Obstructed drainage water flow	Localized flooding and insanitation condition	▪ Setting up appropriate construction schedule at the site to avoid rainy season, especially for excavation activities; ▪ Provision supplemental temporary drainage plans in the construction site to ensure the quickly respond in case of heavy rain, other unforeseen drainage issues and avoid obstructing water in surrounding areas and construction sites; ▪ Providing the temporary irrigation canals or drainage canals during construction phases if any interventions will be made on these canals to ensure the water flows; ▪ Supplemental temporary drainage plans must be revised and approved by PMU, and Construction Supervision before construction works started.
All construction activities	Cultural heritage impacts	▪ Where grave is found during construction, coordinate with local authorities to arrange for relocation and mapping the location of the graves before and after relocation; ▪ Halt construction activities, protect the site and inform construction supervision for guidance if artifacts are found at construction site.
Environmental recovery	Odour generation, unsafety and sanitation condition to local people	Before construction is completed, the contractor will move all construction wastes and unused materials from the sites to approved sites Monitoring environmental recovery at: ▪ Construction waste disposal location ▪ Material soil pit and borrow areas

Sub-project Activity	Potential impacts	Proposed Mitigation Measure
		▪ Working sites Reinstate and ensure good condition for any effected public facilitates