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THANH HOA PROVINCIAL PEOPLE COMMITTEE
DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

ENVIRONMENTAL AND SOCIAL ASSESSMENT (ESIA)

**DAM REHABILITATION AND SAFETY IMPROVEMENT PROJECT
SUB-PROJECT: DONG BE DAM REHABILITATION AND SAFETY
IMPROVEMENT, XUAN DU COMMUNE, NHU THANH DISTRICT,
THANH HOA PROVINCE
(UPDATED)**

**THANH HOA
AUGUST,2018.**

EXECUTIVE SUMMARY

1. Background: The Dong Be Dam rehabilitation and upgrading is one of the priority subprojects which was identified for implementation under the World Bank's fund for Dam Rehabilitation and Safety Improvement Project (DRSIP). This environmental and social impact assessment (ESIA) was conducted in compliance with the requirements of the World Bank's Environmental Assessment Policy and the Vietnam's Law on Environment Protection (LEP).

2. The Dong Be dam is located in Xuan Du commune, Nhu Thanh district, in Thanh Hoa province. It's about 40 km from Thanh Hoa city to the Southwest. It was built in 1989 and the last rehabilitation of the reservoir was done in 2003 with funding of Song Chu Irrigation Company. Its basin area is 9.4 km² and reservoir capacity is about 1.97 million m³. The headworks and its auxiliary structures include the following items:

- *Dam:* The dam was built of homogeneous soil with height of 10.95 m and length of 714.18 m. The dam crest elevation is 42.3 m with width of 5.0 m
- *Spillway:* It has a width of $B_{tr} = 50$ m and made of reinforced concrete. It is connected to a dissipation basin.
- *Intake:* It is located at the right side of the dam. It is made of reinforced concrete and steel with thickness of $F_i = 0.8$ m. It is a circle culvert with an upstream control valve.
- *Management road:* The road consists of two sections: The first section which stretches from Road 506 to Dong Be Reservoir is asphalt pavement with carriage way of 3 m width and 200 meters long. Another road on the right side is made of earth with length of 100 m. The other section on the left side of main dam which stretches from Trieu Thanh junction to the dyke and spillway is an earth road with length of 700 m.

3. The dam is in poor condition: The dam has been operating for 25 years now and it is in poor condition due to there is no major repair carried out during its operation. After being put into operation, in May 1991, the water level in the reservoir was risen and 70cm higher than the floor of the spillway. Floodwater eroded the spillway chute, leakage through dam body and sluice. The entire residential areas in Đông Bún and Xuân Du was flooded. After that, an additional auxiliary dam was built at 300m from the right shoulder of the dam to reduce flood, repair the spillway with concrete. In 1996, 1997, the spillway was repaired again. In 2003, wave protection wall was built on the top of the dam, build the dam berm at downstream face at elevation (+38.00) m and drainage system. Along the length of the dam, there are much seepages. The rock fill in the upstream side is fragmented. About 80 m from the intake to the left the dam surface is sagging. The intake has a defective valve gate which is difficult to move and experiencing leaks. The concrete pipe culvert itself is already damaged and weakened by erosion. There is no management house for the intake operation currently. The concrete surface of the spillway is damaged partially with many dissipation ridges broken. In general, the structures that are still functioning are too old to be able to regulate water and guarantee safety. According to result of flood control modelling, the normal water level at 41.56 m and maximum water level of 42.3 m are higher than current dam crest from 0.16 m to 0.9 m.

4. There are approximately 500 people living at the downstream of the dam. It's also noted that 1000 ha agricultural land and a segment of the Provincial Road 506 are situated in downstream. The deteriorating condition of the dam is threatening the safety of people, their assets and infrastructure. In the recent years, due to the deteriorating condition of the reservoir, the water supply capacity has been reduced and it is adversely affecting the economic

development of Xuan Du and Trieu Thanh communes.

5. Proposed repair and upgrading works. The proposed repair and upgrading works include: (a) treatment of seepage through body and foundation of dam; (b) eroded portions restoration; (c) replacement of the intake; (d) lengthening the spillway and building an overhead bridge; and, (e) upgrading management road. The project was designed and carried out in accordance with the Safety of Dam Policy of the World Bank (OP/BP 4.37) and in compliance regulations and standards of the Socialist Republic of Vietnam.

6. Environmental and Social Screening: The ESIA begun with the conduct of environmental and social screening to, among others, check any ineligible aspects of the proposed works and determine the scope of the assessment. Based on the Environmental and Social Screening, the subproject is eligible for financing under DRSIP. The subproject is classified in Category B according to the World Bank's classification. It is not located within or near any sensitive environment or natural habitat and there is no structure or site in the area of significance cultural and historical structures that will be impacted by the rehabilitation. There is not any ethnic minority affected by the subproject area. The rehabilitated dam is categorized as a small dam based on the World Bank Safety of Dam Policy classification.

7. Environmental and Social Impacts: The subproject will improve dam safety, protect downstream infrastructure as well as the lives and assets of local people at the downstream of the dam. The rehabilitated works will ensure stable and reliable supply of irrigation water for the 255 ha of rice field, upland crops and aquaculture ponds. It will also supplement the existing groundwater for domestic use of local people in dry season. However, there will be some negative social and environmental impacts as follows:

- *Loss of lands and crops* - A survey in the subproject area indicated that 27,171.02 m² will be permanently acquired by the sub-project while 7,190.5 m² will be temporarily used during construction. The lands which will be acquired are within the dam's protected area and belonged to Xuan Du Communal People's Committee (CPC). The trees and crops in the dam's reservation area are managed by the State. The temporary use of 7,190.5 m² during construction will affect 30 households (140 persons) in Trieu Thanh commune of Trieu Son district and Xuan Du commune of Nhu Thanh district. No household (HH) will be relocated or economically displaced.
- *Land and soil degradation* - Soil and land degradation is possible within and around construction sites due to excavation, compaction, change landscape and drainage patterns as well as traditional access routes; litters and possible improper disposal of construction spoils and wastes; possible indirect impact on the use of pesticide due to intensification of agricultural production in the service areas; and
- *Impacts of construction activities* – Impacts of construction activities are significant but they are generally short-term and localized. These include:
 - o Increase concentration of particulate matter (mostly dust)
 - o Noise exceeds the limit due to equipment operation
 - o Increased sediment and turbidity of surface water due to excavation, especially at the borrow pits
 - o Traffic disruptions
 - o Damage existing roads by the heavy equipment's movement; and,
 - o Increase the risk of health and safety for the workers and local people due to

unexpected incidents at the project area.

- The air emissions of equipment and vehicles are deemed not significant. The wastewater and solid waste which are generated by workers are also unremarkable but it would require a standard collection system and disposal such as septic tank and/or soak pit and solid waste collection and disposal system.
- *Other issues* – There is a possibility of encountering unexploded ordnance leftover from the war or of finding archaeological artifacts during excavations. There may also be complaints or claims of accidental damage from the sub-project.

8. Mitigation measures – The Social Environmental Management Plan proposed specific measures to mitigate the identified potential impacts. Interruption to irrigation will be avoided by sitting a new water intake instead of just replacing the sluice, optimizing construction schedule and build coffer dam to avoid unnecessary lowering of water in the reservoir. Other construction impacts would be mitigated by readily known mitigation measures that would be implemented by the contractor as part of construction practice such as covering truck and watering dusty roads, collection and management of construction sites to prevent spreading of water and wastewater, placing signboards to limit traffic speed, requesting the contractors to provide adequate accommodation with adequate water supply and sanitation facilities for the workers to use. These mitigation measures will be incorporated into construction the bidding document and contract in the form of Environmental Specifications.

9. Consultations: The consultant cooperated with the Project owner to organize community consultations in 2 times. The first consultations were organized on 18 February, 2015 at Trieu Thanh CPC with 40 participants including representatives of district, provincial agencies, and 4 communes in the subproject area to inform about the subproject, consult for support of subproject implementation and determine scope and impact of subproject. The second consultations were organized from 17 to 20 of March, 2015 at the CPC offices of Phuong Nghi, Hop Thanh, Xuan Du, Trieu Thanh communes with 30 to 40 participants of each including local authorities and social organizations, village heads and representatives of affected households to inform about the negative effects of the subproject on the environment, society and mitigation measures. Consequently, 100% of participants agreed to implement subproject and proposed mitigation measures. In addition, affected people gave recommendations that: i) construction activities must be carried out quickly and completed each component before going on with the next components; ii) during construction, contractors and project owner need to receive feedback from the community to make appropriate modifications; iii) people want the project to support for rehabilitation, dredging of canals connected to Dong Be reservoir to ensure irrigation; iv) to support training courses on agriculture, business and communication in local area; v) PPMU and contractors strictly implement measures to minimize environmental impact. The project owner was receptive and committed to implement.

10. Resettlement Action Plan (RAP): The implementation of Dong Be Subproject, Thanh Hoa province will permanently acquire 27,171.02m² and temporarily acquire withdrawal 7,190.5 m². There will be 30 households, including 140 people, with trees and crops on the dam safety area will be affected by Subproject. These land were used for purposes of agriculture, forestation and aquaculture. Total cost estimate of compensation and support is 1,675,000,000 (VND) including land compensation cost of 1,507,000,000 (VND); management costs of 93,000,000 (VND).

11. Ethnic Minority Development Plan: In the Subproject area, proportions of ethnic minority (EM) peoples are 28.97% of Muong, 2.97% of Thai and 0.83% of others. There is 01 EM household (Muong ethnic group) in the 30 households affected by land acquisition. According to consultation with ethnic minorities, there is broad support of EM community for implementation of Subproject. The development activities under Ethnic Minority Development Plan include supports for training on agricultural extension, business and communication program. Total cost estimate of EMDP is 310,730,000 (VND). EMDP will be further updated on the basis of the detailed design of the subproject.

12. Risk of dam broken failure: Dong Be dam break will affect Xuan Du and Trieu Thanh commune, with total of 100 households, including 500 people, 15 km of asphalt and concrete road, 7 irrigation canals; 11 schools; 4 health care centers; 4 CPC office buildings. Affected land area including: 255 ha agricultural land; 3,051.9 ha forestry land and 107.46 ha aquaculture land.

1. **13. Budget allocation:** The estimated cost of the implementation of the ESMP, including monitoring activities is 1,396,000,000 VND. The total estimated cost of the sub-project including the implementation of the ESMP is **52,589,900,000 VND**.

Abbreviations

AP	Affected person
CPO	Central Project Office
CPC	Communal People's Committee
CEOHSP	Contractor Environmental and Occupational Health and Safety Plan
DARD	Department of Agriculture and Rural Development
DMS	Detailed Measurement Survey
DPC	District People's Committee
DRC	District Resettlement Committee
DRASIP	Dam Rehabilitation and Safety Improvement Project
EIA	Environment Impact Assessment
EM	Ethnic Minorities
EMPF	Ethnic Minorities Policy Framework
EMDP	Ethnic Minorities Development Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GOV	Government of Vietnam
HH	Household
IOL	Inventory of Losses
IMA	Independent Monitoring Agency
WB	World Bank
LAR	Land Acquisition and Resettlement
LURC	Land Use Right Certificate
MARD	Ministry of Agriculture and Rural Development
MOF	Ministry of Finance
MOLISA	Ministry of Labors – Invalids and Social Affairs
NGO	Non-government Organization
OP	Operating Policy
PAD	Project Appraisal Documents
PPC	Provincial People's Committee
PPMU	Provincial Project Management Unit
PRA	Participatory Rapid Assessment
REA	Rapid Environment Assessment
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
TOR	Terms of Reference
USD	United States Dollar
VND	Vietnamese Dong
WB	World Bank

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CHAPTER I. INTRODUCTION

1.1 Overview

Dong Be is one of the dams selected for first year implementation of the Dam Rehabilitation and Safety Improvement Project (DRSIP). The DRSIP, a World Bank-funded project conceived to support the implementation of the Government dam safety program by improving the safety of prioritized dams and reservoirs as well as to protect people and assets of the downstream communities. The proposed project is intended to improve the safety of the dams and related works, as well as the safety of people and socio-economic infrastructure of the downstream communities as defined in Decree 72 governing the management of dam safety in Vietnam. The project consists of three principal components.

- Component 1: Dam Safety Rehabilitation (US\$412million)
- Component 2: Dam Safety Management and Planning (US\$20 million)
- Component 3: Project Management Support (US\$11million)

DRSIP will be implemented in 34 provinces in the North, Central and Highland regions. Up to 400 dams will be selected for consideration under the projects and it will be based on an agreed priority selection criteria to aim at prioritizing interventions that address the risks within an explicit poverty and inequality framework.

The project will support the physical rehabilitation of the existing irrigation dams in which almost all of them were built during the 1980s and 1990s. It's about 90% of these dams are earthen structures and to be considered as small dams with height less than 15m and design volume less than 3 million cubic meters (MCM). The proposed project is not intended to support significant structural modifications or expansions beyond what is needed to ensure safety. The rehabilitation will be limited to reshaping of the main and auxiliary dams, slope stabilization by either concrete slab or in-situ or stone paving, strengthening or expansion of existing spillways to increase the discharge capacity, refurbishment of existing intake structures, replacement of mechanical and electrical systems of intakes and spillways, grouting for seepage control and improvement of existing roads (access and management roads).

Implementing Agencies

The Ministry of Agriculture and Rural Development (MARD) will be responsible for overall implementation and management of the project. The Central Project Office (CPO) of MARD shall provide the support to all the three Ministries and responsible for overall coordination and monitoring of the project. The implementation of the rehabilitation works and preparation of dam safety plans, including safeguard and fiduciary, will be decentralized to the provincial level authorities. The provincial Department of Agriculture and Rural Development (DARD) would be the lead agency at the provincial level. Provincial Project Management Unit (PPMU) of DARD in each province will respond to manage and monitor the sub-project under MARD supervision.

1.2 Approach and methodology for ESIA

The general objectives of ESIA is to carry out the environmental and social impact assessment of this sub-project, including preparation of the relevant safeguards documents which is required to meet the requirements of the Government of Vietnam and the World Bank.

1.2.1 Approach and methodology of social assessment

The purpose of social assessment (SA), conducted in an integral manner with environmental

assessment for this subproject, is two-fold. First, it examined the potential impacts of the subproject – positive and adverse impact – on the basis of planned project activities. Second, its findings inform the design of measures addressing identified potential adverse impact and proposing community development activities that are relevant to the project development goal. For identified adverse impact that could not be avoided, the public consultation with local people, governmental agencies, project stakeholders, and relevant parties were carried out to ensure affected peoples will be appropriately compensated and supported in a manner that their socio-economic activities will be promptly and fully restored to the pre-project level, at least their livelihoods will not be worsened, and in the long run, as a result of the subproject. Objective of this assignment is assessment of socio-economic situation and planning for implementation of safeguard policy of sub-project. The social assessment and preparation of the social safeguard documents are required in the project preparation phase to ensure that the interventions will take into account the social issues and comply with the legal requirements of the Government of Vietnam and safeguard policies of the World Bank.

As the part of the social assessment, the place that ethnic minority (EM) people are present in the subproject area – resulted from EM screening (as per Bank's OP 4.10), consultation with them were carried out in a free, prior, and informed manner, to confirm if there is broad support from affected EM people community for the subproject implementation. EM screening was conducted as per Bank's OP 4.10, and was done the scope and coverage of the social assessment vis-à-vis the environmental assessment (OP 4.01). A gender analysis was also done as part of the SA to understand underlying gender dimensions (from project impact perspective) to enable gender mainstreaming to promote gender equality, and enhance further the development effectiveness of the subproject and the project as a whole. Depending on the magnitude of the identified potential project impact, and the project development objective, a gender action plan and gender monitoring plan were prepared (please see these plans in the Annex B4 of this ESIA).

To ensure all potential impact could be identified during project preparation, the SA was conducted through series of consultations with various project stakeholders. A particular focus was maintained on households who are potentially affected (both positive and adverse impacts). The research techniques employed for this SA include (i) review of secondary data, (ii) field observations; (iii) focus groups discussions/community meetings, (iv) key informant interview, and (v) households survey (Please see Annex B1 for how the Sampling Frame). A total of 235 of respondents participated in the SA exercise for this subproject, in which 120 people participated in the household survey (quantitative), and 115 people participated in focus groups discussions, community meetings and key informant interview (qualitative).

In Section 4.3, we will present briefly the SA results. Then, we will present the findings of the SA (positive and adverse impacts) along with the recommendations on the basis of the SA findings, including the result of the gender analysis. Please note that a gender action plan and gender monitoring plan are presented at Annex B4 of this ESIA), and the public health intervention plan and public consultation and communication plan were presented at Annex B2 and B3, respectively).

1.2.2 Approach and methodology of environmental assessment

Field survey: survey the current status of environmental resources, the water sampling, and rapid assessment indicators of water quality in the field to update and supplement the latest data in the project area.

Sociological survey: survey interviewed people, local and regional leaders of the affected benefited areas.

Analytic and synthetic method: Analyze and synthesize the impact on the natural environment and socio-economic at the operational area of the project.

Expert method: Consultancy unit participated and organized the meeting to take comments on proposed measures to mitigate the negative impacts of the subproject of environmental experts, sociological experts, dam safety experts and gender experts.

Rapid assessment method: use the pollution factor of the World Health Organization (WHO) to estimate the amount of waste and forecast pollution.

Comparison method: the impacts are evaluated by comparison with the norms and standards for the quality of soil, water, noise, air and other relevant environmental standards.

Modeling methods: using models to calculate and forecast the average concentration of pollutants in the exhaust gas, waste water to assess the impact of pollutants on the environment.

Matrix method: To compare each activity of the project with each parameter or environmental and social component (air, water, health, economic, etc.) to assess the relationship of cause-consequences of the subproject implementation.

1.2.3 ESIA Consultant Team

Table 1- ESIA Consultant Team

Name	Qualification	Task carried out
1	Ngo Xuan Nam	PhD. Waterbody ecology
2	Nguyen Quoc Huy	PhD. Biology
3	Nguyen Anh Duc	MSc. Biology
4	Nguyen Thi Hai	MSc. Agriculture
5	Lai Ngoc Ca	En. Environmental Technology
6	Mai Trong Hoang	MSc. Environmental Technology
7	Nguyen Thai Binh	BA. Environmental Law
8	Le Ngoc Cuong	MSc. Irrigation
9	Nguyen Nguyen Hang	En. Bio-technology
10	Nguyen Thanh Nam	MSc. Irrigation
	And other...	

CHAPTER II. SUBPROJECT DESCRIPTION

2.1 Overview of the Existing Work

The Dong Be reservoir is located 40 km to the southwest of Thanh Hoa City, in the territory of the three communes: Phuong Nghi, Xuan Du of Nhu Thanh district and Trieu Thanh commune of Trieu Son district.

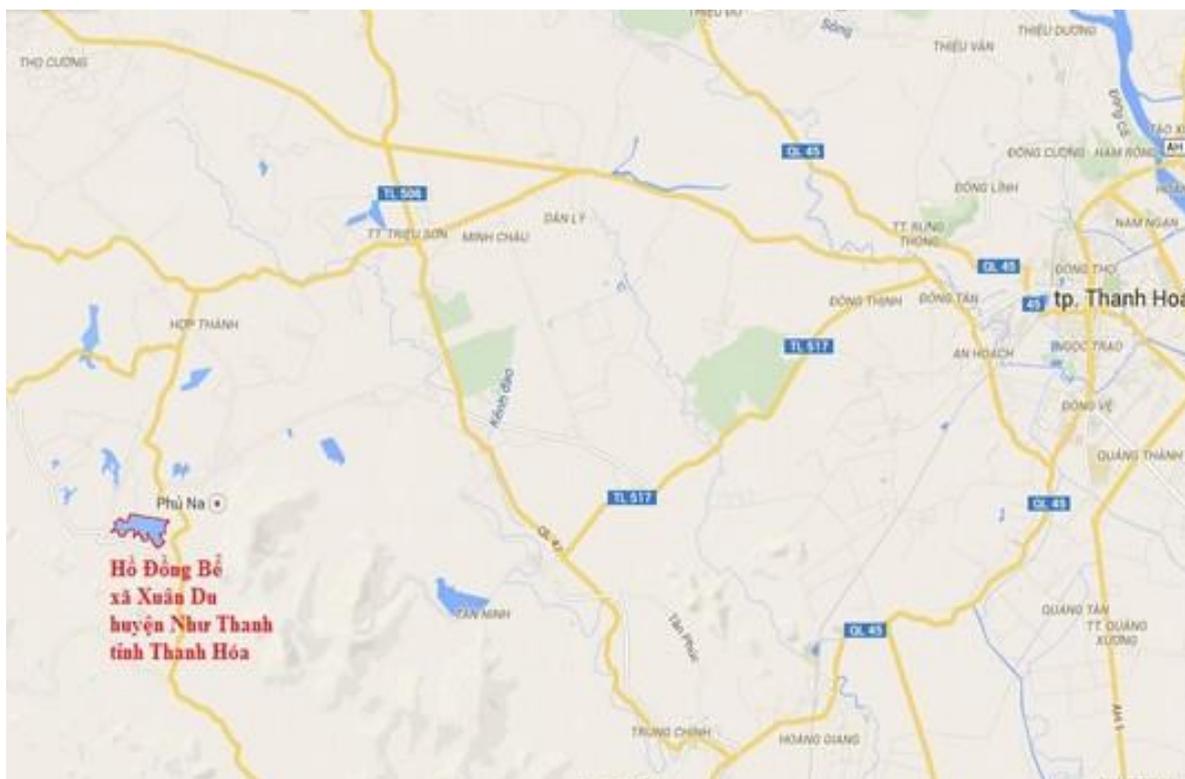


Figure 1 - Location of Dong Be reservoir

The Dong Be reservoir was constructed from 1989 and put into operation in 1991. It has a catchment area of 9.4 square kilometers with total storage capacity of 2.76 millions cubic meters, in which effective storage capacity is 1.89 millions cubic meters and flood control storage capacity is 0.79 millions cubic meters. The normal water level in the reservoir is 39.40 m, dead water level is 34 m, and maximum flood water level is 40.44 m (P2%). The geographical coordinates of Dong Be reservoir are as follows (Figure 2)

Point	Longitude	Latitude	Point	Longitude	Latitude
A	19°45'28.62"N	105°32'34.73"E	C	19°45'10.49"N	105°32'8.34"E
B	19°45'32.07"N	105°32'5.39"E	D	19°45'2.01"N	105°32'33.65"E



Figure 2 - Sub-project area

Dong Be reservoir headwork comprises of the following main components. Their current status is described briefly below:

Dam: The dam was built of homogeneous soil with height of 10.95 m, crest length is 714.18 m. Crest elevation is at 41.50m, and 4 m wide on its crest. Downstream berm elevation is at elevation +38m.

The dam was built using locally available materials within the reservoir at that time, soil used for filling mixed with a lot of gravels. When the water in the reservoir reaches (+38.50) m, leakage can be observed at six locations at downstream face. If these leakages are not fixed, it will be dangerous for the dam. The upstream face has been protected with rock from elevation +34.00m to the top, however, however, parts of that lining layer has been displaced, some sections was sink.

Auxiliary dam was also built with locally available materials. Uneven compaction lead to uneven shrink on top and face of the dam, it is lower than 41.50m at some locations. In the middle of the dam there is a sluice Φ 40cm. It is not working but not being repaired or removed.

Spillway: It is 50 m wide, made of reinforced concrete. The spillway is connected to a dissipation basin. Concrete cover on the chute was peeled off at some locations. Elevation of crest weir is at 39.40 m. The spillway chute is 49 m long. Maximum flood discharge is 82.5 m³/s

Intake: It is located at the right side of the dam. It is made of reinforced concrete and steel with diameter of 0.8 m and 44.72m long. The sluice is not water tight. Concrete has been rotten at some locations making the steel core exposed

The administration building is a single storey house but deteriorated.

Management road: The road consists of two sections: The first section is started from Road 506 to Dong Be Reservoir. It is asphalt road, 3 m wide and 200 meters long and connected with an earth road, 100 m long. The second section 700 m long, earth road started on the left side of

main dam, starts from Trieu Thanh junction to the dyke. The road has been degraded and very hard to travel in rainy season

After being put into operation, in May 1991, the water level in the reservoir was risen and 70cm higher than the floor of the spillway. Floodwater eroded the spillway chute, leakage through dam body and sluice. The entire residential areas in Đông Bún and Xuân Du was flooded. After that, an additional auxiliary dam was built at 300m from the right shoulder of the dam to reduce flood, repair the spillway with concrete. In 1996, 1997, the spillway was repaired again. In 2003, wave protection wall was built on the top of the dam, build the dam berm at downstream face at elevation (+38.00)m and drainage system.

According to result of flood control modelling, the normal water level at 41.56 m and maximum water level of 42.3 m are higher than current dam crest from 0.16 m to 0.9 m.



Figure 3 - Photos showing existing conditions of the dam

2.1 The Proposed Project

While the primary objective of the proposals is to enhance the safety of the dam, the subproject also has the opportunity to (i) improve the efficiency of irrigation and water supply (for non-drinking purpose) services in in Trieu Thanh and Hop Thanh communes of Trieu Son district, and Xuan Du commune of Nhu Thanh district, 255 ha of crop land benefited with more reliable irrigation would produce more stable productivity; (ii) reduce the annual repair costs; (iii) improve local landscape.

The “Dong Be Dam Rehabilitation and Safety Improvement” will be implemented in Xuan Du commune, Nhu Thanh district, Thanh Hoa province. The Project owner is Thanh Hoa Department of Agriculture and Rural Development. Represented by Thanh Hoa Agricultural and Rural Development Project Management Unit; PMU office is at No. 6 - Hac Thanh - Thanh

Hoa City; Representative: Mr. Nguyen Van Nam, Director. Tel: 0373.853406; Fax: 0373.850690

The following work items have been proposed:

Main dam: Strengthen the upstream and downstream face of the dam. The crest elevations of main dam and auxiliary dam will be heightened from 41.5 m to 42.3m (raise 0.8 m) and raise the height of parapet wall on the main dam from 41.9 to 43m (raise 1.1m). B = 5 m.

- Dam Crest: Raise elevation to + 42.30m, width B = 5 m, strengthen concrete dam crest with reinforced concrete M200 = 16cm. Build breakwater wall with reinforced concrete M200, H = 0.7m high.
- Upstream face: Repair the upstream face locally where the pavestones have been displaced or damaged, strengthen the section from elevation from +35.00 to +38.85m with stone; Repair from elevation 38.85m to 42.30m. From the elevation (+38.85) m to the crest of the dam at the elevation (+42.30) is reinforced with a precast concrete M200 size (40x40x12) cm on stone (1x2), 10cm thick and geotextile ART-15 or equivalent;
- Downstream slope: reinforce dam surface from crest to elevation + 36,00m. B = 4m. Install drain system and plant grass.
- Body and foundation: Waterproofing of the dam body by clay powder..

Spillway. Rehabilitate the spillway with reinforced concrete M250. Retain elevation at + 39.40m, and width B = 50m. Links with the components by PVC KN - 92 coupling; embank both side of spillway; rebuild the plunge ground and backyard of plunge basin by reinforced concrete M250. Build working bridges over the spillway at downstream side

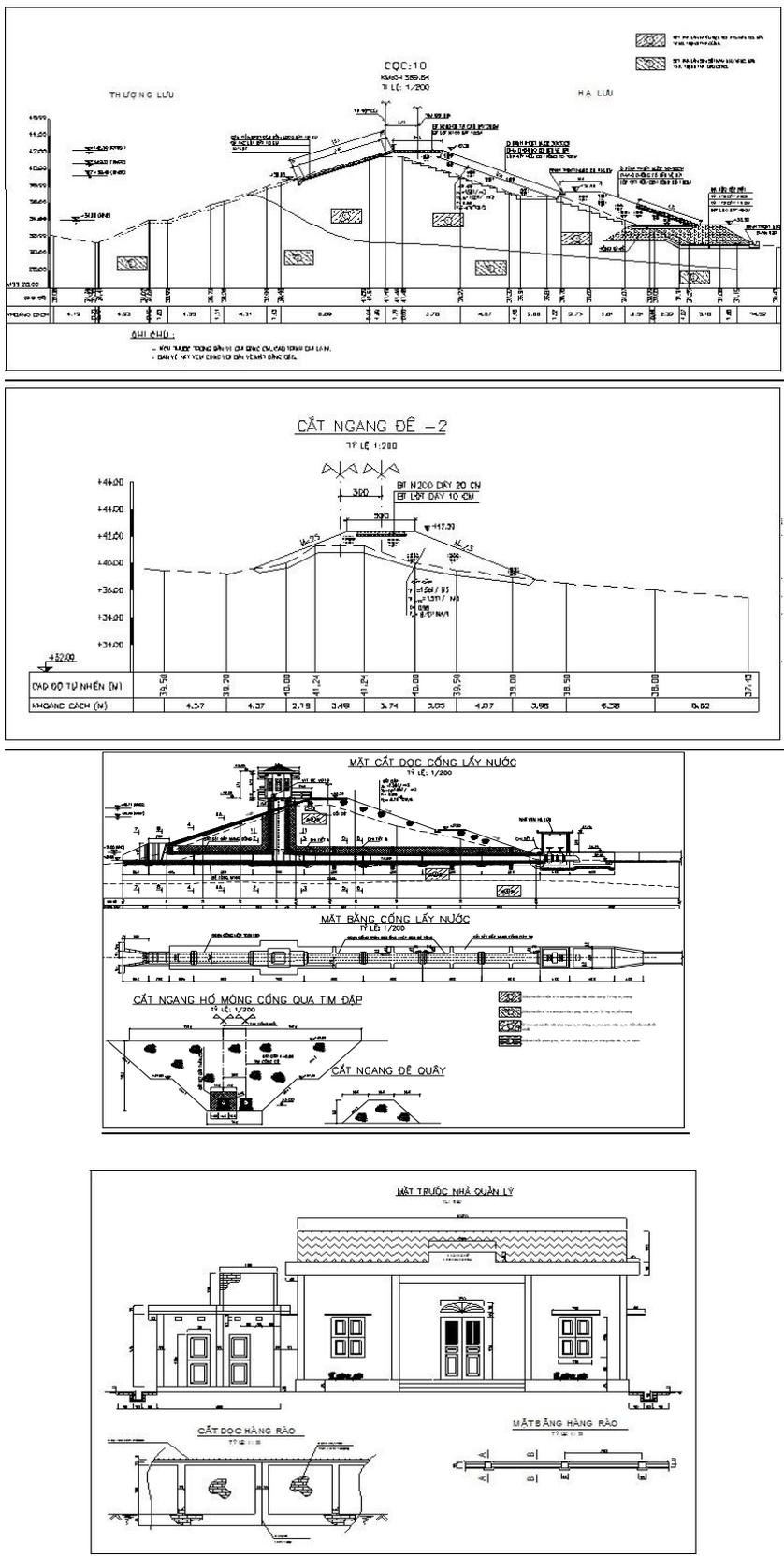
Auxiliary dam: Raise the dam crest from +41.4m to elevation +42.30m with soil. Crest is 5m. Cover the surface with reinforced concrete M200, 16cm thick, 3.5m wide so as it can be used as local road. Replace the culvert under the flood embankment as the old one broken.

Administration building: A new administration building will be built, 60 square meters. It will include an office, a storage room, a canteen, meeting room etc. The building has fence.

Intake work: A new intake will be built, 3 m from the existing intake with steel pipe, D80cm and 8mm thick. The outside will be covered by reinforced concrete M250, 3t cm thick. Flat valve gate will be installed in upstream tower and operated by electrical system. Demolish the existing intake work after the new one is completed

Access road. The two existing access and management roads will be rehabilitated, one is 300m long and the other is 700m. Surface is made of concrete M200, 16cm thick, B=3.5m. Reinforced sluice will be built under the road for drainage. 44.7 to 56.6 m

Monitoring system: Install infiltration and shifting monitoring equipment, and water level measurement equipment.



From top to bottom: Main Dam, Auxiliary Dam, Sluice and Administration building

Figure 4 – Representative Cross Sections

2.2 The key parameters of the subproject “before” and “after” the project

Table 2 - Key parameters “before” and “after” rehabilitation

No.	Item	Unit	Value	
			Current status	After Rehabilitation
I	Dam grade		V	III
II	Reservoir			
1	Catchment area	Km ²	9.4	9.4
2	Design maximum flood frequency	%	2	1.5
3	Normal water level	m	+39.4	+39.4
4	Design maximum flood water level	m	+40.44	+40.71
5	Effective storage capacity	10 ⁶ m ³	1.97	1.97
6	Total storage capacity at design maximum water level	m	2.76	3.01
7	Possible Maximum Flood (PMF) frequency	%	Not considered	0.01
8	Water Level at PMF water level	m	Not considered	41.59
9	Storage capacity at PMF	10 ⁶ m ³	Not considered	3.963
10	Dead volume Vc	10 ⁶ m ³	0.082	0.082
III	Earth dam			
1	Crest elevation	m	+41.50	+42.30
2	Height H _{max}	m	10.05	10.95
3	Length	m	714.18	798.6
4	Crest width	m	4.0	5.0
5	Elevation of parapet wall	m	+41.9	+43
IV	Spill way			
1	Crest elevation	m	+39.40	+39.40
2	Length of slope	m	49	62.76
3	Width	m	50	50
4	Designed flood discharge	m ³ /s	123.83	120.57
V	Intake			
1	Diameter	m	0.8	0.8
2	Designed discharge	m ³ /s	0.4	0.4
3	Elevation	m	+33.0	+33.0
4	Length	m	44.72	69.00
VI	Auxiliary dam (flood embankment)			
1	Crest elevation	m	+41.5	+42.3

No.	Item	Unit	Value	
			Current status	After Rehabilitation
2	Length	m	450	390.8
3	Height H _{max}	m	2.5	5.7
4	Crest width	m	3	5

2.3 Volume of earth work, list of Machines and equipment used

The volume of earthwork are shown in the Table 2 below

Table 3 - Volumes of earthwork

No.	Item	Main volume under the contract
1	Excavated soil(m3)	40.423,2
2	Embankment (m3)	73.398,9
3	concrete (m3)	5.742,7
4	Stell (ton)	158,8
5	Formwork (m2)	20.286,6

Table 4 - List of machine (main types of machine)

No.	Machine	Quantity	Capacity
1	Dump truck	14 cái	5-10 tấn
2	Truck with crane	1 cái	10,15 tấn
3	Excavators	10 cái	0,5-1,25 m3
4	Bulldozers	6 cái	≥110CV
5	Self-propelled vibrator	3 cái	≥9 tấn
6	Sheep foot roller	2 cái	≥9 tấn
7	Concrete mixers	16 cái	250-500 lít
8	Rod vibrator	14 cái	5,5 Hp, 1,5 Kw
9	Table vibrator	10 cái	75W, 1 Kw, 1,2 Kw
10	Rammer	9 cái	9,8 KN, 98 Kg
11	Electric generator	4 cái	≥50 KVA
12	Air compressor	1 cái	3600EC
13	Drill XY-1	2 cái	1010,790,470, 295/140 v/p
14	Pump piston BW250/50	2 cái	15KW-380v
15	Mortar mixer LH 400	2 cái	400 lít

2.4 Source of materials, location of ancillary construction sites

Filling material will be bought at an existing borrow pit in Tho Tien commune, Trieu Son district. It license number 658/GP-UBND dated 23/02/2013 was issued by Thanh Hoa PPC.

The mine has been being operated by the Cuong Trang Ltd. Co. The borrow pit has land area of 20.051m², exploitation depth is 10m, exploitable volume is 50,000 m³. The soil will be transported to the construction site through 506 provincial roads with a total length of 10,8 km. The volume of soil to be bought is 46.158,3 m³. Cement, sand, stone and steel are purchased at agents in Trieu Son town, is transported to the construction site by 506 provincial roads with a total length of 20km.

Disposal site. Two existing ponds, 1.5 to 2 m deep, with total land area of 10,815m² in villages 4 and 5 of Xuan Du commune were selected.

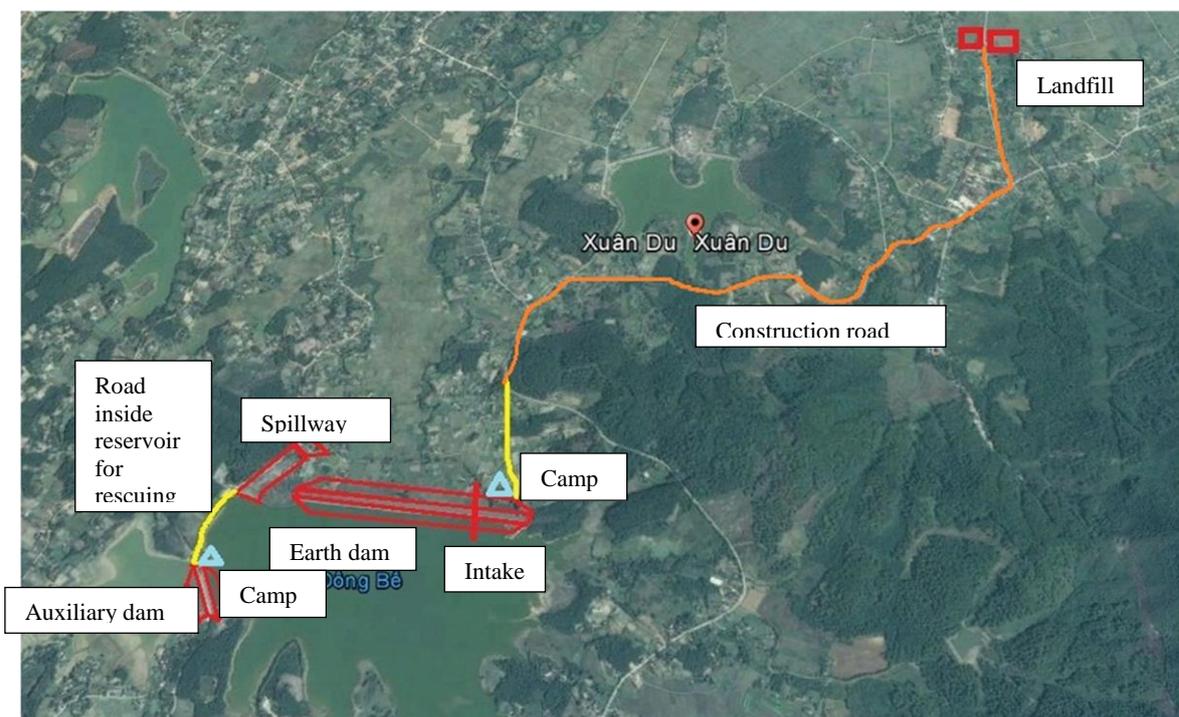


Figure 5 - Location of headworks and ancillary construction sites

Temporary Material storage area. Two zones will be used. Zone 1, 500 m², will be used for access road construction. Zone 2, 500 m², located on the spillway.

Workers' camp. Two sites will be use, each is 500 m². The first site is 100 m from the dam site, currently is abandoned garden and one resident living immediately behind the dam.



Figure 6 - Disposal sites

2.5 Construction Schedule

Construction will be started in dry season. Time of construction is expected in 18 months. The order of construction as follows:

Table 5 - Construction schedule

<i>No.</i>	<i>Items</i>	<i>Schedule</i>	
		<i>From</i>	<i>To</i>
1	Human resources, machinery, construction leveling, warehouse, temporary house	01/3/2018	31/03/2018
2	Main material collection	01/3/2018	31/01/2019
		11/02/2018	31/7/2018
3	Main dam	11/3/2018	31/01/2019
		11/02/2018	30/4/208
4	Auxiliary dam	11/3/2018	30/8/2018
5	Spillway	11/3/2018	31/7/2018
6	Intake work	11/3/2018	30/6/2018
7	Flow conversion for construction	01/3/2018	31/7/2018
8	Road No. 01; Road No. 02	01/3/2018	31/7/2018
		01/5/2018	31/7/2018
9	Operators, electrical systems for operation management	01/7/2018	31/10/2018
10	Acceptance of works	01/8/2018	31/82018

The total estimated cost of the project is approximately 52,589.9 million VND or 2.4 million USD.

No.	Cost item	Unit	Amount
1	Construction	million VND	38,310.7
2	Equipment	million VND	708.8
3	Resettlement, compensation	million VND	1,000
4	Project Management	million VND	679.9
5	Investment preparation	million VND	5,380.4
6	Others	million VND	976.8
7	Contingency	million VND	5,533.3
	Total	million VND	52,589.9

CHAPTER III. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORKS

The subproject does not impact to the ethnic minorities groups, also the addressed areas does not have any natural forests, biodiversity conservation areas, wetlands or the threatened species (includes fauna and flora species). The major impacts of the sub-project to the natural environment relate to the activities of land excavation, reparation of headwork of dam, material and waste transportations, borrow pit exploitation, and some impacts on the local committees due to temporary land acquisition (11 affected households) and permanent land acquisition (12 affected households). The applicable policies, institutional frameworks for environmental and social impacts assessment of the sub-project can be explained below:

3.1 Country's Environmental and Social Safeguards Policies and Legislations

This chapter provides the brief of the relevant environmental and social policies of the GoV and the World Bank. Annex-I includes the detailed description and discussion.

3.1.1 Environment

Law on Environmental Protection (No.55/2014/QH13) dated June 23, 2014 and Decree on Environmental Protection Planning, Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Plans (No. 18/2015/ND-CP) dated February 14, 2015 are key legal framework for environmental management in Vietnam. Law on Environmental Protection (LEP) provides statutory provisions on environmental protection activities; measures and resources used for the purpose of environmental protection; rights, powers, duties and obligations of regulatory bodies, agencies, organizations, households and individuals who are tasked with the environmental protection task. LEP is applicable to regulatory bodies, public agencies, organizations, family households and individuals within the territory of the Socialist Republic of Vietnam, including mainland, islands, territorial waters and airspace. LEP is on regulating strategic environmental assessment, environmental impact assessment and environmental protection commitment. According to Article 10, chapter II of LEP, the responsibility for preparing the planning for environmental protection are as following:

- 1) The Ministry of Natural Resources and Environment shall prepare the national-level planning for environmental protection.
- 2) People's Committees of centrally-governed cities and provinces (hereinafter referred to as provincial People's Committee) shall take charge of formulating processes or preparing the local planning for environmental protection.

Furthermore, the law also indicated to consultation on, inspection and approval of the planning for environmental protection (Article 11, chapter II) as well as the list of entities subject to strategic environmental assessment in appendix I and II of the Decree No. 18/2015/ND-CP dated February 14, 2015 of the Government:

The Ministry of Natural Resources and Environment shall consult with Ministries, regulatory agencies and provincial People's Committees in writing and hold an official consultation with relevant regulatory agencies and organizations during the preparation of the national-level planning for environmental protection.

Provincial People's Committees shall consult with departments, regulatory agencies and People's Committees of a district, town or city (hereinafter referred to as district-level People's Committee) in writing and hold an official consultation with relevant regulatory agencies and organizations during the preparation of the provincial-level planning for environmental protection.

Inspection and approval of the planning for environmental protection shall be required as follows:

The Ministry of Natural Resources and Environment shall establish a Council for interdisciplinary inspection and prepare the national-level planning for environmental protection for submission to the Prime Minister with the intent to seeking the approval for that planning.

Provincial People's Committee shall inspect and approve the report on the provincial-level planning for environmental protection after obtaining written advice from the Ministry of Natural Resources and Environment.

Ministries, ministerial level agencies and Government bodies shall have the responsibility to establish the council or organize the selection of review service organizations to review environmental impact assessment reports of the projects within their competence of decisions and approvals, except inter-sector and inter-provincial projects

Provincial level People's Committees shall have the responsibility to establish the council or organize the selection of review service organizations to review environmental impact assessment reports of the projects that take place within their territories and subject to their competence of decision and approval and that of the People's Councils of the same level.

Management: Unit for Industrial Parks, Export Processing Zones and Hi-tech Zones: Provincial people's committee can authorize the Management Unit for Industrial Parks, Export Processing Zones and Hi-tech Zones as regulated in Decree 29/2008/ND-CP dated 14/03/2008 by the Government on industrial parks, export processing zones and economic zones.

The Section 3 of Chapter II of LEP describes the requirements of Environmental Impact Assessment. Owners of projects regulated in Clause 1 Article 18 of this Law shall carry out, on his own, or hire an advisory organization to carry out the environmental impact assessment and take statutory responsibility for the conclusive result after carrying out such assessment. The environment impact assessment must be performed in the preparatory stage of the project. The conclusive result yielded after carrying out the environment impact assessment shall be expressed in the form of the report on environmental impact assessment. Expenses incurred from the formulation and inspection of the report on environmental impact assessment, and included in total investment budget shall be covered by the project owner.

According to Article 21 of LEP, the consultation to be required in the process of environmental impact assessment is aimed at completing the report on environmental impact assessment. It emphasizes that consultation helps minimize the negative impacts on the environment and human beings and ensure the sustainable development of the project. Project owners are obliged to consult with regulatory agencies, organizations and communities that are directly affected by the project.

The Article 22 of LEP describes the scope of EIA reporting. It will include: (i) origin of the project, project owners, and the competent authority's approval of the project, method of the environmental impact assessment; (ii) evaluation of technological choice, work items and any activity relating to the project which can cause bad effects on the environment; (iii) assessment of current status of natural and socio-economic environment carried out at areas where the project is located, adjacent areas and demonstration of the suitability of the selected project site; (iv) assessment and forecast of waste sources, and the impact of the project on the environment and community health; (v) assessment, forecast and determination of measures for managing the risks of the project posed to the environment and community health; (vi) waste landfill measures; (vii) measures for minimizing the impact of the project on the environment and community health; (viii) consultation result; (ix) environmental management and supervision programs; (x) budget estimate for the construction of environmental protection facilities and

measures to be taken to minimize the environmental impact; and (xi) alternatives to the application of measures for the environment protection.

The Article 23 of LEP defines the authority to verify the report on EIA. The Ministry of Natural Resources and Environment shall arrange to verify the report on environmental impact assessment in respect of the following projects: (a) Projects subject to the decision on investment intentions made by the National Assembly, Government and the Prime Minister; (b) Interdisciplinary or inter-provincial projects stipulated at Points b and c Clause 1 Article 18 in this Law, exclusive of those classified as the secret projects in the field of national defence and security; and (c) Projects verified by the Government's authorized entities. The Ministries and quasi-ministerial agencies shall inspect the report on environmental impact assessment in respect of projects that shall be permitted under their decision and approval, but are not specified in regulations mentioned at Points b and c Clause 1 of this Article. The Ministry of National Defence and the Ministry of Public Security shall arrange to verify the report on environmental impact assessment in respect of projects that shall be permitted under their decision and approval, and those classified as the secret projects in the field of national defence and security. Provincial People's Committees shall arrange to verify the report on environmental impact assessment in respect of investment projects within their territories that are not regulated at Clause 1, 2 and 3 of this Article.

The Article 26 of LEP describes the responsibility assumed by the project owner after being granted the approval of their report on the environmental impact assessment. These include – Clause 1: comply with the requests specified in the approval of their report on environmental impact assessment. Clause 2: where any change in the project size, capacity and technology applied in the project execution is blamed for the negative impact on the environment in comparison with the alternatives given in the approved report on environmental impact assessment, but is not too serious to make another report as stipulated at Point c Clause 1 Article 20 of this Law, the project owner must send their explanation to the agency who grants the approval of the report on environmental impact assessment, and the project shall be commenced only after obtaining the permission from such agency.

The Article 27 of LEP explains the responsibility assumed by the project owner before bringing the project into operation. These include - Clause 1: apply measures for the environmental protection under the decision on the approval of their report on environmental impact assessment; and Clause 2: notify the agency who grants the approval of the report on environmental impact assessment of the developmental process of environmental protection works functioning as an ancillary part of major projects that can cause bad impacts on the environment in accordance with the Governmental regulations. These projects will be commenced only after the agency in charge of the approval of the report on environmental impact assessment has inspected and certified the completion of environmental protection works.

The Article 28 of LEP mentions the responsibility of the agency in charge of approving the report on the environmental impact assessment. These include – Clause 1: Bear the statutory responsibility for their conclusive result and decision on the approval of the report on environmental impact assessment. Clause 2: Within a period of 15 days as from the date on which the project owner's report on the completion of environmental protection works under the regulations specified in Clause 2 Article 27 of this Law, the agency in charge of approving the report on environmental impact assessment must examine and issue the certificate of completion of environmental protection works. Where an analysis of complicated environmental criteria is required, the time span for the issuance of the certificate of completion of environmental protection works can be extended for less than 30 days.

The Article 13 of the Decree (No. 18/2015/ND-CP) explains the requirement of the pertaining EIA agencies. Clause 1: the project owner or the advisory organization conducting EIA must meet all requirements – (a) there are staff members in charge of EIA meeting requirements prescribed in Clause 2 of this Article; (b) there is specialist staff members related to the project obtaining at least Bachelor's degrees; and (c) there are laboratories, inspection and calibration devices eligible for performing measurement, sampling, processing and analysis of environmental samples serving the EIA of the project; if there is not any laboratory with decent equipment for inspection and calibration, it is required to have a contract with a unit capable of carrying out inspection and calibration. Clause 2: the staff members in charge of EIA must obtain at least Bachelor's degrees and Certificate in EIA consultancy and Clause 3: the Ministry of Natural Resources and Environment shall manage the training and issuance of Certificates in consultancy of EIA.

In addition, the following Articles are important for EIA approval and reporting.

Article 14: the authorities for different scales of EIA report approval with deadlines

Article 15: re-compilation of EIA reports

Article 16: responsibility of project owners pertaining to the approved EIA reports

Article 17: inspection and confirmation of environmental protection works serving the operation phase of the projects

Article 21: Reporting.

3.1.2 Dam safety regulations

Decree no.72/ND-CP on date 07/05/2007 of the government of Vietnam regarding on dam safety management. According to the decree, a big dam is the dam with the height calculating from the floor face to the top of the dam equal to or greater than 15 meters or dam of water reservoirs with the scale of capacity equal to or greater than 3,000,000 m³ (three million cubic meters). Small dam is the dam with the height calculating from the floor face to the top of the dam smaller than 15 meters. Dam owners are organizations and individuals owning dams to harness the benefits of water reservoirs or assigned to manage, operate and harness water reservoirs by the competent state agencies. Ministry of Agriculture and Rural Development takes responsibility before the Government for the implementation of state management of dam safety. The Ministry of Industry presides over and coordinates with ministries, branches and relative localities to appraise, approve or submit to the Prime Minister for approval of the process of operating hydropower reservoirs. The provincial-level People's Committees implement its state management on dam safety in the areas.

In chapter 4 of Decree no.18/2015/ND-CP on date 14/02/2015, from the article 12 to article 17 were specified in the formulation, evaluation and approval of environmental impact assessment reports, the implementation of projects and the designed mitigation measures to protect environment before and after a project officially operation. In the article 12 of this Decree also regards on environmental impact assessment process to the project implementation, the project owner have to organize meetings to public consultants, such as Provincial People's Committees, local authority (Commune People's Committees level- CPC), affected (direct or indirect) people or committees in the local by the project implementation, mandatory; analysis the feedbacks, comments obtained from the affected groups, and consider advantage or disadvantage the impacts of the project to community and to design the mitigation measures to reduce the negative impacts on natural environment, biodiversity, community. According to the annex no.2 of the Decree, the project has to make EIA if the reservoir capacity is of 100,000m³ or more. According to the regulations of Vietnam Government, the all proposed subprojects under DRSIP project have to perform the report of Environment Impact Assessment (ESIA).

3.1.3 Land acquisition

The GOV's Legal Framework: The legal framework with respect to land acquisition, compensation and resettlement is based on the Constitution of the Socialist Republic of Vietnam (2013), and the Land Law 2013 (revised), and other relevant decrees/guidelines. The principal legal documents applied for this RPF include the followings:

- Constitution of Vietnam 2013
- The Land Law 45/2013/QH13 which has been effective since July 1, 2014
- Decree No.43/2014/ND-CP dated May 15, 2014 guiding some articles of Land Law 2013
- Decree No.44/2014/ND-CP dated on May 15, 2014 provides on method to determine land price; make adjusted land price brackets, land price board; value specific land price and land price consultancy activities
- Decree No. 47/2014/ND-CP dated on May 15, 2014 providing compensation, assistance, resettlement when land is recovered by the State
- Decree No. 38/2013/ND-CP dated on April 23, 2013, on management and use of official development assistance (ODA) and concessional loans of WB
- Decree No. 72/2007 / ND-CP dated May 07, 2007 of the Government on management of dam safety
- Decree No. 201/2013 / ND-CP dated on November, 27, 2013 of the Government detailing the implementation of some articles of the Law on Water Resources
- Circular No. 36/2014/TT-BTNMT dated 30 June 2014, regulating method of land valuation ; construction, land price adjustment; specific land valuation and land valuation advice
- Circular No. 37/2014/TT-BTNMT dated on 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land
- Decision No. 1956/2009/QĐ-TTg, dated on November 17, 2009, by the Prime Minister approving the Master Plan on vocational training for rural labors by 2020
- Decision No. 52/2012/QĐ-TTg, dated November 16, 2012, on the assistance policies on employment and vocational training to farmers whose agricultural land has been recovered by the State

Other laws, decrees and regulations relevant to land management, land acquisition and resettlement include the Construction Law 50/2014/QH13, dated on 18 Jun 2014, on construction activities, rights and obligations of organization and individual investing in civil works construction and construction activities; Decree 102/2014 / ND-CP on sanctioning of administrative violations in the field of land replaced by Decree No. 15/2013 / ND-CP dated on February, 06, 2013 on quality management of constructions; Decree No. 12/2009/ND-CP of the Government, dated 12 February 2009 on the management of construction investment projects and replacing the Decree 16/2005/ND-CP, the Decree 38/2013/ND-CP of the Government on the management and use of Official Development Assistance (ODA) fund, and Decree 126/2014/ND-CP of the Government on marriage and family Law implementation, stipulating that all documents registering family assets and land use rights must be in the names of both husband and wife; Decisions of project provinces relating to compensation, assistance and resettlement in provincial territory will be also applied for each relevant project province.

3.1.4 Indigenous/Ethnic minority people

Viet Nam has a large number of policies and programs specifically designed to assist ethnic minorities' development. The Government of Viet Nam (GOV) has paid much attention to the welfare of ethnic minority groups. There is a ministerial-level government body, the Committee

for Ethnic Minority and Mountainous Area Affairs (CEMA), which is in charge of management functions for ethnic minorities and mountainous areas. A country profile of Viet Nam published by the International Work Group for Indigenous Affairs (IWGIA) reports that:

“Indigenous peoples are full citizens of the Vietnamese state and enjoy constitutionally guaranteed rights to their languages and cultural traditions. On the legislative level, the “Council on Ethnic Minorities” has the mandate to advise the National Assembly on ethnic minority issues and to supervise and control the implementation of the government’s ethnic minority policies and development programs in ethnic minority areas.”

The document also reports that since the 1960s, a number of policies and programs have been designed specifically for ethnic minorities, but these are mainly aimed at integrating them into mainstream society rather than enabling them to strengthen their own institutions. Regarding land issues, it reports that “it is important to highlight that the present legislation in Viet Nam allows for obtaining use right certificates for land and forest and that in 2004 the National Assembly passed a new land law which, most relevant for indigenous peoples, now includes the category of “communal land”. By introducing the concept of communal land, the new law provides for the possibility of communities to apply for certificates over communal land.

3.2 Implications of National Policies and Regulations on the Proposed Project

Based on the analysis of the national legal framework, the project will have to fulfil the following minimum requirement and process:

- PPMU or the consulting firm conducting EIA must have staff members in charge of EIA must obtain at least Bachelor’s degrees and Certificate in EIA consultancy. They will also have or arrange adequate laboratory facility for performing measurement, sampling, processing and analysis of environmental samples serving the EIA (Ref. Article 13 of Decree).
- Considering the nature of the subproject, the Provincial People’s Committee (PPC) shall assess and approve EIA reports (Ref. Article 14 of Decree). PPC shall arrange to verify the report on environmental impact assessment in respect of investment projects within their territories (Ref. Article 23 of LEP).
- The assessment of EIA report shall be conducted by the EIA report assessment council established by the Heads of the EIA report assessment authority with at least 07 members. Members of EIA report assessment council shall consist of 01 President, 01 Vice President where necessary, 01 Secretary member, 02 Opponent members and other members, which at least 30 percent of the Assessment council members having at least 06 years' experience in the EIA field (Ref. Article 14 of Decree).
- Deadlines for assessment of EIA report is within 30 working days from the date on which the satisfactory application is received (Ref. Article 14 of Decree).
- PPMU will have to comply requests specified in the approval of their report on EIA. For any change, the project owner must send their explanation to PPC (Ref. Article 26 of LEP).
- PPMU will notify PPC and the rehabilitated dam will be commenced only after the agency in charge of the approval of the report on environmental impact assessment has inspected and certified the completion of environmental protection works (Ref. Article 27 of LEP).
- PPMU will prepare a completion report for environmental protection work and within 15 days of receiving the report, PPC must examine and issue the certificate of completion of environmental work (Ref. Article 28 of LEP).

- The inspection of environment protection works serving the operation phase of the subproject shall be carried out by an Inspectorate which is established by the Head of PPC (Ref. Article 17 of Decree).
- The PPC shall send a report on assessment and approval for EIA report, registration and inspection of specific environment protection plans, inspection and approval for environment protection works in the province of the previous year to the Ministry of Natural Resources and Environment before every January 15 (Ref. Article 21 of Decree).
- MARD shall send reports on assessment and approval for EIA report, inspection and approval for environment protection works of the previous year related to project under their management to the Ministry of Natural Resources and Environment before every January 15 (Ref. Article 21 of Decree).

3.3 World Bank Safeguard Policies

The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. Safeguard policies provide a platform for the participation of stakeholders in project design, and act as an important instrument for building ownership among local populations.

The effectiveness and development impact of projects and programs supported by the Bank has substantially increased as a result of attention to these policies. The World Bank Safeguard policies are available in its website: <http://web.worldbank.org/BSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTSAFEPOL/0,,menuPK:584441~pagePK:64168427~piPK:64168435~theSitePK:584435,00.html>.

3.4 Implications of World Bank Safeguard Policies on the Proposed Project

Eight World Bank policies have been triggered for the project. These are: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Pest Management (OP/BP 4.09), Physical Cultural Resources (OP/BP 4.11), Indigenous Peoples (OP/BP 4.10), Involuntary Resettlement (OP/BP 4.12), Safety of Dams (OP/BP 4.37) and Projects on International Waterways (OP/BP 7.50).

According to WB Operational Policy (OP 4.01), the nature of environmental assessment to be carried out for a particular sub-project would largely depend on the category of the sub-project. As mentioned earlier, The World Bank Operational Policy (OP) 4.01 classifies projects into three major categories (category A, B and C), depending on the type, location, sensitivity and scale of the project, and nature and magnitude of potential impacts. Considering the environmental risk and complexity related to a large number of subprojects to be implemented in a widespread area, the project has been classified as category 'A'. However, the subprojects to be funded under the projects can be categorized as 'A' or 'B' depending on the extent, scope and impact of the specific subproject.

The project physical activities would only work on existing dams and are not expected to lead to conversion or degradation of critical or semi-critical natural habitats. However, it is required to scope, screen and assess potential impacts to natural habitants as part of the subproject ESIA. The project will not finance any procurement of fertilizers and pesticides. However, since the dam rehabilitation work will increase the agriculture command areas, there are chances of more uses of fertilizers and pesticides in the project influence areas. The project will promote the application of Integrated Pest Management (IPM) and guidance will be included in ESMF.

Since the exact subproject locations are unknown at this stage, there is possibility that some rehabilitation work and access road may pass through areas with physical cultural resources. The impacts will be examined as part of the environmental screening/assessment of different

subprojects. In addition, 'Chance find' procedures conforming to local legislation on heritage would be evaluated so that any physical or cultural resources are not impacted.

The project may intervene in areas where indigenous people live. In addition, the project may require land acquisition and resettlement. As such, an Ethnic Minority Policy Framework (EMPF) and Resettlement Policy Framework (RPF) are prepared separately.

The project will not finance construction of any new dams or significant change in dam structure. This policy is triggered as the project will finance rehabilitation and improvement of existing dams including large dams (15 meters or more in height). Thus, it requires to arrange for one or more independent dam specialists to (a) inspect and evaluate the safety status of the existing dam, its appurtenances, and its performance history; (b) review and evaluate the owner's procedures for operations and maintenance; and (c) provide written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety. Policy and practice relating to dam safety needs to meet international benchmarks, such as those are laid out by ICOLD and the World Bank regulatory frameworks for dam safety. These measures are designed into the project, which includes the establishment of a national dam safety review panel (DSRP). Also the project will establish an independent Panel of dam safety Experts (PoE) who will carry out independent review of dam safety reports and proposed mitigation measures. This PoE will be working closely with the to-be-established DSRP to ensure the technical integrity of investment interventions. Each subproject will have separate Dam Safety Plan (DSP) in addition to the ESMP.

The WBG guidelines provide guidance on certain EHS issues, which include standards for environmental parameters (ambient air quality, water and wastewater quality, noise level, waste management), hazard and accident prevention, occupational and community health and safety (during commissioning and decommissioning works) etc. These guidelines will be directly applicable to the proposed project. As a general rule, the WBG guidelines should complement the existing Vietnam guidelines or standards. In case the Vietnam guidelines or standards differ from the WBG guidelines, project is expected to follow the more stringent ones.

The World Bank access to information policy would be directly followed. The project will make the environmental/social assessment and ESMF documents available to the public by publishing it in their websites. In addition, Hard copies of these documents in English (including Vietnamese language) will be made available in the MARD and all DARDs.

CHAPTER IV. SOCIOECONOMIC AND ENVIRONMENTAL CONDITIONS

4.1 Physical Characteristics

4.1.1 Climate and Meteorology

Dong Be reservoir is located in the tropical monsoon which is characterised with hot, humid weather and high rainfalls. There are around 1600 to 1800 hours of sunshines each year. The average annual temperature is 23.1°C.

The average annual rainfall is from 1,600 – 2,300mm. There are approximately 90 to 130 days of rain each year. Rainy season starts from May to October, dry season from November to April. Rainfall in rainy season accounts for 60% of the annual rainfall. Irregular rainfall happens in August, September and October. In the months of rainy season, heavy rains come in a few days and often cause floods. Rains leading to small flood usually occur in late May. Heavy rains occur from July to November, when the tropical convergence zone moves through the region, along with weather disturbances such as storms, cyclones, grooves. Rainfall from December to April of the following year is 150mm, accounts for 5 to 10 percent of rainfall in rainy season.

The average annual relative humidity ranges from 79 to 92%. Humidity is very low in the first months of summer. Hot dry wind has detrimental effects on vegetation, drought is most severe in the years having strong westerly wind and the rainy season comes late.

Prevailing wind direction in winter is northwest and northeast; in summer is east and south.

The prevailing wind direction easterly and southeasterly but it changes by seasons. In the beginning of winter, the wind blows from northwest to northeast, then gradually change to northeasterly to easterly or southeasterly wind. Maximum wind speed (P = 10%) is 21.0 m/s, wind speed (P = 50%) is 14.0 m/s.

Hurricanes affect Thanh Hoa from the beginning of June till the end of November. Most of the storms carry a high rainfall high rainfall, from 200 - 500mm in a long duration and in large area. During storms, wind speed can reach 30 to 40 m/s in coastal plains, 30 m/s in the midland plains and over 20 m/s in the mountains.

4.1.2 Topography

The reservoir is formed from a valley surrounded by low hills. Ground elevation of the reservoir bed varies from + 31.00m to + 38.00m. Ground elevation in the project area is lower from southwest to northeast toward the Dong Be stream. The irrigated area is relatively flat, ground elevation varies from + 20 m to + 30 m. The total area of cultivation land is 225 ha of Trieu Thanh commune in Trieu Son district and Xuan Du commune in Nhu Thanh district.

4.1.3 Geology

The hills surrounding the reservoir comprise of heavily weathered rock hills, there is now castor, and reservoir bed is made of sedimented rocks and soil. In general, the dam was built on bedrock, however, weak foundation which is made of the sediments at the downstream side of the dam was treated properly, and localised seepage occurred, water was stagnant at the foot of the downstream slope. The thickness of the weather material is thick, up to 5 m, in the catchment. Weathering process seems to be slow down with good vegetation cover has been well-developed well on the mountain slopes. Land slip or is not observed in the area including upstream area.

4.1.4 Water Resources

30 samples of surface water were tested and compared with QCVN 08: 2008 / BTNMT: National technical regulation on surface water quality, level B1 - for irrigation purposes. Many parameters meet the standard for irrigation: pH values ranges from 6.8 to 8.3, DO from 4.3 to 6.4 mg/l, NO₃ ranges from 0.3 to 2.9 mg/l, NH₄ was from 0.01 to 0.41 mg/l. COD and BOD values vary from 14.3 to 32.9 mg/l, and 7.8 to 16.2, respectively. Nm₂₉ has COD value 1.9 times higher than allowable level (30 mg/l) and BOD value was at 16.2 mg/l which is 1.05 times higher than standard (15 g/l).

Surface water quality in the project area remains relative good because the upstream area is the territory of the Phuong Nghicommune with 87% of ethnic minorities. This is a mountainous rural area and there is no industrial activities, the main economic activity is agriculture and animal husbandry but houses are scatterly distributed. The edge of the reservoir are covered with regenerated forest.

20 samples of groundwater were taken in the project area. Test results show that all parameters are within the allowable limit. Hardness varies from 105 - 420 mg/l (<500 mg/l), NO₂ are from 0.02 to 0.56 mg/l, NH₄ + was from 0.002 to 0.09 mg/l, (standard 0.1 mg/l). Arsenic contents of the samples area are lower than standard.

4.1.5 Water Usage and Management

Dong Be reservoir is used to store the water for irrigation for agriculture and flood control. Water from the reservoir has also been used for non-drinking purposes such as washing and bathing. The Song Chu Company operate irrigation system for 255 hectares of Xuan Du and Trieu Thanh communes. Non-drinking domestic water supply shares the same water intake with irrigation.

255ha of crop lands in Trieu Thanh and Xuan Du commune are irrigated by the water from Dong Be reservoir.

Table 6 - Crop land irrigated by water from Dong Be Reservoir

Crop	Winter-Spring		Summer-Autumn		Winter
	Rice	Vegetables	Rice	Vegetables	Vegetables
Dong Be	125	70	200	55	0

The reservoir also supply water for domestic and industrial users at rate 2,592m³/day or 30l/s, which is less than 10% of irrigation. On the other hand, when drought happen, water from Dong Be reservoir also used to irrigate from 25 to 60 ha located at the end of the C6 irrigation system of Bai Thuong village in Hop Thanh commune, Hop Thang communes of Trieu Son district.

Currently the majority of local households in the project area use groundwater for domestic uses. A few households use rainwater. Groundwater has been extracted mainly through UNICEF supported boreholes schemes or dug wells.

Water is distributed to the irrigated area through culverts located within the dam body and irrigation channels N1 and N2. The N1 and N2 irrigation brick canals have been seriously degraded thus cause very low hydraulic conductivity. The management unit of Dong Be reservoir has three staff from the Song Chu Company. The annual budget from the state's irrigation fund for the operation of reservoir is about 350 million is only enough to cover basic operational and regular maintenance cost but not for major repairs. Due to the unsafe condition of the current dam, the reservoir's water level has been kept lower than normal. Together with

the leakage occurred, irrigation has not been sufficient during late March and April which is the end of dry season.

For every crop, the communes inform the Song Chu company their communal agricultural production schedule and water demand so as the Company prepare operational plans accordingly. Each time, the reservoir open the intake work for irrigation in about one week. Irrigation team members are mostly elderly men and voted by rural communities to undertake the infield irrigation.

4.1.6 Air Quality

33 air samples was tested and found that dust concentration, CO, SO₂, NO₂ and noises all below the national standard QCVN 05: 2013 / BTNMT for air quality and QCVN 26: 2010 / BTNMT for noise.

4.1.7 Soil Quality

33 soil samples was taken and tested from heavy metal contents. The results show that heavy metal contents in soil in the project area are very low and well below permissible limits specified in Vietnamese National Standard QCVN 03: 2008 BTNMT. As content was 0.35 to 8.83 mg /kg, lower than standard at 12 mg / kg;Cd was 0.10 to 1.84 mg/ kg while standard is 2 mg /kg);Cu was from 1.86 to 26.05 mg /kg whilestandard is 50 mg /kg); Pb and Zn contents were from 2.44 to 41.15 mg /kg (standard 70 mg/kg) and from 6.91 to 72.06 mg /kg (standard 200 mg /kg), respectively;

4.2 Biological Resources

The project area has 3,052 hectares of forestry land, accounting for 43% of total natural area.

Floral species are relatively diverse, the most popular plants in forestry land are *Canarium album*, *Liquidambar formosana*, *Lagerstroemia tomentosa*...The secondary bamboo are mostly found at the banks of streams. Species mostly belong to minor family of Bambusoideae with the species in genus of *Dendrocalamus*, *Bambusa* và *Schizostachyum*.In secondary shrub communities that intersects with scattered evergreen broadleaf multispecies such as *Randia spinosa*, *Aporosa sphaerosperma*, *Phyllanthus reticulatus*, *Cratoxylon pruniflorum*,... The species in the components of community are mainly shrub trees, with height of 2-4 m, evergreen, broadleaf. The advantage Shrubs or dominant shrub trees include *Randia spinosa*, *Aporosa sphaerosperma*, *Phyllanthus reticulatus*, *Cratoxylon pruniflorum*, *Breynia fruticosa*, *Wendlandia paniculata*, *Euodia lept*, *Psychotria rubra*, *Ardisia helferiana*, *Mallotus paniculatus*, *Dicranopteris linearis*. On the wet lands, it's noted that there is appearance of *Musa coccinea*, *Arenga pinnata*. In the possible regeneration, the species of timber appear scattered. Common species are *Liquidambar formosana*, *Macaranga denticulata*, *Mallotus paniculatus*, *Trema orientalis*, *Cratoxylon pruniflorum*, *Breynia fruticosa*.



Figure 7 -Secondary shrub community

Surrounding the Dong Be lake are forestry land owned by local communities, mostly are eucalyptus and acacia mixed with shrubs and fruit trees such as mango, jackfruit, guava or lemon. Most of the trees were newly planted so the trees were small; diameters are less than 10cm and lower than 5m. Natural vegetation cover is mostly grassland, vines or shrubs. The most common species are *Saccharum spontaneum*, *Miscanthus japonicus*, *Imperata cylindrica*, *Thysanolaena maxima*, *Themeda gigantea*, *Neyraudia reynaudiana*; they regenerate after the harvest. They distributed over an area of cleared forest, repeated many times by shifting cultivation. The advantage grass species are *Saccharum spontaneum*, *Miscanthus japonicus*, *Imperata cylindrica*, *Thysanolaena maxima*, grow interspersed with shrub. The common shrub species are *Cratogeomys* sp., *Cratogeomys formosum* (Clusiaceae), *Breynia fruticosa*, *Aporosa sphaerosperma*. They are distributed scatterly in the mountainous area in the project area, has low breeding value to animals, low resistance to erosion.

Fauna species in the area is very poor due to strong impact of human activities including cultivation, residency and transportation; Most common are livestock. Local people reported that there is no sign of wild animal such as tiger, leopard, python, serow, bear, porcupine, pangolin for a many recent years, sometimes, they see some reptiles such as snake, amphibian (frog, toad), or rodents (rats, porcupines).

Freshwater Aquatic Community. Sampling of floating flora in the area surrounding the Dong Be reservoir found 29 algae species which belongs to five branches including Chlorophyta (largest number with 18 species accounted for 62.07%), Bacillariophyta (13.79%), Cyanophyta (10.34%), Euglenophyta and Pyrrophyta (6.90%).

Table 7 -- Floating flora in Dong Be reservoir

No.	Taxon	Number of species	Percentage %
1	Bacillariophyta	4	13,79
2	Chlorophyta	18	62,07
3	Cyanophyta	3	10,34
4	Euglenophyta	2	6,90
5	Pyrrophyta	2	6,90
Total		29	100

The average density of algal cell is 133,613 cells/l, the values range from 110,700 to 152,300 cells/l. N2 canal area inside the forest management station has Xuan Du highest density, at 152,300 cells/liter. The area at the left shoulder of the dam has the lowest density, at 110,700 cells/l. The composition of phytoplankton species does not have any absolutely dominant species. This is consistent with the characteristics of freshwater algae composition in Vietnam. There is no known species listed in the Red Data Book of Vietnam (2007) and IUCN 2015 in the project area.

Floating fauna is an important part of the food chain, many of them are food for fish and they are very sensitive to changes in water quality. Sampling in the reservoir found 25 species, 12 families, 3 groups, 2 classes, and two sector namely Rotatoria and Arthropoda. Arthropoda is popular with 16 species, accounts for 64% with 8 families. Rotatoria has 9 species belong to 4 families accounts for 36%. The average density of individuals in the area is 37,660 individuals /m³, the values range from 23,800 to 50,200 /m³. Highest density at 50,200 individuals/m³ was found in the area in the right shoulder of the auxiliary dam and lowest density, at 23,800 individuals per cubic meters were found in rice field next to N2 channel in Village 1 of Xuân Du commune.

There are no known species listed in the Red Book of Vietnam (2007).

Fauna living in the bottom of water bodies has low mobility thus vulnerable to environmental changes. Species community living in the bottom layer of Dong Be reservoir is relatively diverse with has 12 fauna species in 4 families. Among them are arthropoda with 8 species, accounts for 66.7%, in which Crustacea and Macrura (prawn) has 4 species, Branchyura (crab) has only one species, and Insecta has three species. Mollusca has 4 species, account for 33.3%, in which Gastropoda and Bivalvia has two species each. These are common species found in unpolluted freshwater ecosystems, none of them are listed in Vietnamese Red Book. (2007).

According to Đặng Ngọc Thanh and colleagues (1979), the density of species living in the bottom layer depends on the characteristics of the bottom layer and environmental quality. The average density is 31 units/m² and can be varied between from 16 to 49 units /m². Highest density were observed in the drainage canal located in Village 11 of Triệu Thành commune, Triệu Sơn with 49 units/m² while 16 units /m² were observed near the spillway.

Freshwater aquatic ecosystems in Dong Be reservoir and its feeder streams as well as the stream behind spillway channel are characterised with the presence of *Phragmites vallatoria*, *Ludwigia adscendens* plants; submersible plants are *Vallisneria*, *Hydrilla verticillata* and the floating communities comprises of are *Eichhornia crassipes*, *Pistia stratiotes*, *Salvinia cucullata*. Results of analysis of the algae were determined in the presence of 29 species of algae belong to 5 branches Bacillariophyta, Chlorophyta, Cyanophyta, Euglenophyta and Pyrrophyta.

The catchment has been heavily affected by human activities in a long time. There are no known rare or threatened species in the project area. Shrimp, crab, fish ball, carp were reported to be left in the project area. Sesame fish, carp, and tilapia unisex fish have also been farmed in project areas.

4.3 Socio-economic

4.3.1 Population and Demographic

The total population in the project area is 24,716 people. Average population density is 475 people/km², 1.5 times higher than the average population density of Thanh Hoa province which is 312 people/km² (GSO, 2013). The average number of person per household of two communes is 4.1 persons/household, similar to Thanh Hoa province with 4 people/HH. Average percentage of ethnic minority (EM) of the two communes is 32.5%.

Table 8 - Population structure in Xuan Du and Trieu Thanh communes

Commune	Population (people)	Number of households	Ethnic minorities (%)	Females (%)
Xuan Du	7229	1602	35	49,2
Trieu Thanh	5792	1544	30	53
Total	13021	3146		

Between 15% - 30% of the population in each commune do not reside in their homeland regularly but are working elsewhere either for long term or seasonal. Xuan Du commune has 1,300 people working outside the communes 32 people are working abroad. The negative

impacts of labour export include (i) the lack of labour in the locality to carry out heavy agricultural work (such as plowing, although not this has been gradually mechanized and people can hire machines); (ii) the burden of housework is put onto the people who stay behind, particularly the women, the aged people. Children only being take care by grandparents or relatives may be profoundly affected psychologically.

4.3.2 Land Use

The project area covers four communes namely Phuong Nghi, Xuan Du of Nhu Thanh district and Trieu Thanh, Hop Thanh of Trieu Son district.

Table 9 - Land use in the subproject area

Commune	Natural land (ha)	Agriculture land (ha)	Forestry (ha)	Aquaculture (ha)	Residential (ha)
Trieu Thanh	1092.06	452.21	211.12	56.77	420.09
Xuan Du	1708.74	535.35	590.26	16.80	100.00
Hop Thanh	668.08	405.63	19	5	121.47
Phuong Nghi	3634.8	419.83	2231.56	28.89	41.3

Average population density is 475 people/km², 1.5 times higher than the average population density of Thanh Hoa province which is 312 people/km² (GSO, 2013). The average number of person per household of two communes is 4.1 persons/household, similar to Thanh Hoa province with 4 people/HH. Average percentage of ethnic minority (EM) of the two communes is 32.5%.

The average agricultural land are of each household in the two communes is approximately 0.3 ha/HH. Regarding residential land area, each household in Xuan Du commune has average of 600 m², lower than 2700 m²/HH in Trieu Thanh commune. Xuan Du commune is the main benefited commune from Dong Be reservoir with command area of 225 ha, while Trieu Thanh commune has only 24 ha of irrigation from the reservoir.

4.3.3 Infrastructure

Roads. In the project area, rural road system has been relatively well- developed with 100% communes have access roads to the commune center; most of public buildings in these communes are accessible by cars. Provincial road No. 506 passes these communes with total length of 6.5 km and in good condition.

Electrical Power Supply. Overall, the existing power grid has covered all residential area in the subproject area. Power supply meets the basic demand of local people. The power grids are being managed by the Trieu Son and Nhu Thanh Electricity companies. Although made efforts were made to improve the power system, it is still not safe. Most parts of the electrical system in the project area are 15 to 20 years old thus being degraded, particularly households connection cables. On the other hand, the awareness of local people on safety in electrical use is very limited, thus the safety risk related to the power grid is very high.

Culture. The Phu Na temple is located 3 km the north-east of Dong Be dam, 500 m from the provincial road 506. The main festival of the temple is from lunar January to March every year. Up to 14 thousand visitors come to this temple in lunar January. Maintain local security, hygiene, environmental sanitation and forest fire prevention has been the main issues that local authority has to address during this festival time.



Built in the early 19th century, Phu Na temple is located at a location with beautiful landscape that is made of mountain and lake. The temple was built mainly for worshipping the Ba Trieu, a national hero, and the Lieu Hanh Princess.



Figure 8- Phu Na Temple, a historical and religious site in the subproject area

Water supply. The majority (90%) of households in the subproject area use water from wells and boreholes for domestic use. 10% of households use water from the Dong Be reservoir for non-drinking purposes such as bathing and cleaning. Drinking water sources in rural areas include wells and boreholes, rain water have been used by 98% of people in the subproject area. It is noticeable that people in the subproject area do not use water from ponds and reservoir for drinking. In the subproject area, water for drinking and domestic use does not meet demands or standards.

Sanitation. There are 5 main reasons caused negative impact on the health, namely polluted water, polluted residential areas, food insecurity, disease and lack of domestic water. Two of the five most important caused adverse impacts on public health related to lack of access to clean drinking water. According to the survey, 82.5% of households use latrines.

4.3.4 Economic structure and Sources of Main Incomes

In terms of economic structure, the two communes have agriculture weighted higher than handicraft and service sectors (non-agricultural). According to local CPCs, the rates of households living mainly on agriculture in Xuan Du and Trieu Thanh communes were 96% and 91%. The average annual income per capita of the people in Xuan Du commune is 22.9 million/year, higher than that in Trieu Thanh commune, at 12.8 millions/year.

Interview also showed that the rates of households engaged in agriculture are also high. the occupations of interviewed households including (1) not working due to poor health condition, (2) Agriculture, forestry and fisheries, (3) Business and services, (4) government officers (5) Students, (6) handicraft or industry, (7) Workers (8) Retired, (9) freelance, (10) Jobless. the chart below synthetic shows that the percentage of people engaged in agriculture, forestry and fisheries was 46.7% which is lower than the rate of agricultural households provided by the CPC. This is due to agricultural households also include those who do other jobs such as students (25.8%), workers or retired (nearly 10%). Percentage of people without jobs is very low, only one case in the sample, accounting for 0.2%. Percentage of people involving in vocational training, services, handicraft and industry is also very low, at 1% and 0.2%.

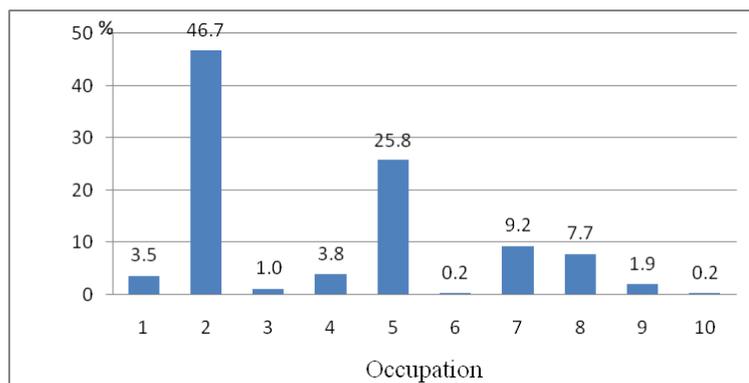


Figure 9-Occupation of household's members

The main income sources of most households in project area are mainly from agriculture including cultivation and husbandry. The main crops are paddy rice, maize, soybean, groundnut, sugarcane, vegetables and some fruit trees. Depending on locality and water availability, farmers plant two (one rice + vegetables) to three (two rice + vegetables) crops per year. However, a lot of people suppose that their current agricultural production is unstable as it depends too much on weather and the operational conditions of irrigation reservoir. Specifically, Trieu Thanh commune has 19 small reservoirs irrigating crop lands.

Besides the income almost from rice farming, a lot of farmer HHs in the districts plant sugarcanes and sell to Lam Son sugar factory. The sugarcane area in Xuan Du and Trieu Thanh communes are 32 ha and 50 ha. It seems that the income from sugarcane is unstable due to variable demands of the sugar factory. When sugar stock is high in their storages, the factory doesn't buy sugarcane from farmers or buy but at low price. On the other hand, Xuan Du commune also has advantage of peach blossom tree cultivation which brings about high economic benefits for many households.

Domestic animals raised by families in the project area are cows, buffaloes, pigs and poultries. The cattle are raised for draught and for selling. Poultries are rarely sold and mainly for family consumption (daily food). Some households developed model of household's farm. Fluctuation of cattle prices also affects considerably farmers. The incomes from selling some cattle and pigs are used for purchasing household furniture, assets, etc.

Poverty is one issue in the group discussion with people in the communes. Xuan Du commune has poverty ratio of 3.2% while Trieu Thanh has higher ratio of 22.9%.

Labour export tends to rise in the locality because this is a way to effectively reduce poverty. The female workers often work in Hanoi for cooking, masonry, selling clothing, and agricultural products. Many women went to Taiwan to work for housework, or garment workers, assembly factory in the electronic components.

Earnings from working in other areas other than their homelands have been a significant source of income for families in the commune. These provide funds for agricultural production activities of many households as the monthly income of people working away from home can be 6 times higher than that from agriculture.

4.3.5 Education

Both communes have fully equipped kindergartens, primary and secondary schools. Learning promotion has been conducted in the communes. Each commune also has community learning center where training activities including agricultural extension classes and communication on scientific, technical knowledge were conducted for the farmers in the village.

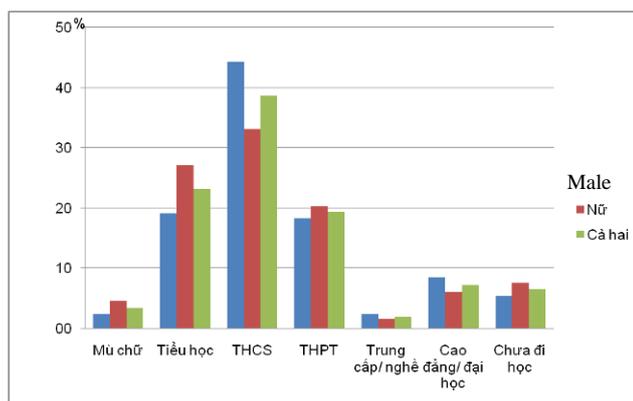


Figure 10-Education level

The chart shows that nearly 40% of people passes secondary school, in which there are more men than women. The illiteracy rate is around 3% but in which there are more female than males. Percentage of people attending vocational school is very low, only 2%, but the rates of people holding university degree is at 8% and divided equally between men and women. Basically, the people here have access to basic education at primary level, most of them are literate.8% of households with children in school age (5-17 years old) but have given up their education due to economic hardship to families and these 16 boys and 10 girls had to support their families with household works.

4.3.6 Health care

86% of the surveyed households had a sick person during last year. Among them, 76% got flu, 26% had respiratory diseases and the rests had malaria, cholera, hepatitis, high blood pressure, accidents and injuries. With common illnesses such as colds, flu, cough, rhinitis, 65% of the people met medical staff in commune health center. Their second choice of health care is in district hospitals (62% interviewees). About 22% had treatment in provincial hospital; there is no case in the central-level hospital.

60% of interviewed people said that the main factors adversely affect people's health are unsafe foods, vegetables and contaminated drinking water sources. Especially, the households living near the cemetery said their well water has been contaminated. 75% of people have health insurance to reduce the health care costs.



Figure 11-Clinic of Trieu Thanh commune

Each commune in the project area has communal clinic. The buildings are commonly grade 4 houses that were built long time ago. Clinic in Xuan Du has 14 beds and 6 medical staff including one chief, 2 doctors, and 3 nurses. Trieu Thanh Clinic has 11 beds and 5 medical staff. Each treatment room is divided into sections such as clinic, pharmacy. These stations have only minimal equipment to treat common diseases.

When asked about the sexual transmitted diseases such as HIV/AIDS, 50% of people are aware of. Most people (88%) still thinks that AIDS is an incurable disease. However, 90% of people

are aware of the precautions such as not sharing needles and using condom during sex. Mostly people receive information through broadcasts on television (92%) and others from the community meetings (25%).

Access to health clinics is important for women. Most ethnic minority women give birth at the health care centre of the commune. The villagers presently could access easily to the commune health care centre or village's nurses. However, consultations and group discussion show that women with gynecological problems make up the high rate in almost localities. The causes were supposed to be related to environmental condition and working conditions of women (unsafe water, lack of sanitary bathing places or flood). Local people have limited knowledge and information on disease prevention and treatment of both men and women. A lot of men expressed that they have never heard or discussed about prevention of diseases of the reproductive organs and are not aware of that husband needs to have coordination activities with his wife in gynecological treatment.

4.4 Gender analysis

Divisions of labor by gender. Women account for more than a half of population (49.2% in Xuan Du and 53% in Trieu Thanh) and accounts for nearly 60% of the labor force in two communes. The middle-aged women and men are the main labor force in agriculture in project area because many young men have been working far from their localities. Plowing and harrowing have been mostly carried out by men while seedlings, harvesting, applying fertilizer and weed removal have been done by women. Many women and men who have been away returns to their locality during peak agricultural production stage. Men play decision-making role about production and investment of the household.

In the project area, women undertake about 80% the household work. Women have been working more than men 10 to 12 hours each week. Housework division still remains as traditional. In family, women take the main responsibility of housework and taking care of children. Although a lot of men think that they should share housework with their wives, but in fact, average time of working of women is much longer than of men. As the result, women are too busy and have no time for relax. In two communes, average time that a woman works per day reaches about 10 to 11 hours. Almost women are farmers but beside the income-generating activities, women are also overloaded with almost household chores and taking care of family's members.

The traditional concepts about gender and obstacle on time have hindered women's participation in decision-making at community. The gender analysis result also confirms that women's understanding on the proposed projects and their participation into community's monitoring activities are more limited than men. This means that the future training on gender of the project should more highlight and emphasize on that women need more share from their family's members in household chores to have more time for relax and health-care.

Women and domestic violence prevention. Since the Law on Gender Equality and Domestic Violence Prevention was passed 2007, improvements were recorded in the project area, especially in increasing awareness on gender issue and implementation of the capacity building program on gender and domestic violence prevention. Before, domestic violence was considered as the internal matter and then solved and kept secret in family without any interference of others. The cases of domestic violence have much reduced compared with 5 years before thanks to various communication programs on gender equality. In case of receiving any reports of domestic violence, the local authorities and neighbors will intervene to protect the victims or women. This is considered as a significant progress to the situation of community's indifference and carelessness to violence against women happening popularly in

rural area before. However, the participants of group discussions expressed that a lot of men still beat their wives as being drunk. Although essence of ethnic minority people is fairly benign but due to drug addiction and poverty, they may feel sorrow, falling deep into drinking and cause more domestic violence.

Women's participation in village's community. Women have more actively participated into the community's activities as village's meetings. The women are generally active participate in training course on agricultural techniques at local dispel the current view of reality "men learn but women practice". The women union is considered as a dynamic mass organization at grass root level and plays an important role in economic development activities and environmental protection of localities. Commune Women Unions are the core member of various programs such as environment protection programs of village, new rural construction and propagation of HIV prevention, prevention of trafficking women and children, monitoring the resettlement programs and programs of new rural development.

Locals appreciate the role of women in the successful implementation of micro-credit program for families and they are in need of capital for economic development, construction and repair of sanitary facilities. All commune governments have recognized the WU as one of the most active organizations in the community. However, women are just as undertaking forces who are actively involved in community activities, but don't have the corresponding voice and position in the decision-making at all levels involved.

Gender equality and political participation. There are a lot of improvements in gender equality issue compared with 5 years ago. Currently, men, including EM men, have more shares with their wives in housework such as cooking, washing and taking care of children. The change of putting both name of husband and wife into LURCs is evaluated as an important legal foundation to protect women's rights in HHs. This becomes much more practically effective to protect their rights when the compensation on affected land or other assets will be implemented for these districts in future.

Women's position has been improved, although still slowly. There have been more women recruited in authority units. There have been more women participating into grass root level authority and party. Currently, women have better understanding on social, economic and cultural issues. Living quality (health, clothing, housing, transportation and cultural demand) has been improved; birth ratio of commune has significantly reduced, from average of 3-4 children/ woman to 02 children/ woman.

However, there are a number of three children or more in a EM HH. Conditions for women to further study are not favorable due to the burden of production and family care. The commune conference commented psychological inferiority, limited communication skills and tight time budgets are these factors reduce the opportunities for advancement of women. In addition, they are faced with gender stereotypes. This is still the traditional concept "preference for boys over girls" and disregard for organizational capabilities of women because thinking that male leaders are always better than female leaders. Psychology of "preference for boys over girls" remains popular among populations of all communes.

4.5 Site-Specific Baseline Conditions

The Dam.

The construction of Dong Be reservoir was completed in 1991. So far, there have been two incidents caused by large storm, causing flood and damage to property and crops of people in the region in 1991 and 1996.

Soon after being put into operation, in May, 1991, the water level rose 70 cm higher than top of spillway causing damage of slope, downstream of spillway, strong seepage through the dam

body, leakage through the intake. Inundation occurred in the entire of Dong Bun village, Xuan Du commune.

After the storm in May, 1991, a new auxiliary dike was built at 300 m away from the left edge of dam, the old auxiliary dam was removed to expand reservoir bed. The slope of spillway was rehabilitated, downstream side was covered by concrete.

In 1996, large flood causes break of auxiliary dam, flooding and loss of 20 ha of rice, crops and property of the people in Trieu Thanh commune. After this incident, the Song Chu IMC rehabilitated the spillway with additional cover of reinforced concrete on spillway, expansion of stilling basin, tightening intake structure.

In 2003, the IMC continued to build wave protection wall on the top of the dam, filling additionally dam body in downstream, drains at the downstream side of dam to the bottom and downstream drainage materials combined with filter layer at the bottom of downstream.

After 20 years of operation, the dam safety is not secured. Along the length of the dam, there are many seepages, rock in the upstream side is broken and fragmented. At the middle of the dam foot, 80 m from the intake to the left, dam surface is sag down that making unsafe condition of the dam. The intake has an impair of valve gate in the construction process so that water leaks through the gate and it is difficult to move the gate. The concrete pipe culvert itself was badly damaged, the concrete strength decreases due to erosion, reinforced steel exposes in some points. There is no management house for the intake operation. Concrete surface of the spillway is deformed partially, many dissipation ridges are broken. Road from the management station to the dam is still dirty road, often muddy, hard to go in the rainy season and reduced ability to respond with the problem of operators.

The residential area, irrigated area in downstream of the reservoir are vulnerable to the unsafe condition of the dam. When flood is high and threat the unsafety of the reservoir, Trieu Thanh commune had to evacuate about 100 households out of dangerous places.

The Spillway channel and connecting streams.

Connected to the spillway is Khe Lim which is 70m to 80m wide on the top and 12m to 15m at the bottom. The stream bed is steep which is good for drainage. It is 2km long, one end is connected to the spillway and the other end joins with other streams that originates from other lakes such as Ao Loc, Lang Hoi, Dong Ngon, Bung Sanh, Truong Son, Huong Son. This section is 15 km long before it joins the the Nha Le river.

Aquatic composition in the Khe Lim is not diverse as there is now running flow in dry season. The mainly aquatic shrubs found along the bank of the stream are Phragmites vallatoria, Ludwigia adscendens; and secondary grass was also observed in water stagnant area. Small fish, shrimp, snail, frog, etc... in the channel are also commonly found in the area. In dry season from January to May, local people cultivate rice crop on the floodplain. In flood season, when water overflow the spillway, part of the floodplain is inundated.



Figure 12- Khe Lim

Local people reported that there has been only one extreme flood in 1991 with 70 cm of water over the top of spillway. It caused damages to some aquaculture land and 20 ha of paddy rice in Trieu Thanh commune as the area was flooded in 2 days. Dong Be stream is joined at 2 km to the downstream with streams originating from other lakes such as Ao Loc, Lang Hoi, Dong Ngon, Bung Sanh, Truong Son, Huong Son, then flow into Nha Le river with total length of 15km.

Access roads. The construction site is accessible through two existing roads. One road is 2 kilometers long, the first section is 1.7 km starting at the Triệu Thành -Provincial road 506 T junction, the second section is 300 m existing rural concrete road. This road passes Xuân Du commune centres and lead to the right shoulder of the main dam. This road will be used for transporting construction materials for the main dam and the intake work.



The second road is started from the Triệu Thành T junction, then it follows the inter-commune roads to the spillway and the auxiliary dam. This road comprises of 2 km

existing rural concrete road and 700 m unsealed road. This route will be used for the transportation of materials for the auxiliary dam and the spillway.



Power Supply. The construction site is located far from the residential area, therefore in addition to connect the site with the local power network through a 0.4 KV power line, generators may also be used at construction sites.

Borrow pit: the subproject will purchase filling materials from an existing borrow pit in Minh Son Commune. This borrow pit has been licensed with Thanh Hoa PPC, license number 16/GP-UBND 15/1/2015. The operator is the North-South Construction and Commercial Investments Company. The borrow pit is 3.08 ha, capacity is 80,000 m³, and is 18 km from the dam site

Disposal Site: Total land area is 10,815 m. currently the disposal sites are the two existing ponds which are 1.5 to 2 m deep. They are located at roadside between villages number 4 and 5 of Xuan Du commune, Nhu Thanh district. The site is four kilometers from the dam site and one kilometer from commune center. Population density is low in this area. The site has been being managed by Xuan Du CPC. Agreements to use this site for disposal of excavated materials were made by CPC.



Figure 13-Disposal site in Xuân Du commune

Construction materials loading area: There are two areas, each has land area of 500 m². One site is 100 m from the construction site, at roadside next to access road of the dam in downstream. Currently, it is an abandoned garden. There is one household living at the back of the dam. The other site is existing crop land, 100 m from the spillway. There is no household living in the area. This area will be used for temporary loading of construction materials for spillway rehabilitation

Workers' camp: Two sites were selected for camp construction. One site is located in downstream of the dam, at access road side. This site will be used for building workers' camps for dam rehabilitation and the intake work contractors. The other site is located next to the spillway, next to the temporary material loading area for spillway construction.

CHAPTER V. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

5.1 Ethnic Minority Screening

The ethnic minority (EM) screening was carried out on the basis of the area of influence identified by the environmental and social impact assessment. Mostly Kinh people are living in areas affected directly/indirectly and benefited by the sub-project while EM people are living in the highland area. Within the project area, there are 145 EM households in Xuan Du commune, while there is no EM household living in Trieu Thanh commune. EM people living in the subproject area is 5% in total. Only one household of Muong ethnic group will be affected by the subproject.. Moreover, all of them are beneficiaries in the irrigation command area of the sub-project.

The free, prior, and informed consultation (FPIC) was implemented with EM peoples in the Xuan Du commune. Almost of all EM peoples living in the project area are Muong groups. Although they have their own cultural identity that is presented through traditional festivals and languages, they still live together with Kinh people in the villages, in the house style of Kinh people and communicate in Vietnamese.

They have good solidarity and assistance with each other in production and daily life. Generally, a lot of EM people are not really good at doing business like Kinh people. They also lack investment capital for production. The main source of income derives from paddy field and sugarcane, however, rice is enough for domestic food demand and sugarcane is purchased in unstable price, the income of the HHs, especially EM HHs, is not improved.

All of EM people in the consultation meeting gave broad support to the implementation of subproject. They acknowledged the project objective to ensure safety of people living in the downstream of dam and maintain stable irrigation for agriculture. Influence of construction on irrigation was also mentioned and the local people agreed on the application of appropriate construction methods which will not influence irrigation during construction. They expected that rehabilitation of the reservoir would improve irrigation service for their agricultural production. In addition, they proposed to project to support agricultural extension with demonstration of high-income agricultural models combined with training on advanced techniques for farmers.

Results of the EM screening confirmed that there is a low proportion of EM (5%) in the area affected by sub-project. However, due to the time constraint of the field survey while it was carried out near the Lunar New Year Holiday (people are busy with festival activities), it was difficult to gather full number of ethnic minority households in the project area to have comprehensive consultation with them. There are 145 EM beneficiaries households present in the sub-project area. In pursuing the development purpose of the project, these ethnic households are entitled to certain supports that are set for them in the Ethnic Minority Development Plan (EMDP) that was prepared for this subproject (please, refer to EMDP for this subproject for more details).

5.2 Environmental and social impacts screening

The subproject area is not located in environmental sensitive areas. There are production forests in the area. There is no known rare or endangered species in the project area. There is one temple in the project area where construction would not affect the structure but transportation along local road may interfere traffic during festival season in January.

Overall, the potential social and environmental impacts of the subproject is positive. Rehabilitation of the dam would enhance dam safety, improve irrigation service thus contribute to socioeconomic development in the area, reduce poverty.

The potential negative social and environmental impacts during construction phase would be dust, noise, vibration, environmental pollution risk related to waste and wastewater generated during construction phase, social disturbance to community, increased safety risks for the workers and local community, damages to existing local infrastructure such as local rural roads, increased pressure onto existing resources in the community such as water supply and power supply, etc., localized flooding as the result of filling up the ponds at disposal site. The implementation of some construction activities in the upstream face and the water intake make disrupt irrigation service. These construction related impacts are mostly short term, temporary, at low to moderate level and manageable. In operation phase, the main concerns would be the changes in hydrology upstream and downstream as the result of raising the height of the dams with primary purpose of enhancing the dam safety.

The safeguard documents required for this sub-project include (i) Environmental and Social Impacts Assessment (ESIA),(ii) Resettlement Action Plan; and (iii) Dam safety report.

Table 10- Environmental and social Impacts screening

	Screening question	Yes	No	Comments
	Does the sub-Project have the potential to			
1.	cause significant adverse impacts on environmental sensitive area?		X	The subproject is not located in protected area, there is no known critical natural habitats, rare or endangered species in the project area. Construction activities only take place mostly in the dam area including the dam crest and faces, spillway, water intake, and access/management road
2.	cause significant adverse impacts on land and related natural resources of ethnic minorities?		X	Xuân Du and Triệu Thành has 30 to 35% of its population are ethnic minority. However, 100% of the 13 AHH are the Kinh people. The project would not acquire any land or natural resource being used or traditionally owned by EM
3.	Cause land acquisition and/or resettlement	X		5,721m ² of land within the dam safety corridor will be acquired. 13 HH in Xuan Du and Trieu Thanh will be affected with agricultural land acquisition. No resettlement
4.	cause significant adverse impacts on the displaced people?		X	Land to be acquired is agriculture, garden land and aquaculture land. No people are displaced
5.	Increased dust, noise, vibration and gas emission?	X		Increased of localised level of dust, noise and vibration are expected at construction area and along the access roads
6.	Generation of solid water and wastewater	X		Large amount of solid wastes will be generated from excavation. Wastewater will also be generated from construction sites. Workers camps will produce municipal waste and wastewater

	Screening question	Yes	No	Comments
	Does the sub-Project have the potential to			
7.	Cause negative biological impacts	X		Site clearance may lead to loss of vegetation cover and trees cut off. Some wildlife may lose their habitats. Aquatic lives may be affected if there are abrupt changes in hydrology or water quality in the reservoir or downstream channel
8.	Water pollution risks	X		Some construction activities will take place beside the reservoir. Construction materials, waste and wastewater may enter water bodies
9.	Soil degradation		X	The subproject would not cause soil degradation in any disturbed areas
10.	Changes in landscape, localised flooding			Two ponds will be filled up at the disposal site. This may affect local drainage pattern.
11.	damages to existing local infrastructure	X		Heavy trucks may cause damages to existing access roads, particularly the unsealed section
12.	Disrupt existing services			Irrigation may be affected.
13.	Increased safety risks for the workers	X		Safety risks are mainly related to electrical system, the operation of construction plants, handling of construction materials and wastes etc.
14.	Affect physical cultural resources or religious activities?	X		The subproject would not affect any graves or known existing pagoda, temple etc. The Phu Na temple is located 3km from the main dam and 500 m from the provincial road 506m. Transportation of construction material may significantly disturb traffic in provincial highway 506 during January and February when the main festival of the Phu Na temple take place.
15.	Social conflicts between workers and local people	X		The risks of social conflicts is low as the rates of people working away from home is high, the rate of unemployment in local community is low
16.	in creased pressure onto existing resources in the community	X		Power supply in the communes is not in good condition. Additional load for construction activities may add pressure onto the system. Local people are using water from boreholes or dug wells for domestic uses so the workers living at the site are not likely to add pressure on water supply
17.	increased safety risks for the community	X		Safety risks are related to travelling on local road, electrical system from source to the construction site, and the operation of construction plants if local people access construction sites
	Operation phase			

	Screening question	Yes	No	Comments
	Does the sub-Project have the potential to			
18.	Increased pollution risks related to increased use of agrochemicals?	X		The total crop land to be irrigated remained unchanged, at 255 ha
19.	Increased flooding risk in upstream	Unknown		The height of the main dam and the auxiliary dam will be raised while the elevation of the spillway remains. it is necessary to assess the changes in semi-flooded area in the upstream and flood duration
20.	Increased flooding risk in area surrounding the spillway channel	Unknown		It is necessary to compare the design flood discharge with the drainage capacity through of the spillway channel taking into account existing conditions
21.	Cause negative biological impacts in the reservoir and upstream	Unknown		construction impacts on the upstream are finished when construction is completed. Biological impacts depend on the water level and duration of flood water which are needed to estimate.
22.	Cause negative impacts at downstream area	Unknown		construction impacts on the upstream are finished when construction is completed. Whether flooding risk would be increased in area around the downstream channel need to be assessed. Mosquito breeding, water-born disease risks would be increased if there are increased stagnant water

According to RAP data, in May 2015, 13 households were affected, no severely affected households. According to the detailed measurement results at the detailed design stage, 30 households are affected (29 King households and 01 Muong household) at Trieu Thanh Commue, Nhu Thanh Distric and Xuan Du Commue, Trieu Son District. 140 persons, are affected by this subproject. On 06/10/2017, the PPMU held a consultation meeting with representatives from PPMU, Compensation Board of Nhu Thanh District and Trieu Son District, Xuan Du and Trieu Thanh Commune People's Committees, and affected households. All 30 affected households were nominated to participate in the consultative meeting. During the meeting, the PPMU informed about the subproject information, policies and benefits of the affected households. All affected households agreed on the subproject construction, totally unanimously agreed on compensation policy of the subproject. The affected households of the subproject are willing to clear the site for construction.

5.3 Positive Social and Environmental Impacts

Rehabilitation of the dam and auxiliary works will enhance the safety of the dam. Particularly, 100 households with about 500 people living in the in Dong Bun village of Xuan Du commune and villages 9, 10, 11 of Trieu Thanh commune together with 20 hectares of crop land in the Trieu Thanh commune will be better protected.

Better irrigation service will contribute to socioeconomic development in the area, helps to improve increase living standard and reduce poverty in the area. After the project, 255 hectares of rice field in Trieu Thanh commune, Trieu Son district and Xuan Du commune, Nhu Thanh

district will be benefited with more reliable irrigation service; The landscape in the up and downstream reservoir are expected to be improved after the dam and its auxiliary work are rehabilitated.

By hiring certain number of local people for short term jobs during the construction phase, the income level of some households will be improved in the short term.

The subproject will ensure the participant of local communities, especially the women and EM. EM women will have the opportunity to become familiar with the issues relating to community management, community monitoring the formation of user groups, to preserve water resources and irrigation systems infield. People will have more knowledge regarding the production, or new production skills through rehabilitation programs in the community. The inclusion of men involved in community activities of the project will make men more aware of their rights and responsibilities to the community.

5.4 Potential Negative Social and Environmental impacts

5.4.1 Pre-construction phase

The subproject will acquire permanently 27,171.02 m² of land within the dam safety corridor which is 50 m wide from the foot of the dam and acquire temporarily 7,190.5 m² of aquaculture land for the disposal site. The dam safety corridor has been being managed by the Sông Chu Irrigation Management Company. However, currently local farmers have been growing rice and vegetables on this land.

30households with 140people will be affected. No household (HH) will be relocated or affected severely as the acquired land accounts for less than 20% of HH's total land area. 01vulnerable HH will be affected (the Muong ethnic household), ethnic group. Income and livelihood of affected HHs perhaps reduced but it's not serious as the acquired lands are is less than 20% of household's total land area.

15,939 trees including 820 banana trees, 1,406bamboos, 489eucalyptus, 12,045 acacias, 648 peach trees, 101 oval tree, 135 lemons, 39 conch tree, 19 jackfruit trees and 273 other types of trees of 21 households will be cut off as the result of land acquisition. 6,538.6 m² of ricefield and crop land will be affected.

Affected households will be compensated in accordance to the Project' RAP.

Table 11-Land acquisition

Commune	Agriculture (ha)	Upland crop (ha)	Forestry land (ha)	Aquaculture land (ha)	Temporary land (ha)	Total (ha)
Xuan Du	0.154	0.057	0	0.031	1.0815	1.322
Trieu Thanh	0.150	0.130	0.05	0	0	0.330
Total	0.304	0.187	0.05	0.031	1.0815	1.652

5.4.2 Construction phase

Increased dust, noise, vibration and gas emission

The total volume of earthwork in construction phase is approximately 140,010.3m³ including manual compaction of 73,398.9 m³; 26,188.1 m³ of sand, crushed stone, cement... to be transported to the construction site, and 13,182.584 m³ of spoil transported to disposal site; 27,240.6m³of excavated materials need to be transport to the dam for filling (Table 2.3).

According to the method of the WHO rapid assessment, the amount of dust generated during construction in accordance with the table below:

Table 12 -Estimate the amount of dust generated during construction

Item	Emission coefficient	The volume of transport, m ³	Estimated Dust generated(kg)
Dust from manual leveling	1-100	73,398.9	7,339
Dust generated from loading, unloading of construction materials mechanically	0.1-1	16,952	17
Dust from concrete mixing	0.1-1	19,093	19
Dust from trucks carrying soils to disposal sites	0.1-1	13,182.584	13,182.584
Total		122,626.48	13,225.924

The calculation results in the table above shows the amount of dust is significant. It may reduce vision and affect construction workers. On the other hand, dust stays on the leaves may limit the growth of vegetation. Therefore, the contractor will be required to implement measures to reduce dust emission.

Gas Emissions

* *Emissions from vehicles using diesel.* Emissions from vehicles exhausts contains SO₂, CO₂, CO, NO_x, VOC ... Such gases may affect the workers in construction site. The workers camp is 300 m from the construction site and the nearest residential is further while the area mostly affected by emission from vehicles is 50 m. The area is large and gases can be dispersed quickly. The potential impacts is short term and temporary. Therefore, the potential impacts of vehicles on the local residents would be negligible. The quantity of gas emitted depends on the number of vehicles and machines used and methods of construction.

To transport 208,020 tons of materials in and out of construction area, there will be 56 (5 ton load trucks), trips of trucks in and out construction area. On average there will be 56 of trucks coming in and going out each day. Forecast load for pollutants from trucks cars using diesel as follows:

Table 13 - And dust emissions corresponding to the regional transportation

Number of vehicles	Dust (g/minute)	SO ₂ (g/minute)	NO _x (g/minute)	CO (g/minute)	HC (g/minute)
56	10.5	0.476	168	33.8352	9.3352

Through concentration estimated in Table 5.9 and compared with NTR 05: 2013 / BTNMT, the concentration of TSP, CO, SO₂ and NO_x estimates arising from transport processes in the construction phase are within the permissible limits. Particularly VOC concentration was 0.029 mg / m³ and not defined in QCVN 05: 2013 / BTNMT. Detail calculations are provided in Annex 6.

f) Noise pollution

Noise arises mainly from the excavation operation with equipment, transport. In the process of repairing and upgrading works to use more machinery and construction equipment (tables 2.4). Noise can adversely affect workers at the site and cause discomfort for people living in the neighborhood. Exposure to high noise in a long time hearing will decrease, causing fatigue, stress, insomnia, reduced labor productivity; if people take too big noise continuously for 8 hours and lasts for many years may increase blood pressure, affects the nervous system and occupational deafness disease.

The calculation results (Annex 5) show that the noise level decreases with the distance to the source point. In the 50m range, the noise level will be approximately 26 QCVN: 2010 / BTNMT, so in this range of workers are only allowed working continuously for 21 hours. However, according to the calculations, while construction on the site has about 10 vehicles operate alternately to the possibility of high noise resonance.

Higher noise level standards will affect the health of workers as well as insomnia, fatigue, cause psychological discomfort. High noise level reduces labor productivity, health workers, and construction workers on site. Exposure to intense noise for a long time will make the hearing decline, leading to occupational deafness.

The above calculation results show that the largest radius of influence of noise emitted from the operation of machinery, equipment and vehicles is 50 meters. Therefore, the impact of noise only affects the workers on site. In addition, the project is far from residential areas (outside radius) and population density in areas of low density and large trees so the noise will not affect the people. This effect can be controlled by the mitigation measures in chapter VII.

Generation of Solid Waste

During construction phase, 16,365 m³ will be excavated. Among this, 8,890 m³ will be reused for filling.

The construction workforce of 100 people / day, the amount of garbage generated an average of 50 kg / day. After 20 months of construction the amount of garbage generated 30 tons. The main contents of this waste would be organic material. If not properly managed, nuisance and health risks would be caused to workers and local community. Therefore, Solid waste generated during construction phase will be collected and disposed off to the approved sites. The size of land used for solid waste disposal will be calculated in the specific mitigation measures (chapter VII). The site will be reinstated after construction is completed to offset environmental impacts. Therefore, the residual impact would be at lower level and can be further be controlled by mitigation measures.

Generation of Wastewater

Domestic wastewater. Up to 100 workers will be working in the subproject. Wastewater generated from worker camps may affect the surrounding environment if not properly managed. According TCXDVN 33: 2006 applicable to mountainous area, the amount of water used per capita is about 80 liters a day, and the wastewater is about 80% of water used. Therefore, the wastewater generated from camps will be 6,400lit/ day.

Table 14 -Load domestic wastewater discharged in the construction phase*Load calculation for 100 people*

No.	Parameter	Emissions rate (g/person/day)	Load (kg/day)	Concentration (mg/l)	QCVN14:2008/BTNMT (Cmax value, column B)
1	BOD ₅	45 – 54	4.5 – 5.4	45 – 54	50
2	COD	72 – 102	7.2 – 10.2	72 – 102	-
3	SS	70 – 145	0.7 – 1.45	7.2 – 14.5	100
4	Total N	6 – 12	0.6 – 0.12	6.1 – 12.2	50
5	Total P	0.8 – 4.0	0.08 - 0.4	0.8– 4	10
6	Coliform	10 ⁶ – 10 ⁸ MPN/100ml	-	-	5000 MPN/100ml

During construction phase, approximately 4,000 m³ of domestic wastewater will be generated. It contains mainly organic matter, suspended solids and microorganisms. Environmental pollution, nuisance, mosquito breeding and water-borne disease are the main risks if wastewater is not collected and treated properly. Camp management plan which also covers wastewater management will be implemented under the project.

Construction wastewater. Construction activities such as grinding concrete mixing, preparation of construction materials, handling of liquids etc. would generate some wastewater. Wastewater may contain some oil/grease and other hazardous substances leaked from machines and equipment. According to calculation made by design consultant, approximately 1m³ of construction wastewater will be generated each. the load of pollutants during construction (540 days) as follows:

Table 15- The amount of pollutants in waste water construction

Parameters	Contents (mg/l)	Total Load (kg)
COD	625	0.3375
BOD ₅	303	0.1636
SS	6,800	3.672
oil	44	0.2376

[Source: Calculated according to documents Economopoulos, WHO, Geneva 1993]

Although the quantity of construction wastewater generated would be very small, it may enter water bodies and affect water quality and aquatic lives if not properly managed. Construction activities carried out at the dam crest and upstream face will be managed through site management plan prepared by the contractor.

Surface runoff. Uncontrolled surface runoff is the main source of environmental pollution during construction phase. Premises of the project area is 20,000m² and average rainfall of the region is 1816,3 mm/year, total rainfall runoff on site will be 2.906,1 m³/year (20% of the rainwater will soak into the ground). Uncontrolled surface runoff will lead soil, sand, scum,

grease... into the surrounding environment. According to statistics from the World Health Organization (WHO), the concentration of pollutants contamination of rainfall runoff usually around 0.5-1.5 MGN / l; 0.004 to 0.03 MGP / l; 10 - 20 mg COD / l and 20 mgTSS / l. Receiving water is rainfall runoff Ho Dong tanks and canals in the region. Load cells rain water runoff during construction is shown in the following table:

Table 16-The amount of pollutants in rainfall runoff

(Construction time of 20 months)

No.	Parameter	Load (mg/l)	Rainfall (m3)	pollution load (kg)
1	TSS	20	291	11.62
2	COD	10 - 20	291	5.8– 11.62
3	Total Nitrogen	0,5-1,5	291	0.29 – 0.87
4	Total Phosphorus	0,004-0,03	291	0.002 – 0.017

Surface water runoff control measures are proposed in section 6.

Biological impacts

The upstream face on the right shoulder of the dam has dense vegetation cover, shrubs and acacia trees. Some insects and wildlife such as birds or frogs may be living there. Vegetation clearance will remove their habitats. The potential impacts are small, unavoidable as these vegetation and trees affect dam safety.

Noise from construction activities will affect the life and behavior of biological species, they move out of the living area.

Construction activities that take place near the water surface such as removing the existing top soil on dam faces or building of coffer dam may make water turbidity increase as loose materials may fall into the water if the excavated area are not managed properly, oil, grease, construction wastewater may leakage in to the reservoir. Degradation of water quality may have negative impacts on aquatic lives, reduce photosynthetic capacity of algae. If large amount of pollutants are introduced into the water, detrimental effects may happen to the habitat of fish and other aquatic species.

However, biological impacts are not significant as there are not many terrestrial and aquatic species in the project area, none of them are rare or endangered. Construction noise, dust and on impacts on water quality are relatively short-term. The noise, movements of machines, trucks and human beings will cause turbulence, wildlife will move to less disturbed area. The impact is mostly short-term in nature and limited to areas where construction. The level of impact is considered small.

Water pollution risks

Some construction activities will take place beside the reservoir. Construction materials waste and wastewater may enter water bodies from the dam and sluice construction sites. This impact is manageable by coffer dam and caissons during construction phase.

Changes in landscape

The project will use existing licensed borrow pit. It is expected that the operation of the borrow pit follows Vietnamese environmental management regulations, the site will be managed in such a way that drainage pattern is maintained. Leveling and reinstatement of the site is required under the license before closure.

Two ponds will be filled up at the disposal site. The storage volume of the pond which is 10,800 m² * 1.5 m deeps is adequate for the disposal of approximately 16,350 m³ of spoil. The site will be flat after disposal. There impacts on landscape of the subproject is insignificant and negligible

Increased Erosion, Sedimentation and localized flooding risks

With a large volume of excavated soil, erosion may occur during the construction phase. Floodwater may wash away excavated or fill materials and wastes from construction sites along the access road, disposal site or the dam sites. In particular, localized flooding may occur at the site and waste dumps if the current drainage system is interrupted.

Filling of the pond may affect local drainage pattern, however, surrounding the area is agricultural and aquaculture land with good drainage capacity, therefore, localized flooding as the result of pond filling is not affected. The contractor will be required to maintain drainage pattern during the operation of the disposal site.

During construction phase, if flood flows through the unpaved disturbed area, temporary loads of construction materials and waste, solid materials may be washed down to create increased turbidity and sedimentation in Dong Be stream. These potential impacts can be avoided or mitigated through site management plan.

Damages to existing local infrastructure

Heavy trucks may cause damages to existing access roads, particularly the 700 m unsealed section. Communication cable, irrigation channels and other public infrastructure that may exist along the transportation route and near construction area may also be affected by the operation of construction plants. This potential impact is manageable

Interrupt irrigation and water supply

The existing water outlet is shared between irrigation (400l/s) and water supply (30l/s). It is noticeable that currently domestic water supply from the reservoir is for non-drinking purposes only.

Some construction work will be carried out on upstream face of the dams and around the sluices of the water intakes. For the upstream face, lining of dam face will take place from the crest down to elevation +36m, which is 3.4 m under the normal level but 2 m above the dead water level. For the sluice at the water intake, the elevation is + 33m, which is 1 m under the dead water level. If water in the reservoir is released and kept at low level for these construction activities, water supply and irrigation service may be disrupted.

This potential impact can be avoided through an optimal construction schedule and proper construction methods described in the Social and Environmental Management Plan.

Increased safety risks for the workers and local communities

Safety risks to workers are mainly related to electrical system, the operation of construction plants, handling of construction materials and wastes etc. Safety risks are also related to the use and handling of power, generator, fuels at the construction site and the camp. On the other hand, safety risks for local communities are related to increased traffic with average 37 trips of heavy trucks travelling on local road each day, electrical system from source to the construction site, and the operation of construction plants if local people access construction sites.

The access to the disposal site cross the center area of Xuan Du commune, passing 250 households living along the road. It also crosses 1 kindergarten, one market and Xuan Du CPC building. Many trucks carrying excavated materials to the disposal site would cause this road become dustier, traffic density would be increased which associated with increased traffic accident risks for local people, particularly children and aged people.

The main transport route of materials transportation to the site goes through two critical locations which are the center of Hop Thanh and Trieu Thanh. These are places where the risk of accident highest in the entire building project area.

A safety risk is significant. The contractor will be required to implement measures to ensure safety at the camp and construction sites, coordinate with local authorities to apply mitigation measures to minimize traffic accidents risks.

Affect physical cultural resources or religious activities

The subproject would not affect any graves or known existing pagoda, temple etc. The Phu Na temple is located 3km from the main dam and 500 m from the provincial road 500m.

Transportation of construction material may significantly disturb traffic in provincial highway 506 during January and February when the main festival of the Phu Na temple takes place.

Social conflicts between workers and local people

The risks of social conflicts is low as the rates of people working away from home is high, the rate of unemployment in local community is low. However, there may be some conflicts between the local people and the workers due to the difference in come, the tension from land acquisition or the use of local resources during construction phase.

Mobilization of workers from other areas to the project sites may affect local security and generate social tensions in the local community. The contractor will be required to implement some measures such as registration to local community or hiring local labours for manual works in order to avoid social tension. The workers will be required to follow the Codes of Conduct

Health Risks

The workers come in from other areas may have some sickness that they may not be aware of. If some of them have some infectious diseases, the workers and local people that they are in contact with may be affected. Workers who work and live away from homes regularly may also be more vulnerable to sexual transmitted diseases such as HIV/AIDS or “social evils such as gambling, prostitutions for drug addicts. While these issues from workers may affect local community, living condition in an unfamiliar mountainous area and possible “social evils” that

may exist in local community may also affect the workers. To manage these issues, the contractor will be required to provide health check and apply workers code of conducts.

Domestic waste and wastewater from the camps if not properly managed would cause nuisance, attracts disease vectors such as such as flies, mosquitoes, rats and affect the health of both the workers and the local community. Inadequate water supply and accommodation for workers may also lead to long term health risks. The contractor will be required to provide adequate accommodation and water supply for the workers to use.

Increased pressure onto existing resources in the community

As described in the baseline chapter, power supply systems in the communes are not in good condition. Additional load for construction activities may add pressure and cause failure onto the system. The contractor will be required implement measures to minimize the additional pressure onto the existing local power system.

Water for the workers camp and construction site can be extracted from excising surface or groundwater sources, therefore, it is not likely that the project would add additional pressure onto local water supply. However, the contractor will also be required to make sure that water of adequate quality and quantity is supply for domestic uses in the camps.

5.5 Impacts during operation phase

Most of the potential impact of the operation is expected to be a positive impact. The temporary impact of the construction phase, such as dust, noise or vibration will be finished when construction is completed. New, improved landscape in the area will be in place. Dam safety will be enhanced to better protect the downstream communities, provide improved irrigation service thus promote economic development and improve the living conditions for the communities downstream.

5.5.1 Flooding in upstream of the reservoir

As the height of the main dam and the auxiliary dam will be raised 0.8m while the elevation of the spillway remains, the normal water level unchanged at +39.40m. The effective storage capacity of the reservoir will also be the same as before dam rehabilitation, at 1.89 millions cubic meters. This means the area permanently inundated are in the reservoir which is from the bottom of the lake to elevation +39.40m, remain unchanged before and after the project. No incremental social environmental impacts in this area.

When the reservoir was built in 1988, the frequency of design flood was chosen was at 2% originally. The corresponding design maximum flood water level at that time was at elevation +40.45m. During the feasibility carried out in 2015, the design flood frequency was chosen at 1.5% in compliance with the existing applicable design standard. The new designed maximum flood water level is 40.71 m. This means the semi-flooded area of the reservoir will be increased. The additional semi-flooded area liesbetween the two topographical contours of +40.45 and 40.71 m (0.26 m difference).

The potential social and impacts on the additionally flooded area depends on the existing conditions of the area, its sensitiveness, the probability and frequency that the designed flood will come, and the duration of flooding when the flood come. The baseline shown that currently the parts of the catchment area closest to the water surface of the reservoir is mainly forestry

land, not a biologically reserved area or strictly protected. There is no known rare or endangered species exit in the area. Therefore, the area is not environmentally sensitive.

The chosen frequency of flood design is at 1.5%, which approximately means there is one in every 67 flood comes to the reservoir can make the maximum flood water level in the reservoir reach or even higher than ground elevation of +40.71m. The probability that this designed flood come is quite low. The duration that the upstream area would be flooded in designed flood even were calculated by the feasibility consultant and presented in the table below.

Table 17-Design Flood curve of Dong Be reservoir, P=1.5%

	T(h)	Q(m3/s)	Z(m)		T(h)	Q(m3/s)	Z(m)
1	0	0	39.4	15	5.2	103.63	40.702
2	0.4	27.4	39.434	16	5.6	89.93	40.673
3	0.8	54.79	39.526	17	6	76.24	40.631
4	1.2	82.19	39.646	18	6.4	62.54	40.579
5	1.6	109.58	39.803	19	6.8	48.84	40.517
6	2	136.98	39.988	20	7.2	35.14	40.436
7	2.4	164.37	40.178	21	7.6	21.45	40.345
8	2.8	185.82	40.374	22	8	7.75	40.249
9	3.2	172.12	40.532	23	8.4	0	40.152
10	3.6	158.42	40.623	24	8.8	0	40.066
11	4	144.73	40.68	25	9.2	0	39.993
12	4.4	131.03	40.709	26	9.6	0	39.928
13	4.8	117.33	40.715	27	10.4	0	39.873
14				28	10.8	0	

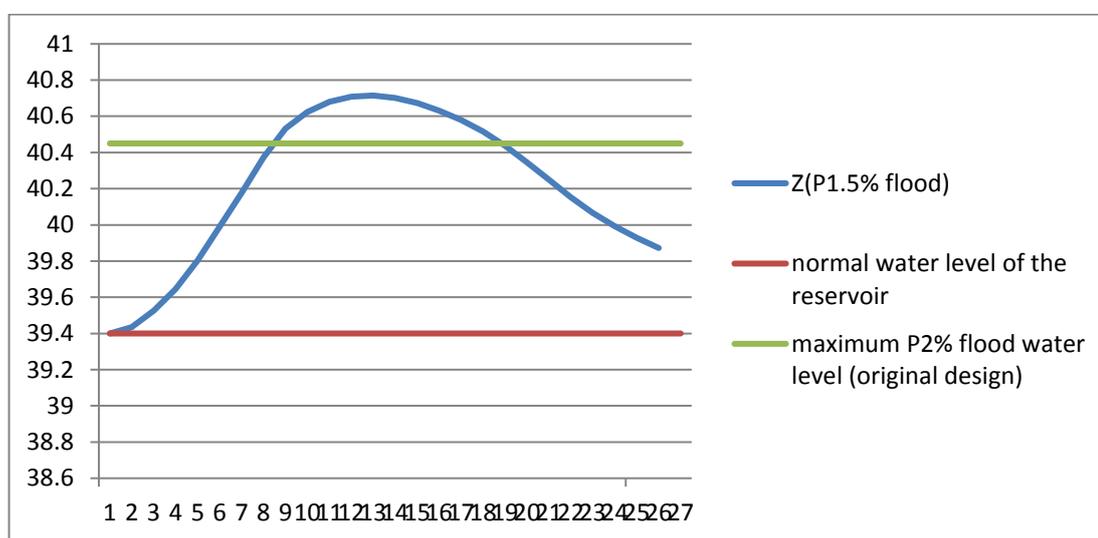


Figure 14- Design flood water level curve, Dong Be Reservoir

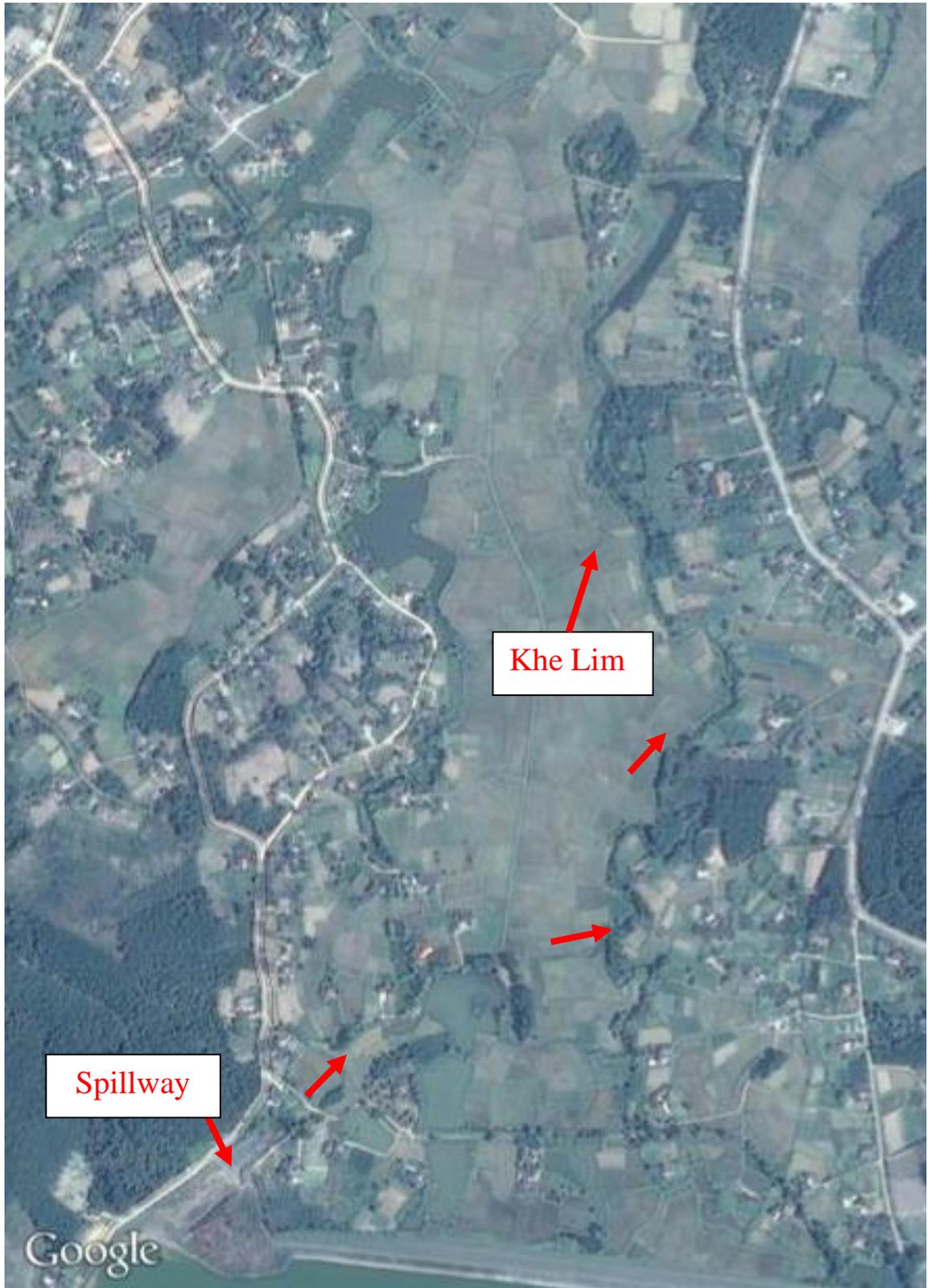
The Table and diagram above shows that the additional semi-flooded area is flooded only from 2.8 hours after the flood started to come and water level will be reduced to the original design P2% flood water level at 6.8 hours. This means even in designed flood event P1.5%, the additional flooded areas is under water in four hours. The total flooding time in the entire semi-flooded are of the reservoir should not be longer than 12 hours. Thus the potential impacts in

the additional flooded area is at low level. Community and terrestrial biological species in this area should be able to adapt to the design flood if it comes. Information, communication campaign will also be conducted to get the affected community to be informed and prepared.

The feasibility study also considered the Possible Maximum Flood (PMF, $P = 0.01\%$) which were not covered in the original design of the dam. The maximum water level of PMF in the upstream would be 41.59m which is 71 cm below the dam crest. As the probability that this flood would happen is very low, at 0.01%, it can be considered as emergency situation when this flood come. The Dam Safety Assessment which includes Emergency Preparedness would cover this situation, thus ESIA does not discuss in detail.

5.5.2 Increased flooding risk in area surrounding the spillway channel

The receiving body of the spillway is the Khe Lim channel. It has trapezoid shape with 70m to 80m wide on the top and 12m to 15m at the bottom with high slop on stream bed. The figure below shows the downstream area of the spillway.



After the dams are raised, the designed discharge rate through the spillway channel to the Khe Lim will be increased from 82.5 m³/s (original design) to approximately 120 m/s (2015 FS). The water level in the receiving channel were calculated by the feasibility consultant and presented below.

Water level curve – Khe Lim channel

TT	T(h)	P=1,5%		P=0,5%		P=0,01%	
		q(m ³ /s)	h _{tk} (m)	q(m ³ /s)	h _{tk} (m)	q(m ³ /s)	h _{tk} (m)
1	0.4	0.863	0.0742	1.067	0.0844	2.515	0.1412
2	0.8	3.714	0.1785	4.813	0.2085	14.301	0.4012
3	1.2	9.887	0.3213	12.954	0.3779	41.68	0.763
4	1.6	20.449	0.4972	27.339	0.592	84.441	1.1663
5	2	36.063	0.6992	47.251	0.8227	133.843	1.5384
6	2.4	54.918	0.9007	72.021	1.0601	182.369	1.8524
7	2.8	76.962	1.1033	98.268	1.2779	217.872	2.0613
8	3.2	96.409	1.2631	117.708	1.4241	240.866	2.1888
9	3.6	108.196	1.354	131.455	1.5221	258.043	2.2599
10	4	115.834	1.4105	139.871	1.5797	259.285	2.2878
11	4.4	119.758	1.439	143.544	1.6045	247.909	2.2273
12	4.8	120.565	1.445	143.334	1.603	233.841	2.1506
13	5.2	118.726	1.4316	139.973	1.5806	216.946	2.0559
14	5.6	114.854	1.4032	134.054	1.5401	196.333	1.9363
15	6	109.261	1.362	126.264	1.4856	173.081	1.7953
16	6.4	102.347	1.3095	116.914	1.4186	145.539	1.6179
17	6.8	94.44	1.2476	106.496	1.341	118.808	1.4322
18	7.2	84.379	1.1658	95.309	1.2545	98.149	1.2768
19	7.6	73.508	1.073	81.617	1.1429	79.65	1.1262
20	8	62.588	0.9742	67.511	1.0196	64.674	0.9936
21	8.4	52.253	0.8741	55.399	0.9052	-	-
22	8.8	43.544	0.7833	45.986	0.8093	53.205	0.8835
23	9.2	36.577	0.7052	38.625	0.7286	44.282	0.7912
24	9.6	30.752	0.6354	32.467	0.6565	-	-
25	10.4	26.069	0.5752	27.383	0.5926	-	-
26	10.8	22.286	0.5236	-	-	-	-

With flood frequency at $P = 1.5\%$ (design flood), the maximum water level in the stream would be 1.45m. With flood frequency $P = 0.05\%$ (test flood) and $P = 0.01\%$, (PMF), the maximum water level in the channel would be 1.6 and 2.3 m. With existing condition, the channel is adequate for draining design flood water.

5.5.3 Negative biological impacts in the reservoir and upstream

Although the height of the dams would be increased, the incremental flood water level in the reservoir would be only 0.27 m and last in four hours. Therefore, the potential impacts of dam raising on aquatic lives are expected to be marginal.

As the aquatic composition in the downstream is poor, and the stream is usually dry in the dry season, the increase in design flood discharge rate is not expected to cause any significant impacts on the ecology at downstream.

CHAPTER VI: ALTERNATIVE ANALYSIS

6.1 “Without” Project scenario

After 25 years of operation, the Dong Be reservoir has been degraded. Erosion occurred on the upstream face of the dam and safety corridor at the downstream side has been encroached. The water intake is not water tight. Water loss is on-going and makes the irrigation service unreliable.

If the subproject is not implemented, the dams and auxiliary works will continued be deteriorated and dam safety risks would be increased. Community, their lives, crop land and infrastructure at downstream would become more and more vulnerable to flood. Irrigation service would continue be operated under design.

Dam failure can cause loss of life (100 household with about 500 people in residential area of two communes in the downstream (Dong Bun village, Xuan Du commune and 9, 10, 11 villages, Trieu Thanh commune) and yield of 1000 ha of agricultural production land of Trieu Thanh and Xuan Du communes, property damage, local hydrologic change cultural and historic losses, environmental losses as well as social impacts.

6.2 “With the Project scenario”

The rehabilitation and upgrading of the Dong Be reservoir will bring about the positive impacts. The lives and livelihood of communities at downstream are better protected with safer dams and reservoir. The capacity of irrigation system would be improved to provide better and more reliable irrigation service to 255 ha of crop land at downstream. The area will become tidier, landscape would be improved. Running cost of the work will be reduced.

6.3 Alternatives considered during site selection

Siting the location of borrow pits. The initial borrow pit of the subproject located at the left shoulder of main dam, 50m from the spillway. If that site is selected, two hectares of forestry land of two HHs would be acquired. The site is very close to the spillway thus vulnerable to erosion by floodwater when the vegetation cover is lost as the result of excavation. On the other hand, rainwater and surface runoff would also wash down the soil from disturbed area, particularly from the cuts and slopes, to make land slide risk and sedimentation risks increases. Aquatic species in the reservoir would be affected. ESIA consultant worked together with the PMU and FS consultant considered and chose the option to use the existing borrow pit in Minh Son commune, 18 km from the construction site in order to avoid the acquisition of forestry land and other environmental impacts associated with the first option on borrow pit. After consulting the construction drawing design stage, the consultant suggested to replace the borrow pit in Minh Son commune with the one in Tho Tien commune, which is only 10,8 km far from the construction site and has been licensed by the People's Committee of Thanh Hoa province in business license number 658 / GP-UBND dated 23/02/2013.

Siting of the water intake. Initially it was proposed that the old culvert would be replaced with a new one at the same existing location. If so, irrigation would be disrupted for 3 months, 255 ha of crop land would not be cultivated in one crop and affect the livelihood of the farmers living in downstream. The Consultant suggested reselecting the site of the new water intake so as construction can be done while the operation of the existing water intake can be maintained. As the result, a new location at 3 m from the existing water intake was selected.

CHAPTER VII: ENVIRONMENT AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1 Mitigation measures

7.1.1 Compensate for Land Acquisition

The subproject will acquire permanently 27.171,02 m² of land in the dam safety corridor and acquire temporarily 7.190,5 m² of aquaculture land for the disposal site. 30 households affected. The Subproject Owner will pay compensation for land acquisition for crop loss in accordance with the subproject's Resettlement Action Plan (RAP). Affected households will be supported by the local community to minimize the potential impacts of land acquisition.

The trees to be cut down will be collected for beneficial use. The disposal site after being used by the subproject will be returned to CPC for tree planting.

7.1.2 Engineering design phase

The Engineering design consultant will be responsible to ensure that adequate environmental and safety clauses are incorporated into the bidding documents and contracts that they prepare. These include construction bidding documents and contracts, and construction supervision contracts.

7.1.3 Mitigation Measures implemented during Construction phase

The following measures will be implemented during construction phase in order to avoid or mitigate the potential impacts.

Dust, noise and gas emission control

The contractors will be required to water the dirty road and at construction sites. All trucks carrying loose materials will be covered to prevent dirt falling along the transportation route. Equipment and machinery will be maintained regularly to minimize noise and emissions.

Solid Waste and Wastewater Management

To minimize solid waste generation, 27,240.6 m³/40,423.2 m³ of materials excavated from the dam face will be reused for filling, particularly for the rehabilitation of the access/management road. The disposal site will be leveled regularly in order to reduce the volume of the dump site, reduce erosion potential and soil subsidence risks.

Approximately 13,182.584 m³ of excavated material will be transported to the disposal site at the earliest possible. As the disposal site is currently aquaculture ponds which are 1.5 m deep and land area of approximately 11,000 m², the ground level at the dump site after disposal is completed will be equal to the elevation of the surrounding ground. Water will need to be released from the pond before disposal is started to avoid flooding when the pond is filled. Recyclable materials such as steel, cement bags will be collected and sold to local recycle dealers. The remaining non-hazardous construction wastes will be reused for leveling or transported to disposal site.

Hazardous materials such as wasted oil, materials contaminated with fuels etc. will be stored separately, specialised solid waste management service provider will be contracted to handle this waste.

Between 40-50 kg of domestic wastes generated from the camp each day. Domestic waste will be separated from source with two types of bins. Recyclable will be sold to local recycle business. Waste collection team of Xuân Du and Triệu Thành commune will be contracted to collect the garbage from the camp site and disposed off in the commune's disposal site. Workers will be prohibited from disposal of domestic waste into water bodies in the project area. Workers codes of conduct will be developed, the camp will be equipped with two types of bins with lids for garbage disposal.

The contractor will be required to provide toilets facilities for the workers to use while working at construction sites.

Wastewater from toilets and kitchen, bath, sink, etc. must be discharged into a tank to take off work or unsatisfactory handling of QCVN 09-2009 before discharge into the environment; not be released directly to any public waters. Upon completion of construction, the cistern and septic pits will be covered and sealed effectively.

Erosion and sedimentation control

The downstream face of the dam will be protected with grass and drainage ditches which was part of the proposed investments

Construction will be started in dry season to minimize the potential impacts of erosion by rainwater. Ground disturbance will be minimized in rainy season. Sedimentation traps will be installed around the area where there are extensive earthworks. Excavated materials will be transported to disposal site as soon as possible, and disposal site will be leveled regularly. At the end of construction phase, all disturbed areas will be leveled and instated before the site is handed over to management authority. The disposal site will be covered with topsoil and leveled before handed over to the local authority Landfill areas must be covered with a layer of clay, compacted to waterproofing and re topsoil

Minimize biological impacts

Land acquisition within the safety corridor of the dam includes garden and croplands. Cutting trees and removal of the existing vegetation cover is not avoidable to ensure the safety of the dam. Affected households will be informed in advance about the land acquisition plan so as they can stop cultivation on this land on time in order to avoid losses. The trees to be cut down manually by shall be collected and reused by the affected households. Cutting trees is strictly prohibited except where expressly permitted in vegetation clearing plan. Tree cutting and vegetation removal will be strictly control to avoid over clearance.

The potential negative impacts on aquatic species in the reservoir will be mitigated through construction method. Cofferdams will be built surrounding the sluice and along the dam foot, section by section, in order to contain the construction area, limiting the spreading of soil and construction materials into the water body. These cofferdams will be removed and the site will be unsteadied when construction is completed in order to maintain regular flow in the reservoir.

Waste and wastewater generated during the rehabilitation of the dam crests will also be contained and collected to prevent from being washed down into the reservoir by rainwater or surface runoff.

The contractor will be required to prepare and submit construction method and site management plan detailing how construction impacts will be managed.

Minimise community disturbance and social conflict risk management

While the risk of social conflict is low, the contractor shall be required to register his workers with local authorities. Where possible, local people will be hired by the Contractor for manual works.

The contractor will be required to schedule timing of transport to avoid trucks going through the residential areas in sensitive hours such as 6pm to 7am and between 11:30 am to 1 pm).

As the festival of the Phu Na temple will take place in January and February, the contractor will be required to schedule construction in such a way that minimise traffic disturbance on Provincial road 506 at the section near the temple, for example avoid or minimising transport the materials and wastes to and from the sites outside these months.

Management of additional pressure on existing power supply. To minimise the additional pressure on to the existing power supply systems which are not in good condition, the contractor will be required to work with local power management authority to ensure that safe power line will be installed to connect to the construction sites but do not worsen the existing system. Generators should also be equipped by the contractor in order to reduce the additional loads onto the local power system.

Avoid, compensate for damages to existing infrastructure. To avoid and compensate for local roads that can be degraded due to large number of trucks travelling on local roads, the project will rehabilitate the access and management roads with concrete M200, 20 cm thick, B=3.5m. Three reinforced sluices will be built under the road for drainage. The project will use only trucks with loads from 5 to 7 tons.

Health Risks Management

The contractor will be required to provide regular health check for the workers in order to minimize the risks related to infectious disease including STD transmission. The workers will also be required to comply with workers to avoid “social evils” such as prostitution, gambling, drinking or drug addiction. Commune health workers and women union should be engaged to conduct communication campaigns on HIV/AIDS and drug prevention. The subproject will also implement a health intervention program to manage health risks.

Avoid interruption irrigation services.

Interruption to irrigation service can be avoided as the scope of work on the upstream face is limited and measures can be implemented regarding the reconstruction of the water intake as described below.

The upstream slope (face) will be repaired locally where the paved stones have been displaced or damaged, therefore, construction will be carried out in accordance with water level in the reservoir during the months from October to March (scheduled by the FS) which are after flood season. Strengthening of the dam face will take place from elevation + 40.3 to +42.30m, i.e. above the normal level of the reservoir (+39.4m).

Construction of the sluice will take place from March to July. In March, the water level will likely be at dead level. To avoid the need to further lower water level in the reservoir to the

bottom of the sluice, coffer dam made of compacted soil will be built will be built. Water will be pumped out of the foundation before construction is started. Water from the sluice construction site will also be diverted through a D500 pipe. The existing sluice continue to be operated during the construction of the new sluice to maintain water supply to downstream. When construction of the new sluice/intake is completed. Cofferdam will be removed and water will be conveyed to downstream through the new sluice. Cofferdam will be built surround the existing sluice before removing it.

Safety Risks Management

The contractors will be required to apply measures to ensure safety. Fences, speed limit signed will be placed at high risks location. Lighting will be maintained at nighttime around the construction site. Transportation of excavated materials to the disposal site will avoid school starting and ending hours (6 to 8 am and 4 to 6 pm)..The contractor shall discuss and agree with the local government on plans to transport materials and waste. Trucks will not pass center of Trieu Thanh, Hop Thanh in rush hour or at night. Lighting will be maintained on transport routes through residential areas. Signs boards will be installed around the construction area to help with transportation, travel are convenient, and provide guidance to the different areas of work and provide instructions and safety warnings.

The contractor will also be required to ensure that vehicles used for the project be inspected and maintained regularly. Trucks will not be overloaded. Maximum speed in the inter-commune road is 30km/h, trucks must be covered to avoid materials falling on road.

The above mitigation measures were translated into the form of Environmental Specifications for inclusion into bidding documents and contracts (Annex A9)

The costs for the implementation of the mitigation measures will be part of the total contract values signed between PPMU and the contractors.

7.1.3 Mitigation Measures implemented during Operation phase

Communities upstream of the reservoir, particularly those in the additional semi-flooded area, should be informed by local authority about the possibility of being in undated in extreme flood events and be prepared for it.

The reservoir management authority should add into their annual work plan activities related to downstream channel inspection and maintenance and protection from encroachment. Communication campaigns should be conducted to communities at downstream of the spillway about no cultivation on the floodplain at times close to flood season in order to avoid losses to crop and dangers to their lives.

7.2 Environmental and social monitoring plan (ESMoP)

7.2.1 Environmental Monitoring Program

Monitoring compliance with ESMP

i) Monitoring by PPMU

PPMU will monitor the contractor's compliance with ESMP of contractor during construction

phase. PPMU will hire Construction Supervision Consultant (CSC) to supervise construction activities but also cover environmental supervision. PPMU will appoint environmental officer to be responsible for the overall environmental performance of the subproject.

ii) Monitoring by community

Local community monitoring board will be established according to Decision No.80/2005/QD-CP dated 18/04/2005 of Prime Minister on investment supervision. Community supervision board of commune has the right and responsibility to supervise construction activities, observe the negative environmental impacts caused by construction activities and monitor the contractor's environmental performance. In case of environmental problems arise and affect the community, the Board will report to the CSC or PPMU by filling in forms reflect information on environmental safety. The CSC and PMU will have responsibility to take action to address the issue identified during community monitoring

Monitoring of environmental quality

Environmental monitoring program in construction phase and operational phase is presented in the following table.

Table 18-Environmental monitoring program in the construction phase and operational phase

No.	Description	Monitoring Parameters	Method	Monitoring Frequency	Resource required and responsibility
I	Construction phases				
<i>1</i>	<i>Air</i>				
	Checking the trend and quantifying the impacts caused by activities in daily lives and construction	Dust PM10, PM 2.5	measure at the roads, specially in sections passing residential areas	at the peak of construction phase,	QCVN 05:2009/ BTNMT QCVN 06:2009/ BTNMT Responsibility: PMU, EMC
<i>2</i>	<i>Surface water</i>				
	Monitoring the water quality.	pH, DO, BOD ₅ , NH ₄ ⁺ , TSS, coliform, turbidity (NTU)	Field survey and analysis in the laboratory	2 times/year	QCVN 08:2008/ BTNMT – follows Column B1 criteria Responsibility: PPMU, EMC
II	O&M phase				
<i>1</i>	<i>Surface water</i>				
	Monitoring the water quality in the reservoir.	pH, DO, BOD ₅ , NH ₄ ⁺ , TSS, turbidity (NTU)	Field measure Analysis in the laboratory	Generally 2 times in the first year	QCVN 08:2008/ BTNMT Column B1 Responsibility: <i>Management and operation Unit</i>

No.	Description	Monitoring Parameters	Method	Monitoring Frequency	Resource required and responsibility
	Ecological parameter	Aquatic species (if any) to be identified during assessment	Field monitoring and interview local people	Generally 2 times in the first year	

7.2.2 Social monitoring program

The social monitoring programs in detail are presented in individual report of RAP or in the Annex B4 of GAP.

7.2.3. Estimated cost for environmental monitoring

Table 19- Estimated budget for environmental and social monitoring

Unit: VND x 1000

No.	Items	Unit	Quantity	Unit Price	Amount
I	Experts				22,029,231
	Environmental expert (survey, sampling and environmental monitoring): 5 days/1 round x 6 rounds	Day	30	244,769	7,343,077
	Environmental expert (preparing reports): 10 days/1 round x6 rounds	Day	60	244,769	14,686,154
II	Management costs: 55% x I				12,116,077
III	Other costs:				210,318,000
1	Materials:				3,900,000
	Printing costs	Page	300	2,000	600,000
	Photocopy	page	3,000	500	1,500,000
	Print maps (A1 size)	page	6	100,000	600,000
	Stationery	Lump sum	6	200,000	1,200,000
2	Tools and Car rental costs:				21,300,000
	Cost of sampling equipment and sample preservation	Lump sum	6	1,000,000	6,000,000
	Car rental costs: 01 day/1 round x 6 rounds = 06 days	day	6	1,800,000	10,800,000
	Per diem: 5 persons/1 round x 6 rounds	Person	30	150,000	4,500,000
3	Sample analysis:				185,118,000
3.1	Air samples	sample			
	SO2	sample	54	140,000	7,560,000
	CO	sample	54	140,000	7,560,000
	NO2	sample	54	140,000	7,560,000
	Noise	sample	54	35,000	1,890,000

	Dust	sample	54	140,000	7,560,000
	Microclimate conditions (humidity, temperature, wind speed)	sample	54	56,000	3,024,000
3.2	Surface water	sample			
	pH	sample	48	56,000	2,688,000
	BOD5	sample	48	200,000	9,600,000
	COD	sample	48	120,000	5,760,000
	DO	sample	48	104,000	4,992,000
	TSS	sample	48	80,000	3,840,000
	N-NO3	sample	48	140,000	6,720,000
	P-PO4	sample	48	84,000	4,032,000
	NH4+	sample	48	98,000	4,704,000
	As	sample	48	150,000	7,200,000
	oil	sample	48	400,000	19,200,000
	Coliform	sample	48	112,000	5,376,000
3.3	Groundwater				
	pH	sample	24	56,000	1,344,000
	Hardness of water according to CaCO3	sample	24	80,000	1,920,000
	Asen (As)	sample	24	150,000	3,600,000
	NO2- according to N	sample	24	100,000	2,400,000
	NH4+ according to N	sample	24	98,000	2,352,000
	SO42-	sample	24	90,000	2,160,000
	E Coli	sample	24	112,000	2,688,000
	Coliform	sample	24	112,000	2,688,000
3.4	Soil				
	Hàm lượng As	sample	54	150,000	8,100,000
	Hàm lượng Cd	sample	54	130,000	7,020,000
	Hàm lượng Cu	sample	54	130,000	7,020,000
	Hàm lượng Pb	sample	54	130,000	7,020,000
	Hàm lượng Zn	sample	54	130,000	7,020,000
3.5	Sample of biodiversity				
	Floating plants	sample	48	142,500	6,840,000
	Floating animals	sample	48	114,000	5,472,000
	benthic organisms	sample	48	171,000	8,208,000
IV	Calculated taxable income: 6% x (I+II+III)				14,667,798
V	V.a.t tax: 10% x (I+II+III+IV)				25,913,111
	Estimated value after tax:				285,044,217
	Rounding:				285,044,000

7.2.4 Monitoring report requirement

The report will be made during the implementation of the monitoring program, to gather reports on the impact or the recommendations of the people of sub-project. To assess the effectiveness of mitigation measures were implemented.

Table 20 - The type of environmental monitoring reports, social

Responsibility	Type of report	Content of report	Frequency	Submitted to
Contractor	Report Accident / incident	Collect information about accidents or incidents	In the 24 hours since the incident	PMU and CSC
	Violation report	Provide information about the	Within a week	PMU and CSC
	The report reveals	Recording and reporting agencies artifacts, archeology, tomb newly discovered	Within 24 hours from the discovery of objects	PMU, CSC and Department of Culture
	Report on the implementation of the EMP	report on the results of implementation of mitigation measures	Every month	PMU
Construction Supervision Consultant	Report on implementation of measures to minimize the impact on the environment, social	<ul style="list-style-type: none"> - Evaluate the implementation of measures to minimize the impact - Results resolve and remedy the problem and the remedies the shortcomings of previous reports 	Every month	PMU
Independent Environmental Consultant	Report an independent safety monitoring of environmental and social	<ul style="list-style-type: none"> - site observation,- Results of community monitoring - CSC reports -environmental sampling - Review the results of ESMP and recommendations 	6 month/time or 3 month/time	PMU and WB
Board sub-project management	A report on the environmental performance of subprojects	Result of ESMP implementation	Every 6 months	CPO and WB

7.3 ESMP implementation arrangement

7.3.1 Agencies and responsibilities

a) The responsibility of project owner/PPMU

PMU, representative of the implementing agency, will be responsible for monitoring the overall project implementation, including environmental compliance of the project. PMU will have the final responsibility for ESMF implementation and environmental performance of the project during both the construction and operational phases. As the subproject owner, PPMU is responsible for implementation of all the ESMP/ESMoP activities to be carried out under the project, including fostering effective coordination and cooperation between contractor, local authorities, and local communities during construction phase. PPMU will be assisted by the environmental staff, and CSC/or field engineer. Specifically the PPMU will closely coordinate with local authorities in the participation of the community during project preparation and implementation, monitor and supervise ESMP implementation including incorporation of ESMoP into the detailed technical designs and bidding and contractual documents, ensure that an environmental management system is set up and functions properly, be in charge of reporting on ESMP/ESMoP implementation to the IA and the World Bank.

b) Construction contractor

The construction contractors are responsible for implementing mitigation measures and the mitigation costs will be part of the contract. Take actions to mitigate all potential negative impacts in line with the objective described in the ESMP. In order to be effective in the implementation process, PMU will establish an Environmental Unit with at least two environmental staffs to help with the environmental aspects of the project, including ESMP at the working site, actively communicate with local residents and take actions to prevent disturbance during construction.

The contractors need to prepare a Contractor Environmental and Occupational Health and Safety Plan (CEOHSP) based on the construction-related measures identified in the ESMP as well as the relevant national standards and standard practice in construction site management, including good housekeeping, construction waste management, etc. A detail CEOHSP for contractors is presented in the Annex A10.

c) Construction Supervision Consultant (CSC) and/or Field Engineer

The CSC will be responsible for routine supervising and monitoring all construction activities and for ensuring that Contractors comply with the requirements of the contracts and the EMP. The CSC shall engage sufficient number of qualified staff (e.g. Environmental Engineers) with adequate knowledge on environmental protection and construction project management to perform the required duties and to supervise the Contractor's performance

d) Independent Environmental Monitoring Consultant (IEMC)

IEMC will, under the contract scope, provide support to PMU to establish and operate an environmental management system, offers suggestions for adjusting and building capacity for relevant agencies during project implementation and monitor the Contractor's EMP implementation in both construction and operation stages. IEMC will also be responsible to support PMU to prepare monitoring reports on EMP implementation. The IEMC shall have extensive knowledge and experience in environmental monitoring and auditing to provide independent, objective and professional advice on the environmental performance of the project.

e) Local community

The local community supervision Board has been established according to "Decision No.80/2005/QD-CP dated 18/04/2005 of Prime Minister on investment supervision statutes of community". The community supervision Board of commune has right and responsibility for supervising construction activities, negative impacts to environment caused by construction activities and guarantees the measures to minimize potential adverse impacts have been

implemented effectively by contractor. In case of arising environmental problems that affect to community, they will report to scene Supervision Consultant and/or PPMU by filling in forms reflect information on environmental safety.

f) Responsibility of reservoir management and development agency

The local irrigation management company will dispatch a staff to manage environment, waste in the irrigation system, coordinate with environmental consultants to monitor environment, periodically report on environment of sub-project to DoNRE.

g) Responsibility of CPO

CPO will guide PPMU to carry out environmental and social management plan of subproject. CPO will monitor the progress of subproject during construction time.

h) Province and District People’s Committees (PPCs/DPCs), Provincial DONRE

Monitor implementation of subprojects under recommendations of DONRE and PPMU to ensure compliance of Government policy and regulations. DONRE is responsible for monitoring the compliance with the Government environmental requirements.

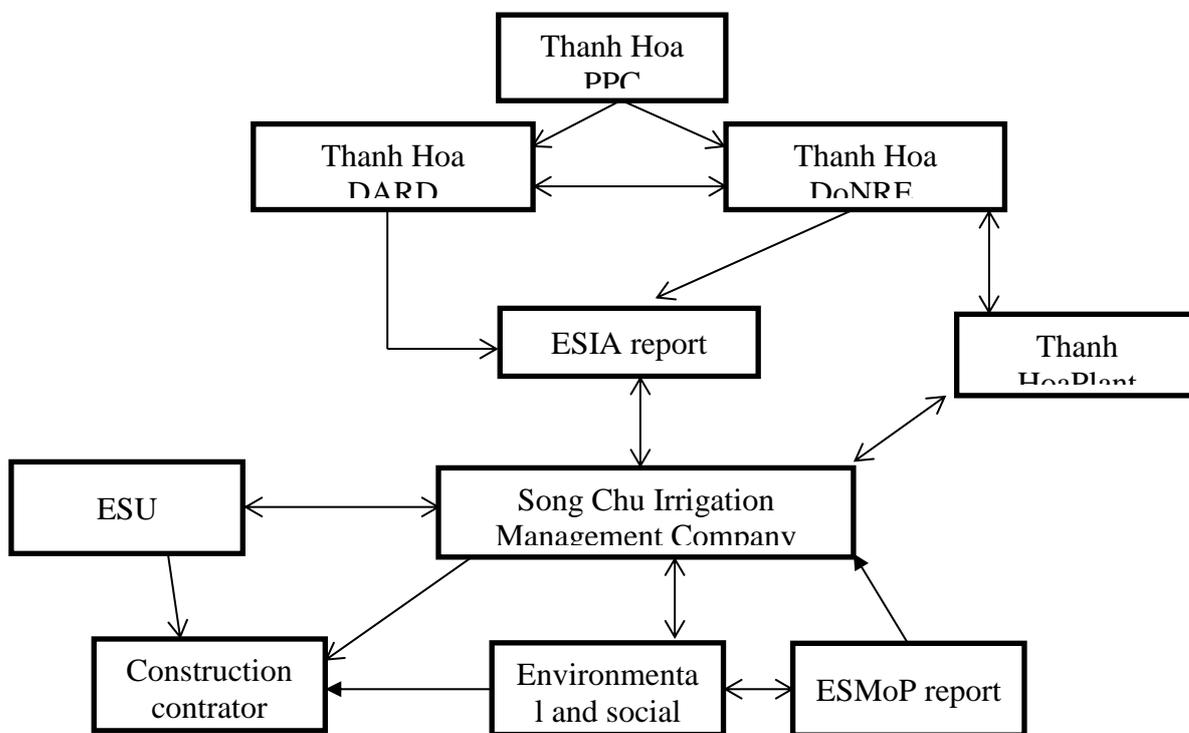


Figure 15 Environmental management organizations in construction phase

7.3.2 Assessment of existing environmental and social management practice and capacity for dam management

Capacity building and training for project's staff and authorities relevant to dam safety is important. Especially, new staff should be trained to focus on dam safety engineering. Because the technique of dam design, construction engineering and inspection activities are constantly changing, even experienced staffs still need training on new techniques and application in practice.

Regarding environmental management resources, the Thanh Hoa PPMU has not had specialized division or personnel responsible for the environmental and social issues.

Regarding the training program, PPMU has not attended any training on safeguard policy on

environment, involuntary resettlement, gender and gender equality.

Training needs of capacity building for environmental management were recommended for training on monitoring and environmental impact assessment for 02 technical staff of the PPMU.

7.3.3 Capacity building capacity

To improve the technical and environment management for staff PPMU, organizations and individuals involved, PPMU will implement the training content is as follows.

Table 21-Program of building capacity and technique of environmental management

No.	Training courses	Implementation cost (VND)
1	Building capacity on ESMP and ESMoP	2 class x VND 2 mil./class = VND 4 mil.
2	Improving knowledge on environmental protection and media	3 class x VND 2 mil./class = VND 6 mil
3	Training on fire fighting	4 class x VND 2 mil./class = VND 8 mil
4	Training on environmental regulations and standards	4 class x VND 2 mil./class = VND 8 mil
5	Training on environmental health and safety measures	4 class x VND 2 mil./class = VND 8 mil
6	Training/coaching on dam safety knowledge	3 class x VND 2 mil./class = VND 6 mil
7	Training/coaching on diseases	3 class x VND 2 mil./class = VND 6 mil
8	Training/coaching on gender equity	3 class x VND 2 mil./class = VND 6 mil
Total		52,000,000

7.4 Community development needs assessment

Social and political organizations at the local (such as Farmer Union, Women's Union, Youth Union, Veterans Association, Association of the Elderly, Red Cross Association, ...) are organization involved in monitoring and implementation of the project, especially the period of land acquisition, compensation, assistance and resettlement of affected households to ensure compliance with policies and resettlement and the objectives of the project. The community organizations are where grasp the issues and responses of people related to the operation of the project during the preparation, construction and put into use. The monitoring of these organizations to coordinate with the population groups in the community is crucial in helping the management and implementation units to adjust timely design, operation construction activities to minimize undesirable social impacts on people lives in the affected areas.

The hamlet: The grant works directly with the people, reflect the issues raised during the preparation, construction and putting into operation of the project category. Hamlets will be the last place the activities implemented to provide information to residents of the project and are the first place to receive the feedback of the people related to the project. The role of village officials/neighbors very important, objectively and timely reflect the aspirations and legitimate petitions of the people for the monitoring of the project implementation process to minimize the impact of project to life of the people. In addition, the comments reflected from village

officials, neighbors also make construction project categories more relevant, bring economic benefits for society than community benefit area direct the subproject.

REFERENCES

1. Report of the sub-projects FS repair, upgrade safety Dong Be reservoirs, Xuan Du, Nhu Thanh District, Thanh Hoa Province;
2. A report on the action plan for resettlement (RAP) subproject repair, upgrade safety Dong Be reservoir, Xuan Du commune, Nhu Thanh District, Thanh Hoa Province .;
3. A report assessing the impact of social subprojects repair, upgrade safety Dong Be reservoir, Xuan Du commune, Nhu Thanh District, Thanh Hoa Province .;
4. Dam Safety Report subprojects repair, upgrade safety Dong Be reservoir, DXuan Du commune, Nhu Thanh District, Thanh Hoa Province.
5. Report on the socio-economic situation Trieu Thanh, Trieu Son district, Xuan Du commune, Nhu Thanh District, Thanh Hoa Province in 2014;
6. Results of the analysis of environmental samples background subproject area repair, upgrade safety Dong Be reservoir, XuanDu commune, Nhu Thanh District, Thanh Hoa Province.
7. The types of maps:
8. Map of the project area
9. The map of land use and planning of the project.

ANNEX A. ENVIRONMENTAL DOCUMENTS

Annex A1. Policy framework, institution and regulation

1. Policy framework, institution and regulation of GoV for ESIA

Legal framework related to environmental protection

- Law on Environmental Protection 2014, No. 55/2014/QH13 regulating the issues related to Strategic Environmental Impact Assessment and commitment of Environmental protection for development activities. EIA report must be prepared during investment preparation process (feasibility study);
- Decree No. 18/2015/NĐ-CP dated 14/02/2015 regulating plan for environment protection, strategic environmental impact assessment, EIA and planning for environmental protection;
- Direction No. 26/CT-TTg dated 25/8/2014 of Prime Minister on implementing the Law on Environmental Protection;
- Circular No.01/2012/TT-BTNMT dated 16/3/2012 of MONRE regulating preparation, approval and monitoring, identifying the implementation of the detailed environmental protection project; preparation and registration of the simple environmental protection project;
- Decree No. 29/2011/NĐ-CP dated 18/04/2011 regulating strategic environmental assessment, EIA and environmental protection commitment;
- Circular No.16/2009/TT-BTNMT dated 17/10/2009 of MONRE on Regulation and Technical Standard on environment, air quality and some toxics in around air;
- Decision No. 22/2006/QĐ-BTNMT dated 25/12/2006 of MONRE on forcing Vietnam National Standards of environment application.
- Legal framework related to land use and land acquisition of the investment projects
- Law on Land No. 45/2013/QH13 approved by Vietnam National Assembly dated 29/11/2013;
- Decree No. 44/2014/NĐ- CP, dated 15/5/2014 regulating the land price;
- Decree No. 47/2014/NĐ-CP, dated 15/5/2014 regulating the compensation, support and resettlement in cases of the land recovered;
- Decree No. 37/2014/NĐ-CP, dated 30/6/2014 regulating in details about the compensation, support and resettlement in cases of the land recovered;
- Circular No. 23/2014/TT-BTNMT dated 19/5/2014 regulating the Certificate of Land use right, House ownership and other assets attached.

Legal framework related to the use and management of the investment projects

- Law on Construction No. 50/2014/QH13 approved by Vietnam National Assembly dated 18/08/2014;
- Decree No. 15/2013/NĐ-CP dated 06/02/2013 on managing the construction quality;
- Decree No. 207/2013/NĐ-CP dated 11/12/2013 on revising and supplement some Articles of Decree No. 48/2010/NĐ-CP dated 07/5/2010 of Government on the contract in construction activities;
- Decree No. 12/2009/NĐ-CP dated 10/02/2009 on managing the construction and investment projects.

Legal framework related to integrated water resources exploitation and forest protection, cultural heritage and biodiversity

- Law on Water Resources approved by Vietnam National Assembly dated 21/06/2012;
- Decree No.42/2012/NĐ-CP, dated 11/05/2012 of Government on managing and using of rice land;
- Decree No. 112/2008/NĐ-CP dated 20/10/2008 of Government on managing, protecting and integrated exploitation of water resources and environment of the electrical generation and irrigation reservoirs;
- Decree No. 120/2008/NĐ-CP dated 01/12/2008 of Government on River Basin management;
- Decree No. 72/2007/NĐ-CP dated 07/05/2007 of Government on Dam safety management;
- Decree No. 149/2004/NĐ-CP dated 27/07/2004 of Government regulating the licensing of exploration, exploitation and use of water resources and waste water discharge into water resources;
- Law on Culture Heritage No.28/2001/QH10 approved by Vietnam National Assembly dated 12/07/2001. Article 13 - Strictly prohibit the following acts: Appropriating and distorting the cultural heritage; destroying or risk destruction of cultural heritage; Unauthorized excavation of archaeological sites; illegal construction, encroachment of land belonging to historical – cultural and scenic areas;
- Law on Biodiversity No.28/2008/QH12 approved by Vietnam National Assembly dated 13/01/2008. Chapter III- Natural Ecosystem conservation and sustainable development, and Chapter IV- Creature Conservation and Development.
- National Policy on Dam safety
- Decree No. 72/NĐ-CP dated 07/02 /2007 on managing Dam safety;
- Government Direction No. 21/CT-TTg dated 14/10/2013 on enhancing the management of reservoir safety;
- - Circular No. 33/2008/TT-BNN dated 04/02/2008 on guiding the implementation of some Articles of Decree No. 72/NĐ-CP;
- - Circular No. 34/2010/TT-BCT of Ministry of Industry and Trade dated 07/10/2010 regulating safety management of Electric Generation Reservoirs.
- - Document No. 1852/BNN-TCTL dated 10/6/2014 of the Minister of Agriculture and Rural Development on supporting the urgent repair funding to ensure the safety of reservoirs;
- Resettlement policy
- The Constitution of Vietnam Socialist Republic (1992) confirmed the people rights on house ownership and house ownership protection.
- The Constitution of Vietnam Socialist Republic 2013.
- Law on Land No. 45/2013/QH13 on administration regulations of land in general. Law on Land 2013 instead of the previous Land Laws in 1987 and 1993.
- Law on Complaints No. 02/2011/QH11 approved by Vietnam National Assembly.
- Decree No. 43/2014/ND-CP dated 15/5/2014 on the Land Law enforcement.
- Decree No.44/2014/ND-CP dated 15/5/2014 regulating the Land price assessment.
- Decree No. 47/2014/ND-CP dated 15/5/2014 on compensation and resettlement in cases of land recovered.
- Decree No. 75/2012/ND-CP dated 03/10/2012 on guiding the implementation of the Law

on Complaints.

- Decree No. 38/2013/ND-CP dated 23/4/2013 on managing and use of Official Development Assistant Fund (ODA).
- Decree No. 42/2012/ND-CP dated 11/05/2012 on managing and use of rice land;
- Circular No.37/2014/TT-BTNMT dated 30/6/2014 regulating compensation, support and resettlement in cases of land recovered.
- Decision No. 1956/2009/QĐ-TTg dated 17/11/2009 of Prime Minister on approving the Overall Strategy of Career training for rural labor to 2020.
- Decree No. 197/2004/NĐ-CP of Government dated 03/12/2004 on compensation, support and resettlement in cases of land recovered.
- Circular No.116/2004/TT-BTC dated 17/12/2004 of Government on guiding the implementation of Decree No.197/2004/ND-CP, dated 03/12/2004 on compensation, support and resettlement in cases of land recovered.
- Decree No.188/2004/NĐ-CP of Government on the methods of determining land price and land price frame for each type of land.
- Circular No.36/2014/TT-BTNMT dated 30/6/2014 regulating the methods of land price assessment, construction and land price adjustment.
- Circular No. 114/2004/TT-BTC, dated 16/11/2004 guiding the implementation of Decree No. 188/2004/NĐ-CP.
- Decree No.17/2006/NĐ-CP of Government dated 27/01/2006 on revising and supplement some Articles of Decree guiding the implementation of Law on Land and Decree No. 187/2004/NĐ on the transformation of state companies into joint stock companies.
- Decree No. 84/2007/NĐ-CP of Government dated 25/05/2007 regulating the supplements of issuing the Land use rights Certificate, procedures of compensation and resettlement in cases of land recovered.
- Decree No. 123/2007/NĐ-CP, dated 27/7/2007 on revising and supplement some Articles of Decree No.188/2004/NĐ-CP, dated 16/11/2004 on the methods of determining land price and land price frame for each type of land.
- Decree No. 69/2009/NĐ-CP of Government dated 13/08/2009 regulating the additional planning regulations on land use, land price, land recovery, compensation, support and resettlement.
- Decision No. 52/2012/QĐ-TTg of Government dated 16/11/2012 on support policy of employment and career training for labors who have land recovered.

Gender policy

- Law on Gender Equality No. 73/2006/QH11 approved by Vietnam National Assembly dated 29/11/2006;
- Direction No. 07/2007/CT-TTg 3/5/2007 of Government on the Law on Gender Equality enforcement;
- Decree No. 70/2008/NĐ-CP dated 4/6/2008 of Government regulating in detail on implementation of on Gender Equality;
- Decree No. 55/2009/NĐ-CP dated 10/6/2009 of Government on administration sanctions of gender equality;
- Decree No. 48/2009/NĐ-CP dated 19/5/2009 of Government on the measures of ensuring gender equality;
- Circular No. 191/2009/TT-BTC dated 1/10/2009 of Ministry of Finance guiding the use and management of funds for gender equality and women advancement;
- Circular No. 07/2011/TT-BTP dated 31/3/2011 of Ministry of Justice guiding the gender

- equality ensure in staff arrangement and legal support activities;
- Decision No. 2351/QĐ-TTg dated 24/12/2010 of Prime Minister approving the National Strategy on Gender Equality for 2011 – 2020 period.
 - Policy for Ethnic Minority community development
 - Decree No. 82/2010/NĐ-CP dated 20/7/2010 of Government on teaching and learning the ethnic language in the schools.
 - Decree No. 60/2008/NĐ-CP dated 9/6/2008 of Government regulating the functions, tasks, responsibilities and organization structures of Ethnic Committee.
 - Decision No. 06/2007/QĐ-UBND dated 12/1/2007 of Ethnic Committee approving Communication Strategy for 135 Program – phase 2.
 - Decree No. 70/2001/NĐ-CP: all registration documents of family assets and land use rights must be filled the names of both husband and wife.
 - Decision No. 134/2004/CP dated 20/7/2004 of Government on policy of supporting productive land, residential land, house and domestic water for the poor and difficult ethnic households.
 - Decision No. 03/2005/QĐ-BNN dated 07/01/2005 of Minister of MARD regulation the wood exploitation to support house construction of the poor and difficult ethnic households in line with Decision No. 134/QĐ-TTg dated 20/7/2004 of Government.
 - Decision No. 33/2007/QĐ-TTg, dated 05/3/2007 of Government on the support policy on immigration and settlement for ethnic minorities;
 - Decision No. 32/2007/QĐ-TTg dated 05/3/2007 of Government on the loans for production development of especial difficult ethnic households.
 - Decision No. 1592/QĐ-TTg dated 12/10/2009 of Government on continuing implementation of some policies to support productive land, residential land, house and domestic water for the poor and difficult ethnic households.
 - Decision No. 05/2007/QĐ-UBND dated 06/9/2007 of Ethnic Committee approving three Ethnic Minority regions and mountainous region based on the development situation.
 - Circular No. 06 dated 20/9/2007 of Ethnic Committee guiding the support services for livelihood improvement of local people, technical assistant to improve knowledge on Law enforcement in line with Decision No. 112/2007/QĐ-TTg.
 - Poverty reduction policy
 - Decision No. 33/2007/QĐ-TTg dated 20/7/2007 of Prime Minister on the support policy to improve knowledge of Law enforcement within 135 program- phase 2.
 - Decision No. 1956/2009/QĐ-TTg, dated 17/11/2009 of Prime Minister approving the Master Plan on career orientation training for rural labors to 2020.
 - Resolution No. 30a/2008/NQ-CP of Government dated 27/12/2008 on the support program for rapid and sustainable poverty reduction for 61 poorest districts.

National Regulations and Standards related to environmental protection

(i) Water Environment:

- QCVN 02:2009/BYT: National technical standard on domestic water quality.
- QCVN 08:2008/BTNMT: National technical standard on surface water quality;
- QCVN 09:2008/BTNMT - National Technical Standard on ground water quality;
- QCVN 14:2008/BTNMT - National Technical Standard on domestic waste water.
- QCVN 39/2011/BTNMT - National Technical Standard on water quality for irrigation;

(ii) Air Environment:

- QCVN 05:2013/ BTNMT - National Technical Standard on around air quality;

- QCVN 06:2008/BTNMT – National Technical Standard on some toxics in around air.
 - QCVN 07:2008/BTNMT: air quality - levels of toxic substances in the air
 - TCVN 6438:2001: Vehicles from the road - the maximum limit of gases emission
- (iii) Land Environment
- QCVN 03 : 2008/BTNMT - National Technical Standard on permitted limitation of heavy metals in the soil;
 - QCVN 04 : 2008/BTNMT – National Technical Standard on residue of chemical and pesticide in the soil;
 - QCVN 43:2012/BTNMT - National Technical Standard on sediment quality.
- (iv) Solid waste management:
- QCVN 07: 2009/BTNMT - National Technical Standard on thresholds of hazardous waste.
 - TCVN 6696:2009: solid waste - sanitary landfill. General requirements for environmental protection
- (v) Vibration and noise:
- QCVN 26:2010/BTNMT – National Technical Standard on the noise;
 - QCVN 27:2010/BTNMT – National Technical Standard on the vibration.
- (vi) Health and labor safety
Decision No. 3733/2002/QĐ-BYT of the Ministry of Health dated 10/10/2002 on the application of the 21 standards of health and safety that relates to microclimate, noise, and vibration chemicals - the allowed threshold in the workplace.

2. Safeguard policies of WB

According to Bank policy, ESIA report must be combined with the economic, financial, institutional, social and technical analysis of projects to ensure that environmental and social issues are adequately reviewed in the selection of projects, location and the decisions relating to technology solutions. Five (05) safeguard policies of the Bank's should be enabled for the project.

Annex A2. Results of environmental sample analysis

1. Results of air quality monitoring

Table 1: Results of the analysis of air quality in project area

Parameter	Unit	Results of sample analysis												QCVN 05: 2009/BTNMT (average 1 hour)
		Mk1	Mk2	Mk3	Mk4	Mk5	Mk6	Mk7	Mk8	Mk9	Mk10	Mk11	Mk12	
Temperature	°C	28.2	29.6	27.9	30.4	27.9	27.6	28.3	28.7	30.3	31.7	30.9	30.4	-
Humidity	%	79	71	73	76	75	73	76	71	77	74	75	78	-
Wind speed	m/s	3.2	3.6	2.9	2.8	4.1	2.2	3.7	2.0	1.9	4.2	2.6	3.7	-
Noise	dB(A)	40	38	44	49	48	51	40	47	43	54	57	39	70*
TSP	µg/m ³	122	148	107	158	90	161	113	172	180	129	146	135	300
SO ₂	µg/m ³	87	72	115	131	139	169	105	173	171	143	202	116	350
CO	µg/m ³	890	1,500	2,300	2,900	1,100	1,800	900	2,200	3,200	1,500	1,600	4,300	30,000
(NO ₂)	µg/m ³	56	46	61	86	82	101	77	125	125	116	158	92	200
		Mk13	Mk14	Mk15	Mk16	Mk17	Mk18	Mk19	Mk20	Mk21	Mk22	Mk23	Mk24	
Temperature	°C	29.2	29.6	28,8	30,1	27,2	28,6	27,9	29,3	29,6	28,9	29,5	29,0	-
Humidity	%	80	79	82	78	75	72	69	72	79	75	77	74	-
Wind speed	m/s	4.8	3.3	5,2	2,4	2,2	2,9	1,3	3,8	3,8	2,4	3,6	4,2	-
Noise	dB(A)	47	51	38	58	43	49	55	56	55	46	59	44	70*
TSP	µg/m ³	140	172	120	195	190	138	155	219	162	133	142	98	300
SO ₂	µg/m ³	119	67	140	161	176	142	119	198	135	121	145	116	350
CO	µg/m ³	2,700	4,500	1,100	3,300	4,300	1,900	2,600	1,400	5,200	2,800	3,300	2,100	30,000
(NO ₂)	µg/m ³	68	45	52	71	124	78	63	162	70	66	82	60	200

Table 1 : Results of the analysis of air quality in project area (continued)

No.	Parameter	Unit	Results of sample analysis								QCVN 05:2009/BTNMT (average 1 hour)
			Mk25	Mk26	Mk27	Mk28	Mk29	Mk30	Mk31	Mk32	
1	Temperature	°C	28,2	28,8	27,9	28,0	30.3	29.7	30.8	30.1	30,5
2	Humidity	%	80	78	77	79	71	76	72	74	75
3	Wind speed	m/s	1,2	3,1	2,6	1,5	4,3	1,7	2,9	3,0	3,7
4	Equivalent noise	dBA	40	38	42	67	58	53	39	49	42
5	TSP	µg/m ³	102	93	131	279	202	191	153	161	140
6	SO ₂	µg/m ³	97	62	108	295	182	151	122	138	117
7	Carbon oxit (CO)	µg/m ³	1.600	990	1.300	12.000	10.200	7.400	2.600	2.900	1.800
8	Nitơ oxit (NO ₂)	µg/m ³	56	43	67	176	163	151	76	115	61

Note: NTR 05: 2009 / BTNMT- national technical standards for the quality of ambient air environment (average 1 hour).
 (-):not specified; *QCVN 26: 2010/BTNMT: National technical regulations on noise.

Code	Location of air quality sampling	Coordinates	Code	Location of air quality sampling	Coordinates
Mk1	Residential area in hamlet 3, Xuan Du, Nhu Thanh, potentially affected by the transport and disposal of excavated materials.	19°46'01,3"N; 105°33'16,7"E	Mk4	Residential area in Dong Thanh village, Trieu Thanh, Trieu Son, potentially affected by the transportation of materials to the spillway and flood protection dike.	19°46'35,6"N; 105°33'21,7"E
Mk2	Residential area in hamlet 1, Xuan Du, Nhu Thanh, potentially affected by the transport and disposal of excavated materials	19°46'10,7"N; 105°33'18,2"E	Mk5	Residential area in village 11, Trieu Thanh, Trieu Son, where affected by the transportation of materials, earth, soil to the spillway and flood protection dike.	19°46'37,2"N; 105°33'23,4"E
Mk3	Residential area in hamlet 2, Xuan Du, Nhu Thanh, potentially affected by the transport and disposal of excavated materials	19°46'13,5"N; 105°33'21,7"E	Mk6	Residential area in village 11, Trieu Thanh, Trieu Son, where affected by the transportation of materials, earth, soil to the spillway and flood protection dike.	19°46'30,8"N; 105°33'26,5"E

Code	Location of air quality sampling	Coordinates	Code	Location of air quality sampling	Coordinates
Mk7	Residential area in Dien Binh village, Hop Thanh commune, Trieu Son district, where affected by the transport of materials, earth for dam.	19°48'29,5"N; 105°53'07,6"E	Mk15	The area along the canal fields N1 Trieu Thanh, where affected by the dike embankment construction of new sewers, drained the reservoir to construction.	19°48'72,4"N; 105°35'51,5"E
Mk8	Residential area in Dien Hoa village, Hop Thanh commune, Trieu Son district, where affected by the transport of materials to the dam.	19°48'41,2"N; 105°55'12,3"E	Mk16	N2 canal area in forest management station Xuan Du, where affected by the construction of intake.	19°49'22,0"N; 105°34'15,6"E
Mk9	Residential area in Dien Trung village, Hop Thanh commune, Trieu Son district, where affected by the transport of materials, earth for dam.	19°48'45,3"N; 105°33'15,7"E	Mk17	Area fields in villages along N2 channels 1, Xuan Du, where affected by the dike embankment construction of new sewers, drained the reservoir to construction.	19°50'16,7"N; 105°33'80,2"E
Mk10	Residential area in zone 4, Trieu Son township, Trieu Son district, where affected by the transport of materials, earth for dam.	19°49'19,3"N; 105°36'08,4"E	Mk18	Residential areas in villages along N2 channel 2, Xuan Du, where affected by the construction of new sewers, drained the reservoir to construction	19°50'20,2"N; 105°35'58,4"E
Mk11	Residential area in zone 6, Trieu Son town, Trieu Son district, where affected by the transport of materials for dam.	19°50'23,7"N; 105°37'10,3"E	Mk19	At the middle of main dam, where affected by weathering erosion processes, damming, reinforcing dam side.	19°45'36,0"N; 105°32'41,6"E
Mk12	Residential area in zone 6, Trieu Son towns, Trieu Son district, where affected by the transport of materials for dam.	19°50'20,4"N; 105°37'12,6"E	Mk20	At the left abutment of the main dam, where affected by erosion, damming, reinforcing dam side.	19°45'35,2"N; 105°35'41,0"E
Mk13	Side of N1 canal in village 11, Trieu Thanh commune, where affected by the dike embankment construction of new intake, draining the reservoir for construction.	19°48'66,2"N; 105°35'41,2"E	Mk21	At the right abutment of the main dam, where affected by erosion processes, damming, reinforcing dam side.	19°45'36,6"N; 105°34'44,2"E
Mk14	Side of N1 canal in village 1, Trieu Thanh commune, where affected by the dike embankment construction of new intake, draining the reservoir for construction.	19°48'56,0"N; 105°35'90,2"E	Mk22	Top of spillway, where affected by the construction earthworks, spillway works.	19°45'30,1"N; 105°31'49,2"E

Code	Location of air quality sampling	Coordinates	Code	Location of air quality sampling	Coordinates
Mk23	Toe of spillway, where affected by the construction earthworks, spillway works.	19°45'33,9"N; 105°32'65,5"E	Mk29	At the entrance road to land mine in Hop Thang commune, where affected by mining excavation and transportation of excavated earth.	19°50'33,5"N; 105°46'52,1"E
Mk24	At the left abutment of the flood embankment, where affected by weathering erosion processes, damming, reinforcing damside.	19°46'30,2"N; 105°38'71,8"E	Mk30	Residential area 500m away from land mine to the south, where affected by mining excavation and transportation of excavated earth.	19°51'12,6"N; 105°45'52,9"E
Mk25	At the right abutment of the flood embankment, where affected by weathering erosion processes, damming, reinforcing dam side.	19°46'30,2"N; 105°38'71,8"E	Mk31	At central of landfill in hamlet 4, Xuan Du commune, where affected by dumping of waste soil after removal of organic layer at the headworks site.	19°46'26,6"N; 105°33'36,2"E
Mk26	At the middle of the flood embankment, where affected by weathering erosion processes, damming, reinforcing dam side.	19°46'83,2"N; 105°39'06,4"E	Mk32	Field in hamlet 4, Xuan Du commune, 50 m away from the landfill to the north, where affected by dumping of waste soil after removal of organic layer at the headworks site.	19°46'74,2"N; 105°33'30,3"E
Mk27	Downstream of the intake, where affected by the dike embankment for construction of new intake, draining the reservoir for construction.	19°46'77,6"N; 105°40'13,2"E	Mk33	Field in hamlet 4, Xuan Du commune, 200 m away from the landfill to the north, where affected by dumping of waste soil after removal of organic layer at the headworks site.	19°47'22,5"N; 105°32'68,3"E
Mk28	At central area of land mine in Hop Thang commune, where affected by mining excavation and transportation of excavated earth.	19°49'60,2"N; 105°47'62,3"E			

2. Results of the analysis of surface water quality

Table 2: Results of the analysis of surface water quality in project area

Parameter	Unit	QCVN08:2008/ BTNMT		Result of analysis									
		B1	B2	Nm1	Nm2	Nm3	Nm4	Nm5	Nm6	Nm7	Nm8	Nm9	Nm10
pH		5,5-9	5,5-9	7,5	7,7	7,8	8,0	8,3	7,3	7,7	6,8	8,2	7,6
DO	mg/l	≥4	≥2	5,8	6,1	6,2	5,0	5,6	4,7	5,5	4,9	5,2	5,8
TSS	mg/l	50	100	31,9	42,7	22,5	29,4	38,2	40,6	37,8	50,6	43,5	31,7
COD	mg/l	30	50	23,7	18,8	28,5	20,0	27,9	19,3	15,6	25,8	31,2	24,6
BOD ₅ (20 ⁰ C)	mg/l	15	25	12,2	9,6	14,7	10,2	14,5	9,8	8,2	12,9	15,8	12,4
NO ₃ ⁻ (N)	mg/l	10	15	0,9	1,6	2,7	1,3	2,4	1,4	2,8	1,7	0,6	1,1
PO ₄ ³⁻ (P)	mg/l	0,3	0,5	0,02	0,08	0,13	0,06	0,16	0,06	0,19	0,28	0,02	0,17
Amoni (NH ₄ ⁺)	mg/l	0,5	1	0,01	0,03	0,02	0,19	0,32	0,05	0,01	0,09	0,22	0,19
Asen (As)	mg/l	0,05	0,1	kph	kph	kph	0,002	kph	kph	0,001	kph	0,002	0,001
Oil and grease	mg/l	0,1	0,3	0,06	0,08	0,04	0,01	kph	0,01	kph	kph	0,04	0,07
Total Coliform	MPN/ 100ml	7.500	10.000	2.700	5.900	4.200	5.300	3.200	1.700	3.900	2.200	1.300	4.400
				Nm11	Nm12	Nm13	Nm14	Nm15	Nm16	Nm17	Nm18	Nm19	Nm20
pH		5,5-9	5,5-9	7,4	7,3	7,5	8,3	7,6	6,7	7,5	7,3	8,0	7,1
DO	mg/l	≥4	≥2	5,1	4,5	5,4	5,7	4,3	5,0	4,8	6,1	5,3	4,9
TSS	mg/l	50	100	32,9	43,7	46,5	29,6	48,4	30,3	27,7	41,2	20,6	43,8
COD	mg/l	30	50	14,9	21,2	16,5	29,2	21,7	19,5	21,2	14,3	28,5	15,5
BOD ₅ (20 ⁰ C)	mg/l	15	25	7,8	10,9	8,7	14,8	10,7	10,2	11,4	12,6	14,7	12,9
NO ₃ ⁻ (N)	mg/l	10	15	1,3	0,7	2,6	0,4	0,3	2,8	1,3	2,9	2,6	0,7
PO ₄ ³⁻ (P)	mg/l	0,3	0,5	0,04	0,09	0,13	0,06	0,15	0,15	0,06	0,05	0,27	0,19
Amoni (NH ₄ ⁺)	mg/l	0,5	1	0,14	0,25	0,04	0,31	0,07	0,26	0,13	0,02	0,08	0,23
Asen (As)	mg/l	0,05	0,1	kph	kph	0,003	0,001	kph	0,001	0,001	kph	kph	kph
Oil and grease	mg/l	0,1	0,3	0,05	0,03	kph	0,06	kph	kph	0,05	0,01	kph	kph
Total Coliform	MPN/ 100ml	7.500	10.000	4.700	1.900	3.500	4.300	4.000	3.600	2.100	5.300	3.200	2.700

Parameter	Unit	QCVN08:2008/ BTNMT		Result of analysis									
		B1	B2	Nm21	Nm22	Nm23	Nm24	Nm25	Nm26	Nm27	Nm28	Nm29	Nm30
pH		5,5-9	5,5-9	7,2	7,8	7,3	6,8	7,6	7,6	7,5	7,2	7,9	8,3
DO	mg/l	≥4	≥2	4,9	5,2	4,8	5,0	6,4	4,3	5,6	4,7	5,2	4,3
TSS	mg/l	50	100	30,8	41,2	38,5	49,6	33,7	21,4	27,3	38,9	40,2	30,2
COD	mg/l	30	50	22,6	18,9	27,3	20,5	30,1	19,6	17,3	27,4	32,9	20,3
BOD ₅ (20 ⁰ C)	mg/l	15	25	11,7	9,7	13,9	11,2	14,8	10,3	8,9	13,9	16,2	10,7
NO ₃ ⁻ (N)	mg/l	10	15	1,8	0,6	1,2	0,3	1,5	2,4	1,3	0,6	1,9	1,0
PO ₄ ³⁻ (P)	mg/l	0,3	0,5	0,16	0,09	0,25	0,06	0,19	0,13	0,04	0,17	0,09	0,15
Amoni (NH ₄ ⁺)	mg/l	0,5	1	0,38	0,15	0,26	0,13	0,09	0,41	0,26	0,15	0,05	0,39
Asen (As)	mg/l	0,05	0,1	kph	kph	0,001	0,001	kph	0,001	kph	kph	0,001	kph
Oil and grease	mg/l	0,1	0,3	0,07	0,02	0,04	0,05	0,08	0,04	kph	0,07	0,03	kph
Total Coliform	MPN/ 100ml	7.500	10.000	1.600	2.300	3.600	2.000	4.600	3.200	1.100	4.900	5.500	2.600

Note: Kph: not detected; Sign (-) is not specified; QCVN 08:2008/ BTNMT: National technical regulation on surface water quality;
B1 - Used for irrigation purposes or other uses require water quality or other similar purposes like type B2;
B2 - Aqualculture and other purposes with the requirements of low quality water.

Code	Location of Surfacewater sampling	Coordinates	Code	Location of Surfacewater sampling	Coordinates
Nm1	Field in hamlet 3, Xuan Du commune, Nhu Thanh district, where affected by transportation and disposal of materials in the construction process.	19°46'12,0"N; 105°33'21,3"E	Nm8	On-farm drain canal in Dien Hoa hamlet, Hop Thanh commune, Trieu Son district, where affected by the transportation of materials, earth for dam.	19°48'37,4"N; 105°55'31,3"E
Nm2	Field in hamlet 1, Xuan Du commune, Nhu Thanh district, where affected by transportation and disposal of materials in the construction process.	19°46'15,7"N; 105°33'09,2"E	Nm9	On-farm drain canal in Dien Trung hamlet, Hop Thanh commune, Trieu Son district, where affected by the transportation of materials, earth for dam.	19°48'49,2"N; 105°33'36,7"E
Nm3	On-farm canal in hamlet 2, Xuan Du commune, Nhu Thanh district, where affected by transportation and disposal of materials in the construction process.	19°46'18,6"N; 105°33'33,7"E	Nm10	On-farm drain canal in zone 4, Trieu Son town, Trieu Son district, where affected by the transportation of materials for dam	19°49'18,9"N; 105°36'08,4"E
Nm4	Pond in Dong Thanh hamlet, Trieu Thanh, Trieu Son district, where affected by the transportation of materials, earth for dam.	19°46'30,4"N; 105°33'19,5"E	Nm11	Drain canal in zone 6, Trieu Son town, Trieu Son district, where affected by the transportation of materials, earth for dam.	19°50'30,6"N; 105°37'11,5"E
Nm5	Canal N1 in hamlet 11, Trieu Thanh, Trieu Son district, where affected by the transport of materials, earth for dam.	19°46'33,8"N; 105°33'29,2"E	Nm12	Drain canal in zone 6, Trieu Son town, Trieu Son district, where affected by the transportation of materials, earth for dam.	19°50'29,3"N; 105°37'18,5"E
Nm6	Drain canal in hamlet 11, Trieu Thanh, Trieu Son, where affected by the transportation of materials and waste of spillway and flood protection dike.	19°46'50,2"N; 105°33'35,7"E	Nm13	N1 canal in hamlet 11, Trieu Thanh, where affected by the dike embankment for construction of new intake, draining the reservoir for construction.	19°48'66,2"N; 105°35'41,2"E
Nm7	Pond in Dien Binh hamlet, Hop Thanh commune, Trieu Son district, where affected by the transportation of materials, earth for dam.	19°48'40,6"N; 105°53'11,1"E	Nm14	N1 canal in hamlet 1, Trieu Thanh, where affected by the dike embankment for construction of new intake, draining the reservoir for construction.	19°48'56,0"N; 105°35'90,2"E

Code	Location of Surfacewater sampling	Coordinates	Code	Location of Surfacewater sampling	Coordinates
Nm15	Field next to N1 canal in Trieu Thanh, where affected by the dike embankment for construction of new intake, draining the reservoir for construction.	19°48'72,4"N; 105°35'51,5"E	Nm23	Toe of spillway, where affected by the construction earthworks, spillway works.	19°45'33,9"N; 105°32'65,5"E
Nm16	At forest management station next to N2 canal in Xuan Du commune, where affected by the coffer dam for construction of new intake,	19°49'22,0"N; 105°34'15,6"E	Nm24	Water inside reservoir next to the left abutment of the flood embankment, where affected by erosion processes, damming, reinforcing damside.	19°46'30,2"N; 105°38'71,8"E
Nm17	Field next to N2 canal in hamlet 1, Xuan Du, where affected by the construction of new intake, draining the reservoir for construction.	19°50'16,7"N; 105°33'80,2"E	Nm25	Water inside reservoir next to the right abutment of the flood embankment, where affected by erosion processes, damming, reinforcing dam side.	19°46'30,2"N; 105°38'71,8"E
Nm18	Field next to N2 canal in hamlet 2, Xuan Du commune, where affected by the coffer dam for construction of new intake	19°50'28,8"N; 105°35'61,3"E	Nm26	Water in reservoir next to the middle of the flood embankment, where affected by erosion, damming, reinforcing dam side.	19°46'83,2"N; 105°39'06,4"E
Nm19	Water inside reservoir next to the middle of main dam, where affected by erosion, damming, reinforcing dam side.	19°45'36,0"N; 105°32'41,6"E	Nm27	Downstream of the intake, where affected by the coffer dam for new intake, draining the reservoir for construction.	19°46'77,6"N; 105°40'13,2"E
Nm20	Water inside reservoir next to the left abutment of the main dam, where affected by weathering erosion processes, damming, reinforcing dam side.	19°45'35,2"N; 105°35'41,0"E	Nm28	At disposal site in hamlet 4, Xuan Du, where affected by dumping of waste after removal of organic layer at the headworks	19°46'26,6"N; 105°33'36,2"E
Nm21	Water inside reservoir next to the right abutment of the main dam, where affected by erosion, damming, reinforcing dam.	19°45'36,6"N; 105°34'44,2"E	Nm29	Field in hamlet 4, Xuan Du, 50 m from disposal site	19°46'79,2"N; 105°33'35,3"E
Nm22	Top of spillway, where affected by the construction earthworks, spillway works.	19°45'30,1"N; 105°31'49,2"E	Nm30	Field in hamlet 4, Xuan Du commune, 200 m from the disposal site.	19°47'28,5"N; 105°32'67,3"E

3. Results of the analysis of groundwater quality

Location of environment sampling - groundwater samples

Sign	Sampling Location	Coordinates
Nn1	Wells of Mr. Quang, Tan Lap village, Xuan Du Commune, Nhu Thanh district	19°46'33,2"N; 105°33'81,7"E
Nn2	Wells of Mrs. Hoa, Hoi village, Xuan Du commune, Nhu Thanh district	19°45'19,6"N; 105°33'92,8"E
Nn3	Borehole of Mr. Sinh, village 3, Xuan Du commune, Nhu Thanh district	19°45'27,7"N; 105°34'15,6"E
Nn4	Borehole of Mr. Dung, Dong Thanh Village, Trieu Thanh commune, Trieu Son district	19°46'96,2"N; 105°37'12,8"E
Nn5	Borehole of Mrs. Khuyen, Dong Thanh village, Trieu Thanh commune, Trieu Son district	19°47'03,6"N; 105°36'19,3"E
Nn6	Wells of Ms. Lieu, village 11, Trieu Thanh commune, Trieu Son district	19°46'40,4"N; 105°36'28,8"E
Nn7	Borehole of Mr. Hung, Binh Dien village, Hop Thanh commune, Trieu Son district	19°49'32,3"N; 105°52'11,4"E
Nn8	Wells of Mr. Ha, Dieu Hoa village, Hop Thanh commune, Trieu Son district	19°49'26,2"N; 105°51'27,6"E
Nn9	Borehole of Mr. Son, Dien Trung village, Hop Thanh commune, Trieu Son district	19°48'90,8"N; 105°52'07,8"E
Nn10	Borehole of Ms. Dao, zone 4, Trieu Son town, Trieu Son district	19°50'16,4"N; 105°40'11,4"E
Nn11	Borehole of Mr. Binh, zone 6, Trieu Son town, Trieu Son district	19°50'73,4"N; 105°38'13,4"E
Nn12	Borehole of Mr. Hoan, zone 6, Trieu Son town, Trieu Son district	19°50'44,6"N; 105°38'17,3"E
Nn13	Borehole of Mr. Chinh, village 11, Trieu Thanh commune near canal N1	19°48'75,4"N; 105°35'03,9"E
Nn14	Borehole of Ms. Tuyet, village 2, Trieu Thanh commune near canal N1	19°48'47,1"N; 105°36'38,8"E
Nn15	Wells of Mr. Ba, village 11, Trieu Thanh commune near canal N1	19°49'60,2"N; 105°35'80,3"E
Nn16	Borehole of Mr. Nam, village 2, Xuan Du commune near canal N2	19°51'22,0"N; 105°36'10,3"E
Nn17	Wells of Ms. Hue, village 3, Xuan Du commune, near the canal N2	19°50'44,8"N; 105°37'05,2"E
Nn18	Borehole of Mr. Tien, village 2, Xuan Du commune near canal N2	19°51'24,7"N; 105°36'18,2"E
Nn19	Borehole of Mr. Ba near the spillway	19°45'88,4"N; 105°31'45,5"E
Nn20	Wells of Ms. Loan near the flood offtake	19°46'51,3"N; 105°40'27,9"E

Table 3 Results of the analysis of groundwater quality

Parameter	Unit	QCVN09: 2008/ BTNMT	Nn1	Nn2	Nn3	Nn4	Nn5	Nn6	Nn7	Nn8	Nn9	Nn10
pH	-	5,5 - 8,5	7,01	7,24	7,14	7,45	7,08	7,32	7,03	7,26	7,40	7,11
Hardness (by CaCO ₃)	mg/l	500	167	303	420	105	389	266	170	351	279	303
Nitorit (NO ₂ ⁻)	mg/l	1	0,07	0,03	0,07	0,08	0,02	0,12	0,06	0,03	0,17	0,31
Amoni (NH ₄ ⁺)	mg/l	0,1	0,06	0,02	0,005	0,09	0,04	0,04	0,01	0,006	0,002	0,05
Asen (As)	mg/l	0,05	kph	0,001	0,002	kph	0,001	0,001	kph	0,003	0,002	kph
Sufat (SO ₄ ²⁻)	mg/l	400	102	137	89	186	160	256	180	132	291	107
E.coli	MPN/100ml	Not detected	kph	1	1	kph	kph	kph	2	1	1	kph
Total Coliform	MPN/100ml	3	3	2	kph	1	2	kph	3	kph	kph	1
			Nn11	Nn12	Nn13	Nn14	Nn15	Nn16	Nn17	Nn18	Nn19	Nn20
pH	-	5,5 - 8,5	7,22	7,13	7,61	7,50	7,03	7,18	7,21	7,01	7,45	7,36
Hardness (by CaCO ₃)	mg/l	500	304	140	262	240	290	307	208	170	361	244
Nitorit (NO ₂ ⁻)	mg/l	1	0,49	0,11	0,28	0,30	0,25	0,19	0,38	0,47	0,12	0,56
Amoni (NH ₄ ⁺)	mg/l	0,1	0,08	0,03	0,01	0,07	0,01	0,08	0,04	0,02	0,05	0,03
Asen (As)	mg/l	0,05	kph	kph	0,001	0,001	0,001	kph	0,001	kph	kph	kph
Sufat (SO ₄ ²⁻)	mg/l	400	205	82	161	227	93	108	182	141	209	151
E.coli	MPN/100ml	Not detected	kph	kph	kph	1	1	kph	kph	1	2	kph
Total Coliform	MPN/100ml	3	kph	kph	1	2	3	kph	1	2	4	kph

Note: NTR 09: 2008 / BTNMT: National Technical Regulation on groundwater quality;

Kph: not detected; Sign (-) is not specified.

4. Results of the analysis of soil quality

Table 4: Results of the analysis of land quality in project area

Parameter	Unit	Results											QCVN 03:2008/BTNMT
		MD1	MD2	MD3	MD4	MD5	MD6	MD7	MD8	MD9	MD10	MD11	
Asen (As)	mg/kg	0,36	1,84	2,33	4,96	2,16	1,03	2,18	0,90	3,27	1,60	0,53	12
Cadmi (Cd)	mg/kg	0,37	0,96	0,12	1,84	0,26	0,32	0,14	0,55	1,07	0,96	0,81	2
Cu	mg/kg	1,86	7,90	4,35	5,10	11,24	9,27	6,80	5,21	13,18	25,05	13,09	50
Pb	mg/kg	10,26	2,44	17,20	21,78	8,80	15,09	8,65	22,05	5,66	29,71	22,69	70
Zn	mg/kg	40,81	29,36	32,18	10,45	20,80	23,44	18,52	49,13	27,06	42,48	49,02	200
		MD12	MD13	MD14	MD15	MD16	MD17	MD18	MD19	MD20	MD21	MD22	
Asen (As)	mg/kg	3,94	1,67	5,15	3,37	2,36	1,04	3,60	4,37	5,18	2,91	0,35	
Cadmi (Cd)	mg/kg	1,02	0,69	0,88	1,35	0,55	0,26	0,78	1,09	0,80	0,77	0,56	
Cu	mg/kg	5,37	9,03	21,09	17,96	13,09	5,37	9,03	21,18	17,96	19,82	10,36	
Pb	mg/kg	17,51	31,65	15,60	9,71	15,06	26,13	33,97	11,42	10,45	21,02	9,35	
Zn	mg/kg	34,68	21,07	29,13	40,91	19,37	51,02	9,83	13,06	26,48			
		MD23	MD24	MD25	MD26	MD27	MD28	MD29	MD30	MD31	MD32	MD33	
Asen (As)	mg/kg	6,13	3,09	7,18	4,76	3,62	7,14	5,46	8,83	3,68	0,74	1,85	
(Cd)	mg/kg	0,25	1,21	0,30	0,84	0,16	0,51	0,10	0,91	0,37	0,19	0,40	
Cu	mg/kg	5,07	8,13	26,05	21,02	3,76	15,93	7,08	10,40	7,61	16,02	24,39	
Pb	mg/kg	30,08	22,16	7,45	19,03	20,36	41,15	8,06	33,92	32,18	19,55	27,08	
Zn	mg/kg				72,06	38,13	6,91	17,52	29,94	26,37	16,42	34,48	

Note: QCVN 03:2008 BTNMT: National technical regulation on maximum permissible limits of heavy metals in soil - land used for agricultural purposes; Sign (-) is not specified. Sign (-) is not specified.

Table Location of soil sampling - soil / sediment

Code	Sampling Location	Coordinates
MD1	Farmland in hamlet 3, Xuan Du , Nhu Thanh, where affected by the transport and landfill of materials.	19°46'12,0"N; 105°33'21,3"E
MD2	Farmland in hamlet 1, Xuan Du commune, Nhu Thanh, where affected by the transport and landfill of materials.	19°46'15,7"N; 105°33'09,2"E
MD3	Farmland in hamlet 2, Xuan Du , Nhu Thanh district, where affected by the transport and landfill of materials.	19°46'18,6"N; 105°33'33,7"E
MD4	Farmland in Dong Thanh village, Trieu Thanh commune, Trieu Son district, where affected by the transportation of materials, earth, soil during construction of spillway and flood protection dike.	19°46'30,4"N; 105°33'19,5"E
MD5	Farmland in village 11, Trieu Thanh commune, Trieu Son district, where affected by the transportation of materials, earth, soil during construction of spillway and flood protection dike.	19°46'33,8"N; 105°33'29,2"E
MD6	Farmland in village 11, Trieu Thanh commune, Trieu Son district, where affected by the transportation of materials, earth, soil during construction of spillway and flood protection dike.	19°46'50,2"N; 105°33'35,7"E
MD7	Farmland in Dien Binh village, Hop Thanh, Trieu Son, where affected by the transport of materials for dam.	19°48'40,6"N; 105°53'11,1"E
MD8	Farmland in Dien Hoa village, Hop Thanh, Trieu Son, where affected by the transport of materials for dam.	19°48'37,4"N; 105°55'31,3"E
MD9	Farmland in Dien Trung village, Hop Thanh, Trieu Sont, where affected by the transport of materials, for dam.	19°48'49,2"N; 105°33'36,7"E
MD10	Farmland in zone 4, Trieu Son town, Trieu Son district, where affected by the transport of materials for dam.	19°49'18,9"N; 105°36'08,4"E
MD11	Farmland in zone 6, Trieu Son town, Trieu Son district, where affected by the transport of materials for dam.	19°50'30,6"N; 105°37'11,5"E
MD12	Farmland in zone 6, Trieu Son town, Trieu Son district, where affected by the transport of materials for dam.	19°50'29,3"N; 105°37'18,5"E
MD13	Side of N1 canal in village 11, Trieu Thanh commune, where affected by the dike embankment construction of new intake, draining the reservoir for construction.	19°48'66,2"N; 105°35'41,2"E
MD14	Side of N1 canal in village 1, Trieu Thanh, where affected by the coffer dam for construction of new intake, draining the reservoir for construction.	19°48'56,0"N; 105°35'90,2"E
MD15	The area along the canal fields N1 Trieu Thanh, where affected by the dike embankment construction of new sewers, drained the reservoir to construction.	19°48'72,4"N; 105°35'51,5"E
MD16	N2 canal area in forest management station Xuan Du, where affected by the dike embankment construction of new sewers, drained the reservoir to construction.	19°49'22,0"N; 105°34'15,6"E
MD17	Area fields in villages along the N2 channels 1, Xuan Du, where affected by the dike embankment construction of new sewers, drained the reservoir to construction.	19°50'16,7"N; 105°33'80,2"E

MD18	Farmlands in villages along the N2 channel 2, Xuan Du, where affected by the dike embankment construction of new sewers, drained the reservoir to construction	19°50'28,8"N; 105°35'61,3"E
MD19	At the middle of main dam, where affected by weathering erosion processes, damming, reinforcing dam side.	19°45'36,0"N; 105°32'41,6"E
MD20	At the left abutment of the main dam, where affected by weathering erosion processes, damming, reinforcing dam side.	19°45'35,2"N; 105°35'41,0"E
MD21	At the right abutment of the main dam, where affected by erosion processes, damming, reinforcing dam side.	19°45'36,6"N; 105°34'44,2"E
MD22	Top of spillway, where affected by the construction earthworks, spillway works.	19°45'30,1"N; 105°31'49,2"E
MD23	Toe of spillway, where affected by the construction earthworks, spillway works.	19°45'33,9"N; 105°32'65,5"E
MD24	At the left abutment of the flood embankment, where affected by erosion processes, damming, reinforcing damside.	19°46'30,2"N; 105°38'71,8"E
MD25	At the right abutment of the flood dyke, where affected by erosion processes, damming, reinforcing dam side.	19°46'30,2"N; 105°38'71,8"E
MD26	At the middle of the flood embankment, where affected by erosion processes, damming, reinforcing dam side.	19°46'83,2"N; 105°39'06,4"E
MD27	Downstream of the intake, where affected by the dike embankment for construction of new intake, draining the reservoir for construction.	19°46'77,6"N; 105°40'13,2"E
MD28	At central area of borrow pit in Hop Thang, where affected by excavation and transportation of excavated earth.	19°49'60,2"N; 105°47'62,3"E
MD29	At the entrance road to borrow pit in Hop Thang, where affected by excavation and transportation of soil.	19°50'33,5"N; 105°46'52,1"E
MD30	Farmland 500m away from borrow pit, where affected by excavation and transportation of excavated earth.	19°51'18,63"N; 105°45'55,9"E
MD31	At central of landfill in hamlet 4, Xuan Du commune, where affected by dumping of waste soil after removal of organic layer at the headworks site.	19°46'26,6"N; 105°33'36,2"E
MD32	Rice field in hamlet 4, Xuan Du commune, 50 m away from the landfill to the north, where affected by dumping of waste soil after removal of organic layer at the headworks site.	19°46'79,2"N; 105°33'35,3"E
MD33	Rice field in hamlet 4, Xuan Du commune, 200 m away from the landfill to the north, where affected by dumping of waste soil after removal of organic layer at the headworks site.	19°47'28,5"N; 105°32'67,3"E

Table 5. List of phytoplankton in the study area

No.	Science name
I	Bacillariophyta
1	<i>Amphora ovalis</i> Kützing
2	<i>Cyclotella comta</i> (Ehrenberg) Kützing
3	<i>Fragilaria capucina</i> Desmazières
4	<i>Pinnularia biceps</i> W.Gregory
II	Chlorophyta
5	<i>Ankistrodesmus falacatus</i> (Corda) Ralfs
6	<i>Coelastrum proboscideum</i> Bohlin
7	<i>C. pseudomicroporum</i> Korshikov
8	<i>Chlamydomonas epibiotica</i> Ettl
9	<i>C. pertyi</i> Gorozh
10	<i>C. pseudotarda</i> Bourrelly
11	<i>Chodatella quadriseta</i> Lemm
12	<i>Didymocystis inermis</i> (Fott) Fott
13	<i>Euastrum turneri</i> West
14	<i>Golenkinia radiata</i> (Chod) Wille
15	<i>Micractinium pusillum</i> Fresenius
16	<i>Oocystis borgei</i> J.Snow
17	<i>O. submarina</i> Lagerheim
18	<i>Pediastrum braunii</i> Wartmann
19	<i>P. biradiatum</i> Meyen
20	<i>Siderocelis ornata</i> Lemm
21	<i>S. tetracerum</i> Bur
22	<i>Tetrastrum heteracanthum</i> (Norost) Chod
III	Cyanophyta
23	<i>Aphanothece clathrata</i> W. et G. S. West
24	<i>Microcystis incerta</i> Lemm
25	<i>Oscillatoria geminata</i> Lyg
IV	Euglenophyta
26	<i>Astasia klebsii</i> Lemmermann
27	<i>Phacus acuminatus</i> Stokes
V	Pyrrophyta
28	<i>Cryptomonas gracilis</i> Skuja
29	<i>Ceratium brachyceros</i> Daday

Table 6: List of zooplankton in the study area

No.	Science name
	Rotatoria
	Monogononta
	Ploimida
	Brachionidae
1	<i>Brachionus angularis</i> Gosse
2	<i>Keratella cochlearis</i> Gosse

3	<i>Platyias quadricornis</i> Ehrenberg
	Lecanidae
4	<i>Lecane leontina</i> Turner
5	<i>L. decipiens</i> Murray
	Synchaetidae
6	<i>Asplanchna brightwellii</i> Gosse
7	<i>Polyarthra vulgaris</i> Carlin
8	<i>Ploesoma truncatum</i> Levander
	Trichocercidae
9	<i>Trichocerca similis</i> Wierzejski
	Arthropoda
	Crustacea
	Cladocera
	Bosminidae
10	<i>Bosmina longirostris</i> (O.F.Muller)
11	<i>Bosminopsis deitersi</i> Richard
	Chydoridae
12	<i>Alona guttata</i> Sars
13	<i>A. rectangula</i> Sars
14	<i>Chydorus ovalis</i> Kurz
	Daphniidae
15	<i>Ceriodaphnia rigaudi</i> Richard
16	<i>Daphnia longiremis</i> G.O. Sars
	Lyocryptidae
17	<i>Ilyocryptus sordidus</i> Liévin
18	<i>I. agilis</i> Kurz
	Sididae
19	<i>Diaphanosoma excisum</i> G.O. Sars
20	<i>Sida crystallina</i> (O.F.Muller)
	Copepoda
	Diaptomidae
21	<i>Eodiaptomus draconisignivomi</i> Brehm
22	<i>Mongolodiaptomus formosanus</i> Kiefer
	Cyclopidae
23	<i>Eucyclops serrulatus</i> (Fischer)
24	<i>Mesocyclops leuckarti</i> (Claus)
	Oithonidae
25	<i>Oithona simplex</i> Farran

Table 7: List of zoobenthos in the study area

No.	Science name
	Phylum Arthropoda
	Class Crustacea
	Order Decapoda
	Sub-order Brachyura
	Family Parathelphusidae
1	<i>Somanniathelphusa sinensis</i> (H. Milne-Edwards, 1853)
	Sub-order Macrura
	Family Atyidae
2	<i>Caridina acuticaudata</i> Dang
3	<i>Caridina tonkinensis</i> Bouvier
	Family Palaemonidae
4	<i>Macrobrachium hainanense</i> (Parisi)
5	<i>Palaemonetes tonkinensis</i> (Sollaud)
	Class Insecta
	Order Hemiptera
	Family Naucoridae
6	<i>Naucoris scutellaris</i> Stal, 1860
	Order Diptera
	Family Culicidae
7	<i>Aedes aegypti</i> (Linnaeus, 1762)
	Family Chironomidae
8	<i>Chironomus plumosus</i> (Linnaeus, 1758)
	Phylum Mollusca
	Class Gastropoda
	Order Prosobranchia
	Family Thiaridae
9	<i>Thiara scabra</i> (Muller)
	Family Viviparidae
10	<i>Angulyagra polyzonata</i> (Frauenfeld)
	Class Bivalvia
	Order Veneroida
	Family Corbiculidae
11	<i>Corbicula leviuscula</i> Prime, 1867
12	<i>Corbicula baudoni</i> Morelet, 1866

Annex A3 – Air and noise emission Calculations

Table A3.1: Emission coefficients by a vehicle in traffic load from 3.5 to 16 tonnes

	Coefficient (kg/1000km)	Distance (km)	Duration (minute)	Number of vehicles (in/out)	Emissions (g/minute)
Dust	0,9	2,5	12	1	0,1875
SO ₂	4.15*s	2,5	12	1	0,0085
NO _x	14,4	2,5	12	1	3,0000
CO	2,9	2,5	12	1	0,6042
HC	0,8	2,5	12	1	0,1667

[Source WHO: Assessment of the sources of pollution of soil, water, air -, Geneva, 1993]

We have the formula for calculating the average concentration of emissions:

The average concentration (mg / m³) = load (kg / day) x10⁶ / 8 / V (m³).

On working 8 hours; the affected area as transport costs and the implementation of the project:

The area of transport costs: S₁ = d x R.

Where: d = 7 km (average length for transporting soil, sand, stone and other materials of all kinds), R = 10 m (average width of the road): S₁ = 7.000m x 10m = 70,000m².

The area of the project: S₂ = 20,000m².

The total area affected: = S₁ + S₂ = ΣS 90.000m².

We have: ΣS = 90.000m², H = 10m (average height distributions of meteorological parameters within 10m).

V = S x H = 90.000m² x 10m = 900,000 (m³).

Table 5. 1: Emission estimates generated (in theory) due to the transport process

No.	Pollutants	Emissions (mg/m³)	QCVN 05:2013/BTNMT Average 1 hour (mg/m³)
1	TSP	0,003	0,3
2	SO ₂	0,014	0,35
3	NO _x	0,035	0,2
4	CO	0,014	30
5	VOC	0,011	-

According QCVN 26: 2010 / BTNMT, noise and public areas are residential areas: 55 - 70dBA (from 6 to 21 h). When spread in the air environment, noise environment will be absorbed in the model (***) below and decreasing intensity with distance.

$$L_P (X) = L_P (X_0) + 20.lg (X_0 / X) (***)$$

In that:

- $L_P(x)$: the noise level at the position calculation (dBA);
- $L_P(x_0)$: a source noise level 1m (dBA);
- X_0 : $x_0 = 1$ m;

TableA3.2: Noise from motor vehicles and construction machinery

No .	Type of machine	The noise level at a distance of 1 m		Noise level corresponding to the distance					
		Approximately	Average	5m	10m	20m	50m	100m	200m
1	Truck	82-94	88	74,0	68,0	62,0	54,0	48	42
2	Concrete mixers	75-88	81,5	67,5	61,5	55,5	47,5	41,5	35,5
3	Excavator	75-98	86,5	72,5	66,5	60,5	52,5	46,5	40,5
4	Excavators	75-86	80,5	66,5	60,5	54,5	46,5	40,5	34,5
5	Compactors	75-90	82,5	68,5	62,5	56,5	48,5	42,5	36,5
QCVN 26: 2010/BTNMT: 70 dBA (6-21h); 55 dBA (21-6h)									

(Source: Prof. Dr. Pham Ngoc Dang, air environment, Publisher of Science and Technology, Hanoi - 1997)

Annex A4. Public consultation records

TT	Day	Location	number of participants	Participants
1	18/02/2015	Trieu Thanh CPC	40	Representatives of the Department of Agriculture and Rural Development; representative of the Department of Natural Resources and Environment; representative of the Department of Culture, Sports and Tourism; representative of the Department of Transportation; representative of the Department of Education; DPC representative Trieu Son; As Thanh District People's Committee representative. Representative CPCs Million Members, Hop Thanh Xuan Du, Phuong Nghi and represent people in the subproject area.
2	17/03/2015	Phuong Nghi CPC	30	Representatives of the CPC; Commune Fatherland Front Committee representative; associations, mass; representing the people of the villages along the reservoir At the pool.
3	03/18/2015	Hop Thanh commune	30	Representatives of the CPC; Commune Fatherland Front Committee representative; associations, mass; representative of the people.
4	03/19/2015	Xuan Du CPC	35	Representatives of the CPC; Commune Fatherland Front Committee representative; associations, mass; representative of the people; households whose land is recovered.
5	20/03/2015	Trieu Thanh CPC	40	Representatives of the CPC; Commune Fatherland Front Committee representative; organizations, social organizations; representative of the people; households whose land is recovered.

TT	Day	Location	Content consultation	Responsibility for implementation
1	18/02/2015	Trieu Thanh CPC	<ul style="list-style-type: none"> - Introduction to the target, the main items of the TDA, scope and objects affected by the subproject - Share the requirements of the World Bank and the Government of Vietnam on health policy and social environment of the subproject - Discussion of consensus on the 	<p>Investors subprojects</p> <p>Environmental Consulting</p> <p>The participants of the conference</p>

			implementation of sub-projects, provide information about the risk / incident happened in history (from the dam), the detection of a positive impact, target pole can occur when implementing projects and proposals on the BP minimize impacts to MTXH and recommendations to investors	
2	17/03/2015	Phuong Nghi CPC	<ul style="list-style-type: none"> - Inform about the negative impact on the environment and society can occur during project implementation. - The proposed measures to mitigate the impact it. - The participants discuss environmental and mitigation measures will be implemented. - Investors acquiring and adding the appropriate information to the ESIA report. 	Investors subproject
3	03/19/2015	Xuan Du CPC	<ul style="list-style-type: none"> - Inform about the negative impact on the environment and society can occur during project implementation. - The proposed measures to mitigate the impact it. - The participants discuss environmental and mitigation measures will be implemented. - Investors acquiring and adding the appropriate information to the ESIA report. 	Investors subproject
4	20/03/2015	Trieu Thanh CPC	<ul style="list-style-type: none"> - Inform about the negative impact on the environment and society can occur during project implementation. - The proposed measures to mitigate the impact it. - The participants discuss environmental and mitigation measures will be implemented. - Investors acquiring and adding the appropriate information to the ESIA report. 	Investors subproject

Annex A5. Stakeholder Consultation and Information Disclosure

1. Public consultation objectives

- To get the consent of the relevant agencies, local governments and communities in the sub- project implementation
- To share information about the scope of the project and its impact on the environment and society
- To increase the encourage of the participation in the community for determining the impacts of the sub-project.
- To collect information about the requirement and the responsibility of the local resident and local authority on the proposing mitigation measures of the project owner, or to improve the mitigation measure in pre-construction phase or project design

2. Consultation on environmental impact assessment

Summary of community consultation activities implemented during the preparation of the ESIA

i) Subjects consultation:

CPC

Fatherland Front Committee

The unions (Farmers Union, women's groups, youth groups

Head of village / hamlet

The affected households in the project area

ii) Consultation content

- Summary information subprojects financed components.
- Discuss the historical risk / accident happened on the environment and society in the past from the building construction.
- The key construction activities and operational issues
- The potential impact on society and the environment is important in the construction phase and operation
- Mitigation measures, environmental management plans and social
- Monitoring and observation
- Settlement Mechanism complaint claims

Commune People's Committee and Fatherland Front comments written

iii) Method of consultation

Organize meetings with components as outlined above including local authorities, the local organizations, people affected. To create the conditions for people to express their opinions, their aspirations, consultations were held open and consultative form of a questionnaire on the situation, the consequences of a disaster phenomenon took place, in which have shown willingness stems and requirements of the unit or the people interviewed for the project.

iv) Comments from local authorities

The subproject had many comments from the Fatherland Front Committee and the

Commune People's Committee in the project area. In general, the opinion of the local government can be summarized as follows:

- Trieu Son and Nhu Thanh District People's Committee and the Fatherland Front Committee of the commune fully support the implementation of the project. Recommend PPMUs collaboration with consulting unit organize padded disseminate information related to the subproject, advocacy for people to understand the purpose and benefits of the project, when the project is completed, it production conditions, activities of local people will be improved and guaranteed;

- Local will create favorable conditions for the maximum support for the project, especially on issues of land acquisition projects in service during site clearance and construction items process;

- Trieu Son and Nhu Thanh District People's Committee and Fatherland Front Committee agrees with the social issues related to the impact of socio-environmental is presented in the report. The impact of the subproject are mainly positive. However, the implementation process, especially in the construction phase of the works, it will create a certain impact on the operation environment and the lives of residents in the construction sector;

- Agree with measures to reduce environmental pollution presented in the report;

- Recommend investors comply with appropriate regulations committed to reducing the negative impacts caused by the subproject, as well as management and monitoring of environmental quality;

- Committee of the Fatherland Front and the People's Committees of communes, are willing to cooperate to deal with problems that arise during project implementation.

The reviews from the locals

Besides opinion in favor of the household, people also gave a lot of opinions and needs to implement the project. These comments are summarized as follows:

- The local community agrees on the impact caused by the project during construction, and implementation require construction contractors to ensure quality and progress;

- To request the competent authority approval allows quick subprojects implemented quickly;

- To minimize the impact of the construction project to the activities of the community, the categories of projects to be done quickly, and complete each section before moving on to the next section;

- Require contractors and investors to listen to feedback from the community to make modifications accordingly. Comments from the community must be sent to the unions, community monitoring committee, CPC, PMU and related units;

- Require the contractor to comply with the commitment to reduce the negative impacts from the implementation of projects outlined in the management plan and monitor the quality of the environment and society;

- Existing canal system degradation, the occurrence of leakage, filling up low hydraulic conductivity. The phenomenon of dehydration occur primarily for high fields, while no shortage of water in the reservoir, due to loss of water in the channel before being led off the field. People who wish to support projects in the rehabilitation, dredging the canal system from Dong Be to ensure water;

- People fear the expansion of aquaculture activities on the reservoir after the project will reduce water quality in the reservoir, causing the risk of water pollution, disease in the country using reservoir water for fish ponds in the commune people's benefit.

- Requirement applied PPMUs implementing measures and provisions on sanctions or even unilaterally terminate the contract with the contractor, environmental monitoring units without complying with adequate safety measures all off and up the proposed measures to protect the environment.

3. Consultation on social impact assessment

i) Consultation subjects:

CPC

The affected households

ii) Consultation content

About the content, the main items of sub-project, funding for implementation;

Advice presented policy interests of the people affected, grievance mechanisms and resolve complaints; compensation policies for each type of land, buildings and structures and trees, crops

Consulting presents forecasts of the impact of resettlement sub-project, gender;

Community discussion of policy benefits and compensation for affected land, buildings, structures and plant crops.

Even in the early stages the project preparation, local government and the leaders of the various levels of government in Trieu Son and Nhu Thanh District, Thanh Hoa Province was informed about the project, the objectives and activities of the proposed project. The people affected are invited to a consultation meeting held at the commune and conduct discussions related content.

iv) The results of the consultation

During the consultation process, many reviews of people attending consultation meetings offer has been discussed widely and freely, are summarized as follows:

- The area of land acquisition is in dam reservation area where people are using without permission.

- Thanh Hoa subproject takes very little land acquisition for the dam rehabilitation was conducted on the old route, thus, the negative impacts can be minimized and recovery project scope negligible .

- The construction and upgrading works to improve the efficiency of dam safety, stable life for local people.

- The affected households wishing to provide information on the progress of the project.

- The affected households wish to be compensated fully transparent replacement cost for lost assets, and market prices for crops affected temporarily.

- Both men and women are involved in the organization and in the local community and make recommendations related to the project, so that gender issues are guaranteed.

- In the area of project implementation EMs are the beneficiaries of the project.

- No occurrence of trafficking of women and children in the project area.

- The BAH understand the impact and benefits from the project for the local people, so they totally agreed with the implementation of the project and wants the project to be implemented soon.

4. ESIA disclosure

Information disclosure: According to the World Bank's policy on access to information, all draft safeguard instruments, including the ESMP/ESMoP, are disclosed locally in an accessible place and in a form and language understandable to key stakeholders and in Vietnamese and English at the CPO and InfoShop before the appraisal mission. EMP is locally disclosed at the sites and in the Vietnam Development Information Centre of the World Bank in Hanoi

- ESIA report in Vietnamese will be public on website of MARD, CPO, People's Committee of Thanh Hoa province. The summary report of ESIA will be sent to Department of Natural Resources and Environment of Thanh Hoa province, People's Committee of districts, communes in order to publish to community, organization contact, monitor and implement ESMP.
- ESIA report in English will be published at VDIC of World Bank in Hanoi and InforShop of World Bank.

UBND TỈNH THANH HÓA
SỞ NÔNG NGHIỆP VÀ PTNT
Số 477 /SN&PTNT-KHTC

V/v Tham vấn cộng đồng và điều tra xã hội các xã bị ảnh hưởng từ tiểu dự án: Hồ chứa nước Đồng Bể xã Triệu Thành, Hợp Thành, huyện Triệu Sơn và xã Xuân Du, Phương Nghi huyện Như Thanh.

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc
Thanh Hóa, ngày 13 tháng 3 năm 2015

Kính gửi: Chủ tịch UBND các huyện Như Thanh, Triệu Sơn.

Tiểu dự án: Hồ chứa nước Đồng Bể xã Triệu Thành, huyện Triệu Sơn và xã Xuân Du, Phương Xuân huyện Như Thanh đã được lựa chọn đưa vào danh mục tham gia giai đoạn 1 của Dự án: Cải tạo và nâng cao an toàn đập, vay vốn Ngân hàng Thế giới (WB8).

Để có cơ sở lập Báo cáo đánh giá tác động môi trường - xã hội; kế hoạch quản lý môi trường và kế hoạch hành động tái định cư theo yêu cầu của Nhà tài trợ; Sở Nông nghiệp và PTNT tổ chức tham vấn cộng đồng và điều tra xã hội các hộ dân bị ảnh hưởng trong vùng dự án; thành phần, thời gian và địa điểm tham vấn cụ thể như sau:

- Thành phần tham gia là các đại diện: Ủy ban nhân dân xã, Ủy ban mặt trận Tổ quốc xã, các thôn/xóm và một số hộ dân trong phạm vi bị ảnh hưởng của dự án.

- Thời gian và địa điểm:

+ Ngày 17/3/2015 tổ chức tại UBND xã Triệu Thành, thời gian từ 8h 00';

+ Ngày 18/3/2015 tổ chức tại UBND xã Hợp Thành, thời gian từ 8h 00';

+ Ngày 19/3/2015 tổ chức tại UBND xã Xuân Du, thời gian từ 8h 00';

+ Ngày 20/3/2015 tổ chức tại UBND xã Phương Nghi, thời gian từ 8h 00'.

Sở Nông nghiệp và PTNT đề nghị UBND huyện quan tâm, chỉ đạo các xã thông báo cho các thành phần được tham vấn có mặt đầy đủ, đúng thời gian và địa điểm quy định.

Nơi nhận:

- Như trên;
- Ban QLDA Thủy lợi;
- Lưu: VT, KHTC, Quang.

KT. GIÁM ĐỐC
PHÓ GIÁM ĐỐC
SỞ NÔNG NGHIỆP VÀ PHÁT TRIỂN NÔNG THÔN
Trần Quang Trung

SỞ NÔNG NGHIỆP VÀ PTNT
TỈNH THANH HÓA
BAN QLDA THỦY LỢI
Số: 04/DATL

V/v: Xin ý kiến tham vấn trong quá trình lập báo cáo đánh giá tác động môi trường, xã hội của Tiểu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa.

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Thanh Hóa, ngày 16 tháng 03 năm 2015

- Kính gửi: - UBND các xã Xuân Du, Phương Nghi huyện Như Thanh;
- UBMTTQ các xã Xuân Du, Phương Nghi huyện Như Thanh;
- UBND các xã Triệu Thành, Hợp Thành huyện Triệu Sơn;
- UBMTTQ các xã Triệu Thành, Hợp Thành huyện Triệu Sơn.

Thực hiện Luật Bảo vệ môi trường, các quy định của pháp luật về đánh giá tác động môi trường (ĐTM) và các yêu cầu của Ngân hàng Thế giới (WB) về đánh giá tác động môi trường, xã hội (ESIA). Ban QLDA Thủy lợi Thanh Hóa đang tổ chức triển khai lập báo cáo đánh giá tác động môi trường và xã hội của Tiểu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa thuộc Dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8).

Ban QLDA Thủy lợi Thanh Hóa xin gửi đến chính quyền địa phương thuộc vùng dự án tài liệu tóm tắt về các hạng mục đầu tư chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường, xã hội của Tiểu dự án và rất mong nhận được ý kiến tham vấn của đơn vị.

Nơi nhận:

- Như trên;
- Sở NN&PTNT (báo cáo);
- Lưu: VT, DA2.

KT. GIÁM ĐỐC
BAN QUẢN LÝ DỰ ÁN THỦY LỢI
PHẠM CÔNG VĂN

Số: ...

Xuân Du, ngày... tháng... năm 2015

V/v ý kiến tham vấn về Dự án: Cải tạo
và nâng cao an toàn đập, vay vốn WB
(WB8)

Kính gửi: Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa

UBMTTQ xã Xuân Du nhận được Văn bản số... ngày... tháng... năm 2015 của Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa kèm theo tài liệu tóm tắt về các hạng mục đầu tư chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường của Tiêu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bề, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa. Thuộc dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8). Sau khi xem xét tài liệu này, UBMTTQ xã Xuân Du có ý kiến như sau:

1. Về những tác động xấu của Dự án đến môi trường tự nhiên và kinh tế - xã hội:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBMTTQ xã Xuân Du đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý

2. Về các biện pháp giảm thiểu tác động môi trường, xã hội của Dự án:

Số:CV-UBND

Xuân Du, ngày... tháng... năm 2015

V/v ý kiến tham vấn về Dự án: Cải tạo
và nâng cao an toàn đập, vay vốn WB
(WB8).

Kính gửi: Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa

UBND xã Xuân Du nhận được Văn bản số... ngày... tháng 3 năm 2015 của Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa kèm theo tài liệu tóm tắt về các hạng mục đầu tư chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường, xã hội của Tiêu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bề, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa. Thuộc dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8). Sau khi xem xét tài liệu này, UBND xã Xuân Du có ý kiến như sau:

1. Về những tác động xấu của Dự án đến môi trường tự nhiên và kinh tế - xã hội:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBND xã Xuân Du đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý

2. Về các biện pháp giảm thiểu tác động môi trường, xã hội của Dự án:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBND xã Xuân Du đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý

3. Kiến nghị đối với chủ dự án:

(nếu cụ thể các yêu cầu, kiến nghị của cộng đồng đối với chủ dự án liên quan đến việc cam kết thực hiện các biện pháp, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

UBND xã Xuân Du yêu cầu Nhà Đầu tư phải chú ý xây dựng công trình phải đảm bảo vệ sinh môi trường, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

Trên đây là ý kiến của UBMTTQ xã Xuân Du gửi Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường, xã hội của Tiêu dự án.

Nơi nhận:
- Như trên;
- Lưu ...

UBMTTQ XÃ XUÂN DU
CHỦ TỊCH



UBND xã Xuân Du đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý

3. Kiến nghị đối với chủ dự án:

(nếu cụ thể các yêu cầu, kiến nghị của cộng đồng đối với chủ dự án liên quan đến việc cam kết thực hiện các biện pháp, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

UBND xã Xuân Du yêu cầu Nhà Đầu tư phải chú ý xây dựng công trình phải đảm bảo vệ sinh môi trường, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

Trên đây là ý kiến của UBND xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa gửi Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa để xem xét và hoàn chỉnh Báo cáo đánh giá tác động môi trường, xã hội của Tiêu dự án.

Nơi nhận:
- Như trên;
- Lưu ...

UBND XÃ XUÂN DU
CHỦ TỊCH



NGUYỄN VĂN SINH

Số:CV-UBND

Triệu Thành, ngày 20 tháng 3 năm 2015

V/v ý kiến tham vấn về Dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8).

Kính gửi: Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa

UBND xã Triệu Thành nhận được Văn bản số... ngày... tháng 3 năm 2015 của Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa kèm theo tài liệu tóm tắt về các hạng mục đầu tư chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường, xã hội của Tiểu dự án: Sửa chữa, nâng cấp đê bao an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa. Thuộc dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8). Sau khi xem xét tài liệu này, UBND xã Triệu Thành có ý kiến như sau:

1. Về những tác động xấu của Dự án đến môi trường tự nhiên và kinh tế - xã hội:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBND xã Triệu Thành đồng ý với những tác động xấu đến môi trường, xã hội của dự án. Các biện pháp giảm thiểu tác động môi trường, xã hội của dự án:

2. Về các biện pháp giảm thiểu tác động môi trường, xã hội của Dự án:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

Số: ...

Triệu Thành, ngày... tháng... năm 2015

V/v ý kiến tham vấn về Dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8)

Kính gửi: Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa

UBMTTQ xã Triệu Thành nhận được Văn bản số... ngày... tháng... năm 2015 của Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa kèm theo tài liệu tóm tắt về các hạng mục đầu tư chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường, xã hội của Tiểu dự án: Sửa chữa, nâng cấp đê bao an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa. Thuộc dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8). Sau khi xem xét tài liệu này, UBMTTQ xã Triệu Thành có ý kiến như sau:

1. Về những tác động xấu của Dự án đến môi trường tự nhiên và kinh tế - xã hội:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBND xã Triệu Thành đồng ý với những tác động xấu đến môi trường, xã hội của dự án. Các biện pháp giảm thiểu tác động môi trường, xã hội của dự án:

2. Về các biện pháp giảm thiểu tác động môi trường, xã hội của Dự án:

UBND xã Triệu Thành đồng ý với những tác động xấu đến môi trường, xã hội của dự án. Các biện pháp giảm thiểu tác động môi trường, xã hội của dự án:

3. Kiến nghị đối với chủ dự án:

(nếu cụ thể các yêu cầu, kiến nghị của cộng đồng đối với chủ dự án liên quan đến việc cam kết thực hiện các biện pháp, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

UBND xã Triệu Thành đồng ý với những tác động xấu đến môi trường, xã hội của dự án. Các biện pháp giảm thiểu tác động môi trường, xã hội của dự án:

Trên đây là ý kiến của UBND xã Triệu Thành, huyện Như Thanh, tỉnh Thanh Hóa gửi Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa để xem xét và hoàn chỉnh Báo cáo đánh giá tác động môi trường, xã hội của Tiểu dự án.

Nơi nhận:
- Như trên;
- Lưu ...

UBND XÃ TRIỆU THÀNH
CHỦ TỊCH



(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBND xã Triệu Thành đồng ý với những tác động xấu đến môi trường, xã hội của dự án. Các biện pháp giảm thiểu tác động môi trường, xã hội của dự án:

3. Kiến nghị đối với chủ dự án:

(nếu cụ thể các yêu cầu, kiến nghị của cộng đồng đối với chủ dự án liên quan đến việc cam kết thực hiện các biện pháp, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

UBND xã Triệu Thành đồng ý với những tác động xấu đến môi trường, xã hội của dự án. Các biện pháp giảm thiểu tác động môi trường, xã hội của dự án:

Trên đây là ý kiến của UBMTTQ xã Triệu Thành gửi Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường, xã hội của Tiểu dự án.

Nơi nhận:
- Như trên;
- Lưu ...

UBMTTQ xã Triệu Thành
Đinh Văn Hải

UBMTTQ XÃ TRIỆU THÀNH
CHỦ TỊCH



Số: ...

Phương Nghi, ngày 18 tháng 5 năm 2015

Vấn đề kiến tham vấn về Dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8)

Kính gửi: Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa

UBMTTQ xã Phương Nghi nhận được Văn bản số... ngày... tháng... năm 2015 của Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa kèm theo tài liệu tóm tắt về các hạng mục đầu tư chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường, xã hội của Tiểu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa. Thuộc dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8). Sau khi xem xét tài liệu này, UBMTTQ xã Phương Nghi có ý kiến như sau:

1. Về những tác động xấu của Dự án đến môi trường tự nhiên và kinh tế - xã hội:

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBMTTQ xã Phương Nghi đồng ý với các nội dung về môi trường, xã hội, kinh tế của dự án. Tuy nhiên, cần chú ý các vấn đề sau: ...

2. Về các biện pháp giảm thiểu tác động môi trường, xã hội của Dự án:

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

BIÊN BẢN CUỘC HỌP THAM VẤN CÁC NGÀNH LIÊN QUAN

- 1- Tên dự án: Sửa chữa và nâng cao an toàn đập (WB8)
2- Tiểu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa.
3- Thời gian họp: 9h 00 ngày 18 tháng 2 năm 2015
4- Địa điểm họp: Sở Nông nghiệp và Phát triển nông thôn Thanh Hóa.
5- Thành phần cuộc họp
a) Đại diện Sở NN và PTNT Thanh Hóa
Ông: Trần Quang Trung Chức vụ: Phó Giám đốc Sở
b) Đại diện Sở TN&MT Thanh Hóa
Ông: Đào Văn Hùng Chức vụ: CB Chỉ huy BVMT Sở TN&MT
c) Đại diện Sở Giao thông VT Thanh Hóa
Ông: Phạm Hoài Nam Chức vụ: CB Sở GTVT
d) Đại diện Ban Quản lý dự án Thủy lợi
Ông: Trần Hữu Quý Chức vụ: Phó Giám đốc BQLDA Thủy lợi
e) Đại diện UBND các huyện
Ông: Lê Xuân Dương Chức vụ: Phó Chủ tịch huyện Triệu Sơn
Ông: Nguyễn Văn Triệu Chức vụ: CB Phòng TNMT huyện Như Thanh
f) Đại diện UBND các xã vùng dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa.
Ông: Lê Minh Phương Chức vụ: CT UBND xã Phương Nghi

(nếu rõ ý kiến đồng ý hay không đồng ý với các nội dung tương ứng được trình bày trong tài liệu gửi kèm; trường hợp không đồng ý thì chỉ rõ các nội dung, vấn đề cụ thể không đồng ý)

UBMTTQ xã Phương Nghi đồng ý với các nội dung về môi trường, xã hội, kinh tế của dự án. Tuy nhiên, cần chú ý các vấn đề sau: ...

3. Kiến nghị đối với chủ dự án:

(nếu cụ thể các yêu cầu, kiến nghị của cộng đồng đối với chủ dự án liên quan đến việc cam kết thực hiện các biện pháp, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

UBMTTQ xã Phương Nghi đề nghị chủ dự án thực hiện các biện pháp giảm thiểu tác động xấu về môi trường của dự án. Cần chú ý các vấn đề sau: ...

Trên đây là ý kiến của UBMTTQ xã Phương Nghi gửi Sở Nông nghiệp & Phát triển nông thôn tỉnh Thanh Hóa để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường, xã hội của Tiểu dự án.

Nơi nhận:
- Như trên;
- Lưu ...

UBMTTQ XÃ PHƯƠNG NGHI

CHỦ TỊCH



HOÀNG VĂN TUẤN

- Ông: Lê Văn Quế Chức vụ: Chủ tịch UBND xã Triệu Thành
Ông: Nguyễn Văn Sinh Chức vụ: Chủ tịch UBND xã Xuân Du
Ông: Nguyễn Đình Phò Chức vụ: Phó chủ tịch UBND xã Hợp Thành

g) Đại diện công ty QLKT CTTL

Ông: Nguyễn Văn Chanh Chức vụ: TP kỹ thuật Cty Sông Chu

h) Đại diện đơn vị tư vấn

Ông: Ngô Xuân Nam Chức vụ: Trưởng nhóm tư vấn MT-XH

Ông: Mai Trọng Hoàng Chức vụ: Chuyên gia môi trường

6. Nội dung cuộc họp

a) Đại diện Ban QLDA, ông: Trần Hữu Quý trình bày nội dung các TDA.

b) Đại diện đoàn tư vấn: Ngô Xuân Nam giới thiệu các chính sách an toàn môi trường của WB và Chính phủ Việt Nam và xã hội, tiến độ chuẩn bị dự án và các tài liệu chuẩn bị.

7. Các ý kiến thảo luận:

7.1- Về phạm vi ảnh hưởng của dự án và các đối tượng bị ảnh hưởng:

a) Về phạm vi ảnh hưởng:

Vùng lòng hồ thuộc đất của xã Phương Nghi, huyện Như Thanh. Khu vực cụm công trình đầu mối của hồ Đồng Bể thuộc xã Xuân Du - huyện Như Thanh và xã Triệu Thành - huyện Triệu Sơn. Các xã vùng hạ lưu được hưởng lợi từ nguồn nước tưới của hồ Đồng Bể bao gồm: xã Triệu Thành, Hợp Thành - huyện Triệu Sơn và xã Xuân Du - huyện Như Thanh.

b) Về các đối tượng bị ảnh hưởng:

Tổng số hộ bị ảnh hưởng về cây cối và hoa màu trên đất do canh tác trong hành lang bảo vệ an toàn đập: 13 hộ, không phải người dân tộc thiểu số, bao gồm 07 hộ thuộc thôn 2 xã Xuân Du - huyện Như Thanh và 06 hộ thôn 9 xã Triệu Thành - huyện Triệu Sơn. Diện tích đất nông nghiệp, lâm nghiệp, thủy sản và các loại khác không bị thu hồi. Dự án không ảnh hưởng đến di tích lịch sử văn hóa và không phải di dời mộ má.

7.2 Về tác động của dự án đến môi trường:

- Tác động tích cực:

Đảm bảo an toàn hồ chứa nước, đảm bảo tính mạng và tài sản của 19.279 người dân 15km đường liên xã; 11 trường học và các tuyến đường tỉnh lộ 506, 514, 15B ở phía hạ lưu đập;

Tăng khả năng trữ nước trong hồ chứa để cung cấp nước tưới cho 255 ha đất sản xuất nông nghiệp và cấp nước phục vụ sinh hoạt, công nghiệp với tổng lưu lượng 2592m³/ngày đêm.

- Tác động tiêu cực:

Trong thời gian thi công khu vực đầu mối có thể có những ảnh hưởng đến khu vực xung quanh như: tiếng ồn, bụi... Những tác động này là không lớn và có thể giảm thiểu được. Mặt khác vùng TDA nằm xa khu dân cư đông đúc nên sẽ không ảnh hưởng nhiều;

Trong quá trình làm đường vào đập cần chú ý về vấn đề môi trường (bụi, tiếng ồn) đối với các hộ dân ven đường;

Mở rộng tràn sẽ làm tăng khả năng xả lũ, an toàn cho hồ nhưng có khả năng ảnh hưởng đến vận chuyển bùn cát, có thể ảnh hưởng đến vùng hạ du, tư vấn FS cần phải tính toán kỹ vấn đề này;

Trong thời gian thi công ảnh hưởng đến việc tích nước trong hồ dẫn đến có thể ảnh hưởng đến cấp nước tưới cho vùng hạ du. Tuy nhiên, đơn vị tư vấn thiết kế đã đưa ra biện pháp thi công hợp lý: đắp đê quay thi công công mới, giữ nguyên công cũ phục vụ tưới cho đến khi thi công xong công mới sẽ không ảnh hưởng tới nhiệm vụ cấp nước cho vùng hạ du.

7.3- Tác động của dự án đến xã hội:

Tác động tích cực:

- Tạo việc làm cho một số nhân công địa phương, tăng thu nhập, tăng diện tích tưới, tăng năng suất cây trồng, nuôi trồng thủy sản và nâng cao đời sống nhân dân trong vùng dự án.

- Người BAH hiểu được những tác động tích cực và lợi ích dự án mang lại cho người dân địa phương, do đó họ hoàn toàn nhất trí với việc thực hiện Dự án và mong muốn Dự án sớm được triển khai.

7.5- Kiến nghị của các ngành liên quan:

Đồng tình với các nội dung của dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bè, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa;

Ở gần khu vực TDA có khu di tích Phú Na, đây là khu du lịch tâm linh nên trong khi thi công không được để gây ảnh hưởng đến khu vực này;

Trong quá trình thi công phải có giải pháp để đảm bảo cấp nước tưới cho vùng hạ lưu như: chọn thời điểm thi công hợp lý quản lý bùn thải khi nạo vét long hồ;

Tư vấn thực hiện dự án cần bổ sung, lồng ghép Kế hoạch ứng phó với BĐKH của Tỉnh để hoàn thiện hồ sơ.

8- Kết luận:

Các Sở, ban ngành, chính quyền địa phương các huyện, xã trong vùng dự án cùng đơn vị QLKT CTTL đều đồng tình với việc đầu tư dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bè, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa.

Việc đầu tư xây dựng nâng cao an toàn hồ chứa nước Đồng Bè sẽ góp phần bảo đảm an toàn tính mạng, tài sản, nâng cao đời sống kinh tế của người dân trong vùng dự án. Nâng cao hiệu quả tưới, khai thác hiệu quả các công trình thủy lợi hiện có phục vụ thâm canh tăng vụ, tăng năng suất và chất lượng sản phẩm, phát triển mạnh việc trồng các loại cây có năng suất cao, có giá trị kinh tế lớn. Đảm bảo phục vụ nhu cầu dùng nước cho dân sinh, phát triển công nghiệp của địa phương. Giảm thiểu lượng nước tồn thất.Tạo cảnh quan thiên nhiên, cải thiện môi trường sinh thái, thúc đẩy phát triển du lịch trong vùng.

Tuy nhiên trong quá trình thực hiện dự án, sẽ không tránh khỏi các tác động tiêu cực đối với môi trường, xã hội. Chủ đầu tư cam kết thực hiện đầy đủ các biện pháp giảm thiểu tác động môi trường, xã hội được nêu trong Báo cáo đánh giá tác động môi trường, xã hội được Nhà tài trợ (WB) thông qua.

- Việc xây dựng và nâng cấp các công trình nhằm nâng cao hiệu quả an toàn đập, ổn định cuộc sống cho người dân địa phương.

- Cả nam giới và phụ nữ đều được tham gia vào các tổ chức và đoàn thể tại địa phương và đề xuất ý kiến liên quan đến Dự án, do đó vấn đề về giới được bảo đảm.

- Trong khu vực thực hiện dự án người DTTS là những người hưởng lợi của dự án.

- Không xảy ra tình trạng buôn bán phụ nữ và trẻ em trong khu vực dự án.

Tác động tiêu cực :

- Diện tích đất bị ảnh hưởng bởi dự án chủ yếu là đất vườn.

- Tiểu dự án Thanh Hóa chiếm dụng đất rất ít vì việc nâng cấp, sửa chữa đập được tiến hành trên tuyến cũ, do vậy, các tác động tiêu cực có thể được giảm thiểu được và phạm vi thu hồi dự án không đáng kể.

7.4- Kiến nghị của các địa phương trong vùng dự án/ có đồng tình với các nội dung của dự án không:

- Tất cả các xã trong vùng dự án đồng tình với việc đầu tư: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bè, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa.

- Toàn bộ cây trồng trong khu vực hành lang bảo vệ an toàn đập, khi thi công sẽ phải chặt bỏ, ảnh hưởng đến kinh tế của một số hộ dân ven đập. Đề nghị Chủ đầu tư phối hợp cùng chính quyền địa phương tiến hành đền bù theo đúng quy định của Nhà nước Việt Nam và Ngân hàng Thế Giới.

- UBND xã Xuân Du đồng ý bố trí bãi đỗ đất thải của dự án tại 2 hồ thuộc thôn 4 và 5, với tổng diện tích: 1,08 ha, trong quy đất của xã quản lý.

- Các hộ bị ảnh hưởng mong muốn được cung cấp các thông tin về tiến độ thực hiện dự án.

- Các hộ bị ảnh hưởng mong muốn được bồi thường đầy đủ, minh bạch theo giá thay thế cho những tài sản bị thiệt hại, và giá thị trường cho hoa màu bị ảnh hưởng tạm thời.

Sở Nông nghiệp & PTNT
PHÓ GIÁM ĐỐC
ĐỖ VĂN HƯNG

Số TN&MT
ĐỖ VĂN HƯNG
Công ty QLKT CTTL

Trần Quang Trung
Ban Quản lý dự án

UBND Huyện Triệu Sơn

UBND Huyện Như Thanh
Phùng TN&MT huyện Như Thanh
Nguyễn Văn Tiến

Số Công trình và tài
Phạm Hoa Nam

Xã Xuân Du
Lã Minh Phương

V/v: Ý kiến phản hồi và cam kết của Chủ dự án về các vấn đề môi trường, xã hội của Tiểu dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa.

Kính gửi: UBND các xã Xuân Du, Phương Nghi huyện Như Thanh;
UBMTTQ các xã Xuân Du, Phương Nghi huyện Như Thanh;
UBND các xã Triệu Thành, Hợp Thành huyện Triệu Sơn;
UBMTTQ các xã Triệu Thành, Hợp Thành huyện Triệu Sơn.

Ban Quản lý dự án Thủy lợi Thanh Hóa phúc đáp văn bản của chính quyền địa phương về các vấn đề môi trường Dự án "Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh tỉnh Thanh Hóa. Thuộc dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB (WB8)" do Ban Quản lý dự án Thủy lợi Thanh Hóa làm đại diện Chủ đầu tư. Ban QLDA cảm ơn ý kiến đóng góp từ chính quyền địa phương thuộc vùng Dự án và cam kết sẽ thực hiện đầy đủ các biện pháp giảm thiểu các tác động xấu đến môi trường, đồng thời cam kết thực hiện tất cả các quy định chung về bảo vệ môi trường trong quá trình triển khai thực hiện Dự án, cụ thể:

1. Phối hợp với UBND cấp huyện, cấp xã và Hội đồng đền bù và giải phóng mặt bằng theo quy định hiện hành.
2. Chỉ đạo Nhà thầu thi công và phối hợp với chính quyền địa phương quản lý các hoạt động trên công trường để đảm bảo vệ sinh và an ninh xã hội khu vực.
3. Chỉ đạo Nhà thầu thi công thực hiện nghiêm chỉnh các biện pháp giảm thiểu, không chế ô nhiễm môi trường trong quá trình thi công xây dựng và dọn dẹp vệ sinh sạch sẽ vùng Dự án sau khi thi công.
4. Thực hiện kế hoạch quản lý môi trường và chương trình giám sát chất lượng môi trường trong giai đoạn thi công và vận hành của Dự án.

Nơi nhận:
- Như trên;
- Lưu: VT, DA2.



Annex A6. Contractor Environmental and Occupational Health and Safety Plan (EOHS)

The contractors are required to prepare site-specific EOHS as part of their construction method and submitted to the CSC/PMU for review and approved before construction is commenced.

Meanwhile, the contractors are also required to comply with the the terms and conditions below and the specific mitigation measures specified in the subproject's Social and Environmental Management Plan.

1. Contractors' Environmental Supervision during Construction

The Contractor shall ensure adequate Workplace Safety and Environmental Officers (SEOs) are allocated and available for the implementation of the EMP throughout the construction period.

The SEOs are responsible for implementation and management of the EMP program. Regular environmental monitoring works, as required by the environmental legislation, shall be carried out by qualified laboratories and monitoring team. The laboratories and the monitoring team shall be considered members of the SEO. The roles and responsibilities of SEO and SEO are:

1. Sampling, analysis and evaluation of monitoring parameters with reference to the EMP recommendations and requirements
2. Carry out environmental site surveillance to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and adequacy of environmental mitigation implemented
3. Review the success of the EMP Implementation Plan to cost-effectively confirm the adequacy of mitigation measures implemented
4. Monitor compliance with environmental protection, pollution prevention and control measures, and contractual requirements
5. Monitor the implementation of environmental mitigation measures
6. Audit and prepare audit reports on the environmental monitoring data and site environmental conditions
7. Complaint investigation, evaluation and identification of corrective measures
8. Advice to the Contractor on environment improvement, awareness, proactive pollution prevention measures
9. Engage a qualified staff, preferably a Landscape Architect to review and monitor the Contractor's submitted Landscape, Visual Impacts and Re-vegetation Plan, and to supervise the Contractor's landscaping works
10. Follow the procedures in the EMP and recommend suitable mitigation measures to the Contractor in the case of non-compliance / discrepancies identified. Carry out additional monitoring works within the specified timeframe instructed by the PEO; and
11. Liaison with the Contractor and PEO on all environmental performance matters, and timely submission of EMP Implementation Plan reports to the PEO, SES, and relevant administrative authorities, if required.

Prohibitions

The following activities are prohibited on or near the project site;

1. Cutting of trees for any reason outside the approved construction area
2. Hunting, fishing, wildlife capture, or plant collection
3. Buying of wild animals for food
4. Having caged wild animals (especially birds) in camps
5. Poaching of any description
6. Explosive and chemical fishing

7. Building of fires
8. Use of unapproved toxic materials, including lead-based paints, asbestos, SEOC.
9. Disturbance to anything with architectural or historical value
10. Use of firearms (except authorized security guards)
11. Use of alcohol by workers in office hours
12. Washing cars or machinery in streams or creeks
13. Maintain (change of oils and filters) of cars and equipment outside authorized areas
14. Driving in an unsafe manner in local roads
15. Working without proper safety equipment (including boots and helmets)
16. Creating nuisances and disturbances in or near communities
17. The use of rivers and streams for washing clothes
18. Disposing garbage in unauthorized places
19. Indiscriminate disposal of rubbish or construction wastes or rubble
20. Littering the site
21. Spillage of potential pollutants, such as petroleum products
22. Collection of firewood
23. Urinating or defecating outside the designated facilities; and
24. Burning of wastes and/or cleared vegetation.

Any construction worker, office staff, Contractor's employees, the Client's employees or any other person related to the project found violating these prohibitions will be subject to disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

2. Construction Worker Health Management Plan

The Contractor shall prepare and enforce a Health Management Plan to address matters regarding the health and safety of construction workers and project staff. The Contractor shall include in his proposal the outline of the Health Plan. The Environmental Supervisor will issue a certificate of compliance to the Contractor prior to the initiation of Construction.

The following measures shall be implemented by the Contractor to ensure an adequate Project Health Program:

1. Screening of all workers on recruitment and annually
2. Implementation of a comprehensive vaccination program including but not limited to hepatitis A and B, tetanus, polio, etc.
3. Implementation of anti-malaria measures following current accepted practice at the camp area and establishment of facilities for the early diagnosis and treatment of patients with the disease
4. Storing sufficient medicines for malaria treatment
5. Collect and test sputum of individuals who are at risk for Tuberculosis (TB) infection
6. Storing antibiotics for treatment of respiratory infections
7. Storing medicines and transfusion fluid to treat food poisoning and diarrhea
8. Develop solutions for mass outbreaks of food poisoning
9. Periodic monitoring of public kitchen in construction camps
10. Storing and distributing vermifuges to workers
11. Implementation of a disease control and pest management measures at the time the construction camps are built
12. Distribution of free condoms to camp workers
13. Monitoring of health indicators to follow the trends
14. When buildings cannot be made mosquito proof, pyrethroid-treated nets shall be provided
15. Appropriate measures shall be taken subject to risk assessment and review of potential environmental effects to address mosquito control including dengue fever control

16. Implementation of a program for the detection and screening of sexually transmitted infections, especially with regard to HIV/AIDS, amongst labourers
17. The smaller construction camps shall have subsidiary treatment or first aid posts staffed by either a trained nurse or a locally trained personnel, as required
18. Examine and screen construction workers before employment for schistosomiasis; and
19. Selection of suitable workers from the workforce who shall receive additional training in occupational health and first aid and shall form teams of two or three personnel at each work site. They shall be under the supervision of the medical officer.

3. Waste Management Plan

During the construction stage, the Contractor shall prepare a Waste Management Plan before commencement of project works. The Plan shall include:

Water and Wastewater

1. A review of the preliminary site drainage design prepared during the detailed design.
2. An update of the preliminary design based on the actual construction program and site specific conditions (e.g. the geographical conditions, location of slopes and the nature of construction work).
3. Detailed design including drawings, location maps, specifications of drainage collection channels and wastewater treatment facilities.
4. Proposed discharge locations and treatment standards.
5. A detailed implementation program of the proposed drainage system.
6. As part of the design of the site drainage system, surface runoff within the construction site shall be diverted in order to avoid flushing away soil material and the water is treated by device such as sediment trap before discharge.
7. Domestic sewage from site offices, toilets and kitchen shall either be collected by a licensed waste collector or treated by on-site treatment facilities. Discharge of treated wastewater must comply with the discharge limits according to Vietnamese legislation.
8. A Wastewater treatment device such as a sediment tank can be installed near each of the constructions activities that may generate wastewater. Alternatively, sedimentation ponds can be constructed on-site to settle out excessive suspended solids (SS) before discharging into a discharge intake.
9. Retaining walls and sandbags barriers shall be constructed surrounding the bored piling machine in order to trap bentonite and wastewater within the piling location. The collected spent bentonite or the wastewater shall be pumped for treatment before discharge.
10. Prior to the rainy season, all exposed surfaces and slopes shall be properly covered or landscaping shall be provided to minimize run-off of sediment laden. Slope protection can be carried out in sequence to construction and in advance of the rainy season.
11. Drainage control devices such as sediment traps shall be installed at each discharge intake, and they shall be cleaned regularly, and
12. Chemical toilets can be provided on each work site employing 5 workers or more.
13. At least one toilet shall be installed per 25 workers. Domestic sewage collected from the site office and chemical toilets shall be cleaned up on regular basis. Only licensed waste collectors shall be employed for this disposal. The sludge shall be treated according to the requirements of the Contractor's Waste Management Plan.

Solid Wastes. Wastes such as those listed below are expected due to construction activities:

1. Surplus excavated materials requiring disposal due to earth moving activities and slope cutting.
2. Disposal of used lumber for trenching works, scaffolding steel material, site hoarding, packaging materials, containers of fuel, lubricant and paint.
3. Waste generated by demolition of existing houses / buildings affected by the project or

- breaking of existing concrete surfaces.
4. Waste from on-site wastewater treatment facility (e.g. treatment of bentonite from tunnelling works by sedimentation process), and
 5. Domestic waste generated by workers, at campsite and other facilities.
 6. The above wastes must be properly controlled through the implementation of the following measures:
 7. Minimize the production of waste that must be treated or eliminated.
 8. Identify and classify the type of waste generated. If hazardous or chemical wastes are generated, proper procedures must be taken regarding their storage, collection, transportation and disposal. (See Emergency Plan for Hazardous Materials and Chemical Waste Management Plan).
 9. Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each, and
 10. Control placement of all construction waste (including earth cuts) to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). Collect and recycle and dispose where necessary in authorized areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials.

The Contractor shall make a commitment to waste recycling and re-use methods in consideration of the following:

1. A method statement on waste recycling, re-use and minimization of waste generation.
2. Excavated material shall be re-used on-site or the nearby road segment / other projects as far as possible in order to minimize the quantity of material to be disposed of.
3. Recyclable materials such as wooden plates for trench works, steel, scaffolding material, site holding, packaging material, etc. shall be collected and separated on-site from other waste sources. Collected recyclable material shall be re-used for other projects or sold to waste collector for recycling, and
4. Collected waste shall be disposed of properly through a licensed waste collector.

4. Construction Camp Management Plan

Workforce and Camps: *General Requirements*

The Contractor shall, wherever possible, locally recruit the available workforce and shall provide appropriate training as necessary. The Contractor shall consider all aspects of workforce management and address potential ethnic tensions between workers and the local communities, increased risk of prostitution and communicable diseases, theft, drug and alcohol abuse, market distortion due to temporary inputs to local economy and other local tensions such as unemployment, ethnicity and divergent cultural values.

The following general measures shall be considered for construction camps:

1. The construction camp site will have to be approved by the local authority.
2. The Contractor shall present the design of the camps including details of all buildings, facilities and services for approval no later than two months prior to commencement of any construction work. Approvals and permits shall be obtained in accordance with applicable laws, applicable standards and environmental requirements for the building and infrastructure work for each camp area.
3. The Contractor shall provide adequate and suitable facilities for washing clothes and utensils for the use of contract labor employed therein.
4. Camp site selection and access roads shall be located so as to avoid clearing of major trees and vegetation as feasible, and to avoid aquatic habitats.
5. The Contractor shall provide suitable, safe and comfortable accommodation for the workforce. The contractor shall ensure that effective natural drainage and landscaped to

- avoid erosion are maintained at the camp area
6. The Contractor shall provide adequate lavatory facilities (toilets and washing areas) for the workers and visitors. Toilet should also be provided with clean or potable water, soap, and toilet paper. Adequate bathing facilities shall be provided for the use of workers. Such facilities shall be conveniently accessible and kept in clean and hygienic conditions at all times.
 7. The Contractor shall implement effective sediment and erosion control measures during construction and operation of the construction camps in accordance with the environmental requirements as stipulated by the ESMP and SESIA.
 8. The Contractor shall provide recreational facilities to the workforce. Such facilities will help to mitigate against potential conflict and impact on the local population as the incentive to go outside the camp will be reduced.
 9. The Contractor shall provide safe potable water for cooking, drinking and bathing.
 10. The Contractor shall install and maintain a temporary septic tank system for any residential labor camp, without causing pollution of nearby watercourses. Wastewater should not be disposed into any water bodies without treatment, in accordance to applicable Vietnamese standards.
 11. The Contractor shall establish a method and system for temporary storage and disposal or recycling of all solid wastes generated by the labor camp and/or base camp.
 12. The Contractor shall not allow the use of fuel wood for cooking or heating in any labor camp or base camp and provide alternate facilities using other fuels.
 13. The Contractor shall ensure that site offices, depots, and workshops are located in appropriate areas as approved by the appropriate the Dam Safety Project environmental officer or the Supervisory Engineer;
 14. The Contractor shall ensure that storage areas for diesel fuel and lubricants are not located within 100 meters of watercourses, and are operated so that no pollutants enter watercourses, either overland or through groundwater seepage, especially during periods of rain. A ditch shall be constructed around the area with an approved settling pond/oil trap at the intake.
 15. Areas for the storage of fuel or lubricants and for a maintenance workshop shall be fenced and have a compacted/impervious floor to prevent the escape of accidental spillage of fuel and or lubricants from the site. Surface water drainage from fenced areas shall be discharged through purpose designed and constructed oil traps. Empty fuel or oil drums may not be stored on site. Waste lubricants shall be recycled, and not disposed to land or adjacent water bodies.
 16. The Contractor shall ensure that site offices, depots, and workshops are located in appropriate areas as agreed by local authorities and approved by the Dam Safety Project or supervisory engineer. They shall not be located within 200 meters of existing residential settlements.
 17. Concrete batching plants shall not be located within 500 m of any residence, community or work place.
 18. The Contractor shall provide medical and first aid facilities at each camp area; and
 19. All medical related waste shall be disposed off in proper containers, or dealt with accordingly with established procedures for safe disposal.

Security. Security measures shall be put into place to ensure the safe and secure running of the camp and its residents. As a minimum, these security measures should include:

20. Access to the camp shall be limited to the residing workforce, construction camp employees, and those visiting personnel on business purposes.
21. Prior approval from the construction camp manager shall be required for visitor access to the construction camp.
22. Adequate, day-time night-time lighting shall be provided.

23. A perimeter security fence at least 2m in height shall be constructed from appropriate materials; and
24. Provision and installation in all buildings of firefighting equipment and portable fire extinguishers.

Maintenance of Camp Facilities

The following measures shall be implemented to ensure that the construction camp and its facilities will be organized and maintained to acceptable and appropriate standards:

1. A designated camp cafeteria shall be established under strict sanitary and hygiene conditions
2. Designated meal times shall be established
3. Cooking or preparation of food shall be prohibited in accommodation quarters
4. Designated rest times shall be established
5. Designated recreational hours shall be put in place
6. Smoking shall be prohibited in the workplace
7. Procedures shall be implemented to maintain the condition of the construction camp and facilities and ensure adequate cleanliness and hygiene
8. The latrines and urinals shall be adequately lighted and shall be maintained in a clean sanitary condition at all times
9. Water shall be provided in or near the latrines and urinals by storage in drums; and
10. A complaint register to receive and respond to complaints from the construction camp residents regarding facilities and services provided.

Code of Conduct

A major concern during a construction of a project is the potentially negative impacts of the workforce interactions with the local communities. For that reason, a Code of Conduct shall be established to outline the importance of appropriate behavior, drug and alcohol abuse, and compliance with relevant laws and regulations. Each employee shall be informed of The Code of Conduct and bound by it while in the project. The Code of Conduct shall be available to local communities in place easily accessible to the communities. The Code of Conduct shall address the following measures (but not limited to them):

1. All workers and subcontractors shall abide by the laws and regulations of Vietnam
2. Illegal substances, weapons and firearms shall be prohibited
3. Pornographic material and gambling shall be prohibited
4. Fighting (physical or verbal) shall be prohibited
5. Workers shall not be allowed to hunt, fish or trade in wild animals
6. No consumption of bush meat shall be allowed in camp
7. No pets shall be allowed in camp
8. Creating nuisances and disturbances in or near communities shall be prohibited
9. Disrespecting local customs and traditions shall be prohibited
10. Smoking shall be prohibited in the workplace
11. Maintain appropriate standards of dress and personal hygiene
12. Maintain appropriate hygiene standards in accommodation
13. Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and
14. Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.

ANNEX B. SOCIAL**Annex B1: Methodology notes****Sampling Frame**

Household survey was done with 120 households in two communes by sampling with the sample amount depending on the number of affected person (according to the guidance of national consultants). 100% of the 13 affected households were interviewed, together with 107 other farmers benefited from Dong Be reservoir.

Four focus groups discussions with 40 people in total were held in each of two communes, of which, one discussion with the 10 staffs of CPC including leaders, land, agriculture, irrigation manager, women union, farmer association, etc. and one discussion with the 10 people affected and benefited from sub-project.

15 key informant interviews were done with the directly/indirectly affected persons in different spaces from upstream to downstream of the dam in two communes of Xuan Du (upstream) and Trieu Thanh (downstream), and dam managers, CPC leaders, political organizations, village heads, irrigation staff, clinic staff, DARD staff.

Community meetings with 60 people in total were held in two communes with 30 people of each.

The education level of the householder (unit:%)

No.	Commune	Education Level				Total
		Illiterate	Primary school	Secondary school	High School	
1	Trieu Thanh	5.4	32.1	50.0	12.5	100
2	Xuan Du	0.0	50.0	40.0	10.0	100
3	Total	4.5	34.8	48.5	12.1	100

The education level of household members by sex (unit:%)

Gender	Illiterate	Primary school	Secondary school	High School	Vocational school	College/ university	Not yet school	Total
Male	2.3	19.1	44.3	18.3	2.3	8.4	5.3	100
Female	4.5	27.1	33.1	20.3	1.5	6.0	7.5	100
Total	3.4	23.1	38.6	19.3	1.9	7.2	6.4	100

The main occupation of the householder (unit:%)

Commune	Occupation						Total
	Laborless	Agriculture, forestry and fishery	Business, service	Worker	Retired	Hired work	
Total	6.8	70.3	0.8	1.7	18.6	1.7	100
Trieu Thanh	12.7	45.5	1.8	3.6	32.7	3.6	100
Xuan Du	1.6	92.1	0.0	0.0	6.3	0.0	100
By ethnic minorities							
Kinh	7.1	68.8	0.9	1.8	19.6	1.8	100
EM	0.0	100.0	0.0	0.0	0.0	0.0	100

The main occupation of the household members (unit:%)

Commune	Laborless	Agriculture, forestry & fishery	Business, service	Employee of state	Student	Handicraft	Worker	Retired	Hired work	Jobless
Total	3.5	46.7	1.0	3.8	25.8	0.2	9.2	7.7	1.9	0.2
Trieu Thanh	6.2	36.2	1.4	1.9	27.1	0.0	10.5	12.4	4.3	0.0
Xuan Du	1.5	54.8	0.7	5.2	24.8	0.4	8.1	4.1	0.0	0.4
By ethnic minorities										
Kinh	3.8	46.8	0.9	3.5	25.8	0.2	8.6	8.2	2.0	0.2
EM	0.0	44.4	3.7	7.4	25.9	0.0	18.5	0.0	0.0	0.0

The main water supply for households affected (unit:%)

No.	Commune	Drinking water			Bathing water		
		Wells	Rain	Total	Wells	Rain	Total
1	Trieu Thanh	100.0	0.0	100	98.2	1.8	100
2	Xuan Du	96.9	3.1	100	98.4	1.6	100
3	Total	98.3	1.7	100	98.3	1.7	100
No.	Commune	Productive water					Total
		River	Reservoir	Wells	Irrigation	Rain	
1	Trieu Thanh	10.7	7.1	1.8	80.4	0.0	100
2	Xuan Du	6.3	12.5	6.3	71.9	3.1	100
3	Total	8.3	10.0	4.2	75.8	1.7	100

Current status of the toilet used in affected households (unit:%)

TT	Commune	Type of toilet					Total
		No toilet	Septic	Two compartments	Simple	Ponds, rivers,	
1	Trieu Thanh	1.8	26.8	28.6	42.9	0.0	100
2	Xuan Du	1.6	29.7	29.7	35.9	3.1	100
3	Total	1.7	28.3	29.2	39.2	1.7	100

The disease mainly in the project area during the past 12 months (unit:%)

No.	Commune	Flu	Respiratory	Cold	Malaria	Liver	Poisoning	Injury	Total
1	Trieu Thanh	75.5	26.5	4.1	12.2	8.2	0.0	8.2	100
2	Xuan Du	77.8	22.2	0.0	0.0	0.0	0.0	0.0	100
3	Total	75.9	25.9	3.4	10.3	6.9	0.0	6.9	100

The health services reach the common people (unit:%)

No.	Commune	Commune clinic	Inter-communal clinic	District hospital	Provincial hospital	Central hospital	Private clinic	Pharmacy	Traditional medicine	Total
1	Trieu Thanh	34.0	2.1	33.0	10.6	0.0	0.0	18.1	2.1	100
2	Xuan Du	32.1	1.9	32.1	9.4	0.0	2.8	20.8	0.9	100
3	Both	33.0	2.0	32.5	10.0	0.0	1.5	19.5	1.5	100

Energy source for lighting (unit:%)

No.	Commune	Power source		Total
		Petrol	Grid	
1	Trieu Thanh	1, 8	98, 2	100
2	Xuan Du	3, 1	96, 9	100
3	Both	2, 5	97, 5	100
By ethnic minorities				
	Kinh	1.8	98.2	100
	EM	16.7	83.3	100

Energy sources used for cooking (unit:%)

No.	Commune	Power source				Total
		Wood	Petrol	Gas	Biogas	
1	Trieu Thanh	80.4	0.0	17.9	1.8	100
2	Xuan Du	73.4	3.1	23.4	0.0	100
3	Both	76.7	1.7	20.8	0.8	100
By ethnic minorities						
	Kinh	77.2	1.8	20.2	0.9	100
	EM	66.7	0.0	33.3	0.0	100

Average size of household land

Commune	Residential land (m ²)	Garden soil (m ²)	Agricultural land (m ²)	Aquatic Land (m ²)	Forest land (m ²)
Average	434	1886	589	186	1042
Trieu Thanh	378	2043	540	149	893
Xuan Du	483	1748	632	218	1172
By ethnic group					
Kinh	442	1864	495	140	921
EM	290	2303	383	1050	3333

Annex B2. Public Health Intervention Plan

1. Main contents in the Public Health Intervention Plan

Identification of risk factors

Step 1: Identify health problems by answering screening questions as follows:

- What issues on health sector need to concern in the project?
- What reasons causes health risks?
- Why these health risks need to be concerned?
- What measures to identify risk factors for health?
- Is assessment of health risk appropriate to the context of the project?

Step 2: Evaluation of risk factors in both qualitative and quantitative methods.

Qualitative and quantitative information aims to assess relationship between different levels of exposure and its effects to community health, especially the adverse impacts. Methods to identify risk factors to health include: (1) physical, chemical, biological factors; (2) factors of social, cultural, custom aspects ... affect to community health.

Step 3: Description of risk

This is final step of identification and assessment process of risk factors. Objective of this step is to synthesize all information step 1 and step 2. Contents of the step aim to provide managers scientific basis for making decisions on selection of risk management solutions and provide basic information for risk communication activities.

Implementing above 3 steps aims to provide information for management of health risks which can occur when implementing project. Also, according to concept of integrated risk assessment, the three steps are implemented in a uniform and link to help determine the closest and truest risk factors.

Promoting positive factors of community health

This is an important content because besides risk of adverse impacts on health when implementing the project, positive impacts also need to interest and have solutions to promote positive factors. Such as solutions for protection of air environment, beautiful scenery, clean water in the structures during operation process or to encourage people to participate in healthy entertainment activities in the works where can be exploited to sever community activities (in accordance with regulations).

Developing community health management program of the sub-project

Based on strategic directions of community health management, the sub-projects will develop plans and programs of community health management in accordance with the characteristics of the sub-projects.

2. Management of health risks of the WB8 project

Assessment of risk factors for health

The surveys on disease in community of project area show that common diseases in this area include flu, respiratory diseases, malaria, cholera / dysentery, hepatitis, etc. The number of people suffering from colds has relatively high proportion ranged from 49% to 65%. The percentage of people who get sick in the survey of the sub-project is 86%. There are 5 main reasons have a adverse impact on the health situation from high level to low level are water contaminated, residential areas polluted, food insecurity, disease and lack of clean water for

living.

Implementation process of the sub-projects can cause impacts on health and community unsafety as follows.

- Upgrading some structures will create beautiful landscape, increasing number of tourism as well as tourist services can cause some social ills such as drug smoking, prostitution, etc. Also, attracting visitors can increase environmental pollution (litter), or drowning risk for children and women.
- Affecting safety of workers during the construction project. Construction process can cause loss of safety for workers if not properly implement procedures for occupational safety, fire prevention.
- Most of results of social impact assessment showed that social risks associated with construction can be occurred such as HIV/AIDS, issues on community unsafety because a large number of workers concentrate in construction time. The presence of a large amount of male can create risk of transmission of HIV/AIDS through injecting and sex. Neighborhood security may be affected by conflicts between community and construction workers.
- In consultation process, people expressed concerns on impacts on environmental pollution due to transportation of soil, construction materials, oil waste, and domestic waste of workers. Travelling activities may be hindered or unsafe due to dirt roads and transportation of vehicle.

Besides, construction process can cause noise of machineries, security issues such as theft or public unsafety due to conflicts between workers and indigenous people or noise of group activities.

The process of living of workers and project management as well as operation of machinery on construction projects can lead to contamination of waste, especially hazardous waste may affect health people.

Management of health risks

To minimize the risk factors which have adverse impacts on community health, it is necessary to implement the following measures:

- It requires control and assessment measures of cumulative impacts, developing public health management plan, dissemination plan and community consultation in order to minimize impacts on surrounding communities in the project areas such as transportation, traffic, noise, etc.
- Good management of production activities; encouraging and guiding people to apply new production and environmental friendly methods.
- Implementing successfully provisions on ensuring safety corridors of irrigation structures, managing dangerous areas for people, adding some items such as bridge over spillway, bridge over flood discharge route, management road combined migration, rescue, water-level gauge of flood warning ... to reduce the risk of drowning occurred, especially children and women.
- During the construction process, workers in construction site must be equipped with knowledge of occupational health, food safety, propaganda, information on health protection in order to minimum transmission of sexual diseases, etc.
- The truck transporting sand and gravel for construction services should be screened carefully to avoid spillage of materials affected roads and atmosphere (dust, dirt). Should use cars before expire date and transport with designed volume to avoid road subsidence due to over volume allowed.

- Project Management Board should have garbage containers classified for related waste oil and waste generated by activities of workers. Types of hazardous wastes should be collected and transported carefully to handle places to avoid adverse impacts on community health of the project.
- Vehicles and construction equipments must be maintained periodically. Avoid implement construction activities near residential areas in the break time. Regularly announce construction plan to communities and local authorities by telephone, speaker, text or message boards of CPC, message boards at construction site. The Management Board should install signs of dangerous warning around the construction site to prevent movement of the local people, and control movement of people in the project area.
- When the project is put into operation, it needs to test periodically the safety of reservoirs, arranging people to monitor activities in the rainy season. Coordinating with local people in activities; constructing safety corridors of flood discharge; developing dam break scenarios; announcing time of flood discharge for people. Residents and local authorities need to have community based disaster risk response plans.
- As for sub-projects related to mine clearance activities, these activities were carried out according to regulations and mitigation measures from survey step, project design, and site clearance, ensuring compliance with safety procedures, regulations, and rules.
- Propagating disseminating to the local people around construction area on information of environmental protection, water resources, natural landscape, developing advantages of clean water for life and production.

3. Responsibilities of stakeholders

- CPO is responsible for developing community health management of the project, ensuring activities of plan to comply with objectives, coordinating the participation of stakeholders.
- Provincial Project Management Office will be responsible for general supervision of all project activities, including communication plan, public health consultation. The issues relating to public health is also one of the content is reflected in complaints mechanism of the project.
- Construction contractor:
 - Commander of construction on the behalf of the contractor will coordinate with local governments to implement the communication, and consultation activities related to community health and workers.
 - Contractor will be assigned to commander of or a worker in charge of occupational safety and health for workers to monitor and support related issues.
 - Contractor shall coordinate with commune clinic, officers of clinic in the village to timely update on disease situation in the province or health problems of workers can spread
 - Contractor shall coordinate with local authorities, clinic to inform on issues related to people's safety at construction sites or in the road for transport of construction materials / waste
 - Contractor shall coordinate with CPC / clinics to coordination mechanism when accident or disease occurs.
- Workers / employees: implement fully provisions in the process of construction.
- Clinic: clinic at communes has function of management, monitoring, first aid, reporting problems to community health in the commune. Therefore, the issues relating to community health are supported by the units.

4. Monitoring and evaluation

Indicators for health monitoring and management:

- The number of accidents caused by construction of sub-projects
 - The number of traffic accidents by construction vehicles of sub-projects
 - Number of times / number of workers are ill, especially infectious diseases
 - The availability of medicine cabinet for workers in camps
 - Number of employees are guided / trained on issues related to community health: diseases transmitted via sex
 - Knowledge and understanding of construction workers on prevention of social evils and social diseases
- The documentations to guide for coping with disease, accidents which contractors provide for workers

Annex B3. Public Consultation, Participation And Communication Plan

1. Information disclosure and participation

Information disclosure is an on-going process beginning early in the project cycle and continuing throughout project preparation and implementation. The process provides timely information to communities in order that they may meaningfully contribute to project design, decisions and also mitigation. Provision of timely and accurate information will avoid misinformation and inaccurate rumours from circulating in communities. During consultations particular attention is given to vulnerable groups in the community to ensure their understanding and collective input. In accordance with both WB and GoV policy (contained in Decree 69 Articles 29, 30 and 31 and 2) the PPC and DPC ensure that public notice is given and disseminate details of the approved draft resettlement plan, or framework, before project Fact Finding by the WB. This draft will also be disclosed on the WB website. Following the census of affected persons, the final resettlement plan, as endorsed by the GoV and WB, is further disseminated to the affected communities and posted on the WB website. Any updates or revisions to the final resettlement plan must be further disseminated to affected communities and again, posted on the WB website.

The Resettlement Provincial Project Management Unit, with assistance from consultant, relevant provincial and districts, commune's agencies, conducted a series of public meetings to provide information regarding project activities and the proposed resettlement and compensation arrangements. These public meetings have been carried out to: (i) disseminate information on inventory and pricing results, (ii) inform the APs on amounts of compensation and supports of each affected household, (iii) to listen to their feedback and suggestions, and (iv) for revising or adjusting the inaccurate data, if any. It is important that APs are informed well in advance of the date, time and location of each meeting, and that reminders are also provided. It is essential that these meetings enjoy maximum participation as this will reduce misunderstandings and potential for conflict. For removal or relocation of tombs/graveyards or other religious or cultural significant items, special consultation took place and a record of consultation should be made available which includes: (i) nature and type of tombs; (ii) how old are the tomb and status of land where the tombs are located; (iii) new location and status of land; (iv) if the tombs are owned by ethnic minorities or not and the implications of impact on the religious and cultural sentiments of the community; (v) agreed ritual process, cost and time of removal of tombs, and other arrangements as deemed necessary.

In accordance with Decree 69/ND-CP Article 30(2b) the posting must be recorded in official minutes and confirmed by the CPC, the Commune Fatherland Front and APs. As per Decree 69/ND-CP Article 30 Clause 3(a), following expiration of this period the agency in charge of compensation will summarize all opinions and comments received, including numbers of APs and stakeholders who agree and disagree, with the compensation and land acquisition and assistance offered in the resettlement plan. Interviews with APs will be conducted in order to check the adequacy of compensation prices issued by the provinces. Further public consultations will be carried out during the implementation stage with a focus on specific activities including assessment of compensation, acquisition of land, and design of rehabilitation assistance planning. These measures are undertaken to ensure that APs are satisfied with the compensation arrangements and will not object to the disruption and that they will not suffer enduring adverse impacts due to the project and be able to fully restore and further improve their livelihoods.

Participation provides for the occasion and the process by which stakeholders influence and become co-responsible for development initiatives and decisions that affect them. Through participation, the needs and priorities of the local population are expressed and can be addressed in project and resettlement planning. The affected households and other stakeholders will continue to be consulted during RAP updating and implementation, following a two-way

process – information dissemination and gathering of feedback and suggestions.

2. Public Consultation

A Social Impact Assessment (SIA) was pursued to inform stakeholders on the project and possible social impact resulting from it, and solicit their comments and suggestions on possible mitigation of the perceived impacts. The activity utilized focus group discussions that were participated in by section of stakeholders (i.e. Ethnic Minority, women, etc.) in project district.

There was an active participation of the stakeholders in the Provincial consultation meetings. Briefly, the predominant feedback related to resettlement are as follows:

- (i) All are in favour of implementing the project;;
- (ii) Un-harmonized compensation policies adopted by different projects financed by different multi-lateral funding institutions as well as the Vietnam government, are causing social problems due to disparity between unit rates used to compute for compensation and other benefits provided to affected persons;
- (iii) Since there are no available replacement land for affected households dependent on agriculture, it is essential that the crafting and implementation of viable livelihood restoration program for severely affected and vulnerable groups be given serious consideration; and
- (iv) Close coordination between the Executing agency, project consultants and concerned provincial/district/commune implementers is essential to the success of the Project;

The first public consultations at project affected communes were held prior to the commencement of the IOL and SES with participation of communal officials and affected households. In addition, focus group discussions were held with the affected people and local officials during the conduct of the census and the IOL survey.

During the meetings, the consultant teams relayed to participants the following topics:

- i. General information of the project and its features;
- ii. Objectives and Principles of RAP according to the requirements of GOV and WB's policy on involuntary resettlement;
- iii. Livelihood restoration program;
- iv. Compensation and relocation modes (options for cash and/or in-kind compensation);
- v. Ethnic, Gender and vulnerable group issues;

The reactions of the community consultation meetings were various. There are those where active participation were observed, while there were also some meetings where the public rather listen and offer minimal inter-action with the members of the consultant team. Among the issues discussed above, the following were the most significant:

- i. Basis for compensation and allowance package for affected persons; and
- ii. Crafting and implementation of a viable and acceptable income restoration program for SAHs is essential as suitable replacement land for recovered agricultural lands is not available.

The consultant carried out detailed consultations individually and/or in small groups with all type of affected households, in order to determine their specific requirements and preferences for rehabilitation assistance and, as required, resettlement.

The second of Public Consultation was held along with the Environmental Impact Assessment (EIA) for public hearing, where the contents of the resettlement plan is briefly disclosed, including its social impact assessment of the project, compensation plan and other proposed

involuntary resettlement mitigation measures. Participants came from relevant affected Province departments, concerned communes and representatives from affected persons. Feedbacks and suggestions to be secured from stakeholders on the resettlement plan, foremost of which is the harmonized resettlement policy, compensation plan and income restoration approach and institutional arrangements among others.

Further public consultations will continue during updating and implementation of resettlement plans. RAP updating is necessary during the detailed engineering design phase, where the full extent of the land acquisition will be known and the DRCs would have conducted the cadastral survey to delineate the recovered and residual lands of affected persons, and prepared the updated Compensation Plan. Similar to the approach during RAP preparation, separate meetings will again be undertaken with the vulnerable and severely affected households. All consultation and disclosure activities will be properly documented. These meetings will take place: (i) following completion of the DMS and review and updating of replacement costs for affected assets, where the District Resettlement Council consults with the affected households individually and/or in group in connection with the updating of compensation and entitlements and, as warranted, income restoration programs and relocation plans; and (ii) following approval of the updated RAPs, to present to the affected households in the communes (i.e., also referred to as “final disclosure meeting”) the validated/updated list of affected people, compensation and entitlements due to them, and schedule of delivery of compensation and entitlements.

3. Disclosure of RAP

A public information booklet (PIB) will be prepared and distributed to the affected households through the concerned local governments (PPC/DPC/CPC) after the approval of the RAP by WB and GOV. The following information are provided in the PIB: (i) a brief background of the Project, specifically the civil works to be undertaken and the adverse social impacts; (ii) IOL results, with a statement that detailed information is available at the commune office; (iii) basis used for asset valuations, stating also that detailed information is available at the commune office; (iv) the entitlements due to the affected households; (v) timing of payments and the schedule of displacement; (vi) grievance redress mechanism; and (vii) contact persons at RAP-PMU, DRCs and concerned local authorities.

With regard to disclosure of the draft RAP, key information of the plan will be disclosed to the PPC, DPCs, and relevant Provincial Departments during the third Public Consultation meetings in which Resettlement Impacts, Mitigation Measures, Compensation and Rehabilitation will be present. The results of the consultation meetings, which focused on alternative livelihoods are discussed in detail in subsequent chapter. A copy of the RAP, also translated in Vietnamese, will be placed in the provincial, district and communal offices. Similarly, the draft RAP will be uploaded on the WB website following approval of the draft RAP by CPO and WB.

Disclosure of the updated RAP to PPC, DPCs, will be carried out prior to its submission to WB for review and approval. Key information in the updated RAP to be disclosed to the displaced persons, will include: (i) compensation, relocation and rehabilitation options, (ii) DMS results, (iii) detailed asset valuations, (iv) entitlements and other benefits, (v) grievance redress procedures, (vi) timing of payments, and (vii) displacement schedule. The final updated RAP will again be disclosed to the affected households and uploaded on the WB website. The information will be made publicly available in commune offices and provided to the displaced persons in the form of a summary RAP. Social monitoring reports as well as resettlement External Monitoring Report will also be uploaded on WB website.

Annex B4. Gender Action Plan

Gender Action Plan (GAP) is designed to directly improve women's approach extent to social services, and/or opportunities and economic and financial resources, and/or base urban and rural infrastructure works, and/or enhancing voice and right of women, contributing into gender equality and empowerment to women

1. Legal policy framework

The Law on Gender Equality is considered as the key legal basis of the GoV to enhance gender mainstreaming in the socio-economic development programs.

Law on Gender Equality was issued by GoV on 29th November 2006 aiming at elimination of gender discrimination, creating equal opportunities for both men and women in socio-economic development, man power development and establishing the mutual cooperation and support mechanism for men and women in all aspects as well. Regarding content, the Law on Gender Equality launches the principle of gender equality in all fields of economics, politics, in family and society. Coming together with these principles, the Law also refers to the implementation of measures to ensure gender equality as well as the responsibilities of agencies, organizations, families and individuals in the implementation of gender equality. The strengthening of gender mainstreaming in socio-economic development programs is the measures strategy that creates opportunities for women to have voice and participation in process of decision-making to the critical issue of communities. It is also the measure to give women the opportunity to reach equally and sustainably the benefits of the project and the opportunity to develop capabilities, innovation in management and monitoring; and to limit the adverse impacts and promote the positive impact of the socio-economic development and construction of rural and urban infrastructure programs.

2. Main activities of GAP

The GAP of project is proposed based on the general strategy of enhancement of the extensive involvement of stakeholders in construction and management of irrigation system to ensure all concerns and interests of stakeholders (women, men, the poor, EM and farmers) are satisfied. The plan is also aimed at increasing ability and capacity of women and community in planning, implementation, management and monitoring.

The common feature of those gender actions includes (i) the common design to redress the shortcomings that women face in 5 districts and promote the advantages of women and (ii) specific design to individual issues of each group and circumstances of every district. Those activities are prepared through consultations with stakeholders, especially to local women, and will be implemented during project's implementation. The issues that the project focuses on the most include information disclosure to people and design of actions to attract participation of whole community, men and women from the beginning. This will be implemented by the WUS in coordination with Central Woman Union during project's implementation (construction phase).

The communication/gender training programs combined with building of happy family, domestic violence prevention, development of HH's economics and protection of environment and irrigation canal system will be carried out selectively in each commune, depending on budget and actual condition as well as demand of women and community at consultations. Some training and communication activities will be highlighted in some locations based on analysis of actual situation.

Another key issue is building activities creating employment and increasing income during and after the construction phase of the project, contributing in ensuring stability and recovery of livelihood of AHs. Although the main responsibility for livelihood recovery program for Ahs belong to Provincial and district compensation committee, WUs are responsible for adding the

training programs supporting women business knowledge. The specific practice measurements should pay special attention to HHs affected on land, housing and assets or relocated HHs who are the poor or women-headed HHs and EM HHs.

Furthermore, another indispensable emphasis is communications program warning of the spread of the disease through sexual transmission/HIV. A campaign to raise awareness about HIV/AIDS prevention will be conducted at the construction site and in the affected communes before and during the construction phase of the canal system.

Employment in the construction phase is the issue attracted many people's arguments. The canal construction work will need unskilled labor to prepare the ground, making the earthworks and other activities. The preferential employment of unskilled labor in the locality, where canal is upgraded and constructed, would bring significant social benefits for women, communities and participating households, and it is also a way of compensation for households affected by construction of canals.

It should be noted that a campaign to raise awareness on prevention of HIV infection will be carried out individually by the contractors for their workers. The contractor shall prepare plan for the awareness raising campaign, organize and implement training programs for the workers. Funding for this program will come from the contractor's budget. Women's Union and village officials, along with gender specialist will coordinate, monitor and report on the campaign against HIV/AIDS by contractors and assist them by providing documentation and implementation of activities propagation to their workers.

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As per the Labor Code, all employment for civil work will have to respect GOV commitments to gender equity and promotion of ethnic minorities, including:

- Employment targets for women and ethnic minorities
- No discrimination against the employment of qualified women and ethnic minorities, and;
- No differential wages paid to men and women for work of equal value.

It will need discussion and agreement to include specifications in bidding documents and civil works contracts that require, to the extent feasible, civil works and other contractors for the project to hire a local labor force, especially: i) 30% of the labor force (unskilled laborers) will come from the local project communes; ii) Among 30%, 50% will be women; and iii) Equal work for equal pay and no use of child labor.

Discussion with commune authorities will also need to identify the process to hire local people. Contractors will have to submit to the commune authorities the number of people and the types of tasks needed. The local authorities, in collaboration with the Woman Union (WU), will inform the community and will ask interested people to give their names at the commune level. The list, 50% men and 50% women, will be given to the contractors. The PPMU, district and commune authorities and WU will monitor whether the contractor meet the targets i.e. agreed percentage of local labors and women; wages to be paid by the contractor.

Serving for project management and effective mainstreaming of gender issues, the project will also ensure a minimum of 25% of total staff of CPMU / PPMU to be women. The gender training and introduction to gender action plan will be introduced to all the staff of the PMU,

CPMU and the partners involved. The activities of monitor, examine and evaluate the implementation of the GAP and gender mainstreaming in the activities will be carried out according to the cycle beginning, middle and the end.

3. The Matrix of Gender Action Plan (GAP)

Project Component	Actions
Dam Safety Rehabilitation	<ol style="list-style-type: none"> 1. At least, 50% female will participate the consultation meetings on information regarding projects and build up the action plans for communes. In a such meeting, at least that 25% of participants will be minority women in ethnic minority communities <p>+ Carrying out trainings for core groups including volunteers on communication skills. These will disseminates information on project and communicate the obligations to protect irrigation system. It is possible to integrate media content in activities hold by the happy family clubs. At least, 30% of trained volunteers are women.</p> <p>+ Carrying out communication campaigns on project implementation (be played on the district's and commune's radio, or in writing such as flyers, brochures distributed to hands of households and / or representatives).</p> <p>+ Conduct regular consultations with women and men during whole project implementation process. Formation of a feedback mechanism for the concerns of women to all levels of project leadership timely capture and adjust as needed.</p> <ol style="list-style-type: none"> 2. Building community monitoring groups and these will be responsible for supervision of construction works through their locations. A minimum of 20% of the supervision leadership groups will be female. 3. At least, 20-30% participants of training on reservoir operation will be women. <p>+ The training/consultation should be held according to the time frame proposed that creates favorable conditions for women's participation.</p> <p>+ The consultation meetings, and training information can be used by the Kinh language since minority households in the commune are fluent in Kinh.</p>
Dam Safety Management and Planning	<ol style="list-style-type: none"> 1. Organize some training program on gender, gender equality and environmental protection, the role of women in water resources and environmental protection. 50% participants should be women. 2. At minimum, 50% participants of meetings, discussion on the topic "keep clean the living environment, keep irrigation system" are women. 3. Carry out activities/ campaigns to keep hygienic environment in villages like sweeping, picking up trash, guiding people not to throw garbage into the canal, protecting of canal section not to be contaminated. At least, 30% of participants of each campaigns are male. 4. The contractor should prioritize recruiting the local employees for unskilled labor

	<ul style="list-style-type: none"> + Unskilled labors should be paid equally by gender at the same job; + It is not allow to use child labor in building of civil work; + Contractors will inform CPCs on their needs of unskilled labors; Consider will register at CPCs and CPCs will submit the name list to the contractors. It should be given a priority to the poor and the poor whose female are householders.
Project Management Support	<ol style="list-style-type: none"> 1. At least 25% of CPMU and PPMU staff will be women, and gender sensitive training provided for all project staff. 2. GAP will be introduced for all stakeholders and make sure the compliance GAP during whole implementation section. 3. Implementation for monitoring and supervisor. <ul style="list-style-type: none"> + Develop a simple monitoring form based on the initial HH survey and socio-economic data + Collect and analyze the initial data separated by gender on project's impacts; and conduct regular assessment and make adjustment if needed. + Make final assessment upon the project complete, compare with the initial indicators, especially gender indicators to identify how the gender situation would have changed. + Lessons to be learned. <ol style="list-style-type: none"> 4. Organize final review workshops as well as festival/ art contests among communes in the project areas.

5. Cost estimate

No.	Activities		Cost (VND)
1	The public disclosure of information relating to the project	All of 4 components	20,000,000
2	Organize training on community supervision in the implementation of irrigation projects for the community monitoring committee	Component 1	20,000,000
3	Communication and raising awareness to the people about the risks that may occur during project construction,	Component 1	20,000,000
4	Communication and raising awareness through organizing training for local communities downstream of the risks	Component 2	20,000,000
5	Organize gender training activities	Component 3	20,000,000
Total:			100,000,000

Annex B5. Grievance redress mechanism

In order to ensure that all APs' grievances and complaints on any aspect of land acquisition, compensation and resettlement are addressed in a timely and satisfactory manner, and that all possible avenues are available to APs to air their grievances, a well defined grievance redress mechanism needs to be established. All APs can send any questions to implementation agencies about their rights in relation with entitlement of compensation, compensation policy, rates, land acquisition, resettlement, allowance and income restoration. Otherwise, all APs are not ordered to pay any fee during the grievance and complaints at any level of trial and court. Complaints will pass through 4 stages before they could be elevated to a court of law as a last resort. The Executing Agency (EA) will shoulder all administrative and legal fees that might be incurred in the resolution of grievances and complaints.

First Stage, Commune People's Committee: An aggrieved affected household may bring his/her complaint before any member of the Commune People's Committee, either through the Village Chief or directly to the CPC, in writing or verbally. It is incumbent upon said member of CPC or the village chief to notify the CPC about the complaint. The CPC will meet personally with the aggrieved affected household and will have 15 days following the lodging of the complaint to resolve it. The CPC secretariat is responsible for documenting and keeping file of all complaints that it handles.

Second Stage, District People's Committee: If after 15 days the aggrieved affected household does not hear from the CPC, or if the affected household is not satisfied with the decision taken on his/her complaint, the affected household may bring the case, either in writing or verbally, to any member of the DPC or the DRC. The DPC in turn will have 15 days following the lodging of the complaint to resolve the case. The DPC is responsible for documenting and keeping file of all complaints that it handles and will inform the DRC of any determination made. The DRC must ensure this decision is notified to the AP.

Third Stage, Provincial People's Committee: If after 15 days the aggrieved affected household does not hear from the DPC, or if the affected household is not satisfied with the decision taken on his/her complaint, the affected household may bring the case, either in writing or verbally, to any member of the PPC. The PPC has 15 days within which to resolve the complaint to the satisfaction of all concerned. The PPC is responsible for documenting and keeping file of all complaints that reaches the same.

Final Stage, the Court of Law Arbitrates: If after 15 days following the lodging of the complaint with the PPC, the aggrieved affected household does not hear from the PPC, or if he/she is not satisfied with the decision taken on his/her complaint, the case may be brought to a court of law for adjudication.

The above grievance redress mechanism is subject to be disclosed and discussed with the APs to ensure that the APs understand the process. RP-PMU and DRCs are responsible to follow up the grievance process from the APs.

The procedure described in these four steps complies with the legal process for resolution of disputes in Viet Nam which include: a) Article 138 of Land Law 2003, Article 63, Article 64 of Government Decree 84/2007/NĐ-CP, b) Clause 2, Article 40 Decree 69/2009, and c) regulation on grievance at Government Decree 136/2006/ND-CP dated 14/11/2006.

The External monitoring Agency (EMA) contracted for external monitoring and evaluation will be responsible for checking the procedures for and resolutions of grievances and complaints. The EMA may recommend further measures to be taken to redress unresolved grievances.

As part of the Project internal monitoring and evaluation, PPC and RP-PMU will keep a written record of all grievances and complaints brought forward by APs, as well as their final

resolution. PPC and the RP-PMU will be responsible to ensure that the grievance redress procedures and timeframes are explained clearly to each level of People's Committees. CPO being the Executing Agency will retain the overall responsibility for the resolution of all grievances, and can follow-up resolution of outstanding cases in the Project level especially those that are policy related.

In addition to the grievance mechanism described above, APs may also (or permit representatives on their behalf) raise their concern or complaint with the WB, through the WB office in Hanoi, if APs are still not satisfied with the grievance resolutions at the Project level.

Annex B6. Implementation Arrangements

1. Central level

MARD will delegate responsibility of the Executing Agency to a Central Project Management Unit (CPMU) within MARD's Central Project Office (CPO), which will be led by a Project Director with fully-delegated responsibility for decision making. The CPMU comprises full-time qualified and experienced staff of CPO. Project implementation consultants will assist the CPMU with these tasks.

The CPMU will:

- i Provide overall management and coordination of the project;
- ii Liaise with IAs to carry out all project components;
- iii Coordinate with WB in providing resettlement consultant services for the project;
- iv Support the RP-PMU for updating RPs of the project's components;
- v Consolidate project progress reports on land acquisition and resettlement submitted by the RP-PMU for relevant ministries and WB; and
- vi Recruit and supervise the external independent organisation (or consultants) for external resettlement monitoring.

2. Provincial Level

The Implementing Agency (IA) will be Thanh Hoa Provincial People's Committee (PPC). The PPC will be responsible for issuing all decisions and approvals relating to the implementation of RP including those relating to its formal adoption, unit compensation costs, notices and approvals for information disclosure, land acquisition and compensation payments, allocations of replacement land (if applicable) and grievance redress. The PPC will also be responsible for establishing the Land Valuation Council and allocation of responsibilities to district-based organizations.

Thanh Hoa PPC authorizes Thanh Hoa DARD to be the Owner of the land acquisition, resettlement and compensation component in this Project. Within its authorization, Thanh Hoa DARD established the Resettlement Provincial Project Management Unit (RP-PMU) for Land Acquisition, Resettlement and Compensation of the Project and to undertake the implementation of RPs for the Project.

The RP-PMU will oversee all activities of District Resettlement Committees (DRCs) in regard to the implementation of the RP. The RP-PMU will also be responsible for:

- (i) Updating RPs for the project components, including updating numbers of APs, compensation rates (based on an independent assessment of current market values) and budget, submitting this to the PPC for approval and, once approved, making it publicly available in commune offices;
- (ii) Working with relevant agencies at different levels to ensure timely and effective implementation of RP; this applies particularly to DONRE who will review the overall RPs and recommending PPC approving the land acquisition plans and the unit compensation costs (with assistance from the Land Valuation Council in regard to current market prices, if necessary) and verify compensation plans;
- (iii) Resolving any issues of inter-agency coordination that cannot be resolved by the relevant agencies;
- (iv) Monitor grievances related to the project and calls the attention of concerned government

offices where complaints have remained outstanding beyond prescribed action periods. Resolving any grievances that have been appealed to the PPC;

(v) Ensuring the timely release of funds;

(vi) Design and implement an internal monitoring system that shall capture the overall progress of the RP updating and implementation; and prepare quarterly progress reports for submission to CPMU and WB.

The membership of the RP-PMU will include the Vice-Director of Thanh Hoa DARD who will be the Head of the RP-PMU; Vice-Director of the Provincial Sub-Department of Rural Development will be the Deputy Director of RP-PMU, and other RP-PMU staff.

3. District and Commune Levels

District People's Committee (DPC)

The District of Peoples' Committees will be responsible for the following:

(i) Establish the District Resettlement Committee (DRCs) or empower an existing body (Land Fund Development Centre) of similar function, to assist the RP-PMU in the updating of the RP and implementation of resettlement related activities;

(ii) Assist the RP-PMU in coordinating with the Commune People's Committees and relevant organizations on various resettlement activities;

(iii) Review and endorse the Updated RP prepared by DRC for endorsement to the PPC; and

(iv) Oversee the updating and implementation of the RP within the District.

District Resettlement Committee (DRC)

The composition of the DRCS but will be coming from the District offices and Government bodies, in addition to the representatives of the affected households (including women affected households), District Farmers' Association, Women's Union, and Committee for Ethnic Minorities, if ethnic minority households are among the affected households in the district. The main responsibilities of DRCs are the following

(v) The dissemination of the Public Information Brochure and other publicity material; ensuring that APs are aware of the LAR process.

(vi) Planning and carrying out the DMS and the disbursement of compensation payments.

(vii) The identification of severely affected and vulnerable APs and the planning and implementation of rehabilitation measures for these APs.

(viii) Help identify any resettlement sites and new farming land for APs who cannot remain in their present location.

(ix) Assist in the resolution of AP grievances.

(x) Facilitate the work of the agency appointed to undertake the external monitoring

Commune People's Committee (CPC)

The responsibilities of the CPC relative to resettlement include the following:

(i) Assign commune officials to assist the DRCs in the updating of the RP and its implementation;

(ii) Identify replacement land for the AHs;

(iii) Sign the Agreement Compensation Forms along with the AHs;

(iv) Assist in the resolution of grievances; and

(v) Actively participate in all resettlement activities and concerns

4. Consultant

The Project consultants (i.e., TA Loan consultants and the Project supervision consultants) will assist the CPMU in its tasks, specifically during RP updating and implementation. Said consultants likewise will provide training and capacity-building interventions to the DRCs as needed. TA consultants during RP updating and implementation including:

- a) Resettlement/Social Development Team.
- b) Income Restoration Program.
- c) Replacement Cost Study.

5. Implementation

The implementation process is as follows:

(i) Establishment of the DRCs. The PPC will establish DRCs for the projects, and entrust tasks to relevant agencies and entities.

(ii) Land clearance/boundary setting for the Project. After receiving the PPC and DPCs in revoking land and handing over land to the RP-PMU for implementing the projects, RP-PMU will cooperate with the provincial Department of Natural Resources, Environment and the specialised cadastral agency having a contract with RP-PMU to determine the project land clearance red line and setting out boundary at the field, handing over land to implement resettlement tasks for the displaced persons, in order to clear land for the project. Relevant Offices of Natural Resources, Environment of districts and Commune People's Committees of the project will assign their staff working as members of DRCs to implement this task.

(iii) Engagement of External Monitoring Agency. CPMU will engage the services of an external monitoring agency to carry out independent monitoring and evaluation of RP preparation and implementation activities. Semi-annual progress reports will be submitted by the EMA to CPMU and WB.

(iv) Information campaign before DMS. According to Decree No.181/2004/ND-CP, before land acquisition, within 90 days in case of agricultural land and 180 days in case of non-agricultural land, the DRCS must send written notices to affected land owners in respect of reasons for land acquisition, time and plan of displacement, resettlement options, land clearance and resettlement.

(v) Before census and detailed measurement survey, RP-PMU in cooperation with local authorities of districts and communes will provide project information to residents in the project area. Information will be broadcasted via the public address system of the locality in combination with other multi-media such as radios, press, television, brochures or letters delivered to households to be open posted in public areas.

(vi) Orientation meetings will be held in the project affected commune to notify the affected community about the scope and scale of the project, impacts, policies and rights for all kinds of damages, implementation schedule, responsibilities for organisation, and complaint mechanism. Brochures including (images, photos or books) related to project implementation will be prepared and delivered to all affected communes in the meetings.

(vii) Conduct of Replacement Cost Survey by a Qualified Agency. A qualified agency will be engaged by CPMU to assist PPC in determining the current market price under normal condition of land and non-land assets. If there is a significant difference between compensation price and market price as per replacement cost survey carried out by a qualified agency, PPC will update the compensation unit price according to regulations and implementation guidance of Decree No.197/2004/CP and 17/2006/ND-CP.

- (viii) Detailed Measurement Survey. DMS will be undertaken once detailed design is finalised. These surveys will be the basis for the preparation of compensation plan and for preparation of the RPs.
- (ix) Preparation of Compensation Plan. DRCs are responsible for applying prices and preparing compensation tables for each affected commune. RP-PMU and People's Committees of districts will appraise these tables in respect of prices, quantities of affected assets, rights that the displaced persons are entitled to, etc. before notifying each commune for review and comments. All tables of compensation price application must be checked and signed by the displaced persons to prove their consensus. RP-PMU and DRCs will submit the proposed unit rates as per result of the replacement cost survey to PPC for review and approval. The unit rates to be applied will be based on the approved unit rates of PPC.
- (x) Submission of RP and WB concurrence. RP-PMU will prepare Updated Resettlement Plan, disclose key information of the Updated RP to the displaced persons and submit the same to WB for review and concurrence.
- (xi) RP Uploading on WB website. Once the RP is acceptable to WB, the RP will be uploaded on the WB website.
- (xii) Implementation of RP. Compensation and assistance will be paid directly to the APs under the supervision of representatives of DCARBs, commune authorities and representatives of the displaced persons. Income restoration and relocation plan will be implemented in close consultation with the APs and concerned agencies.
- (xiii) Monitoring. Internal monitoring and independent monitoring will be implemented from RP preparation to implementation. Grievances received will be addressed through the grievance redress mechanism set up for the project. One post-project assessment survey will be undertaken by the EMA within 6 to 12 months after completion of compensation and resettlement activities.

Annex B7: Photos of community consultations



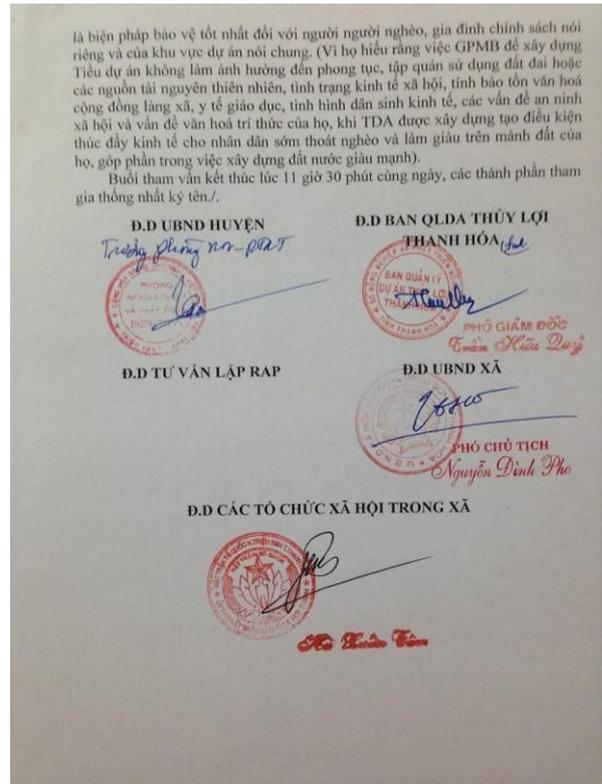
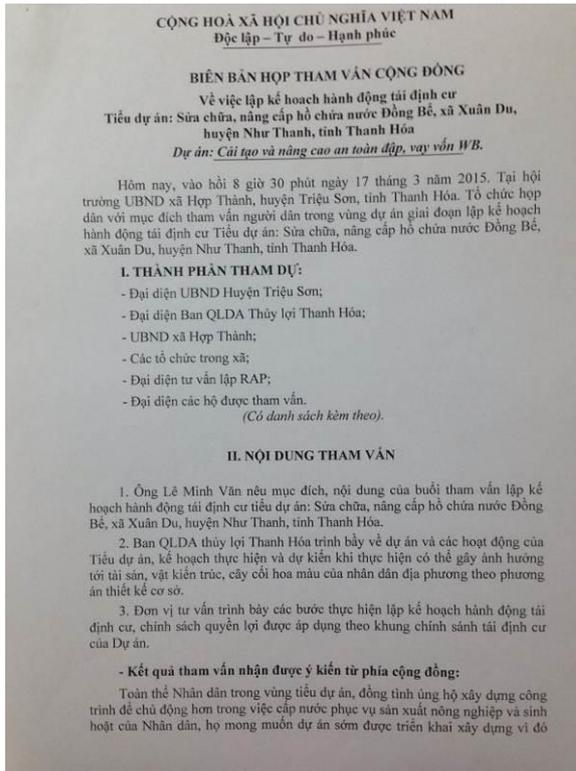
Community consultation in Xuan Du commune



Community consultation in Trieu Thanh commune

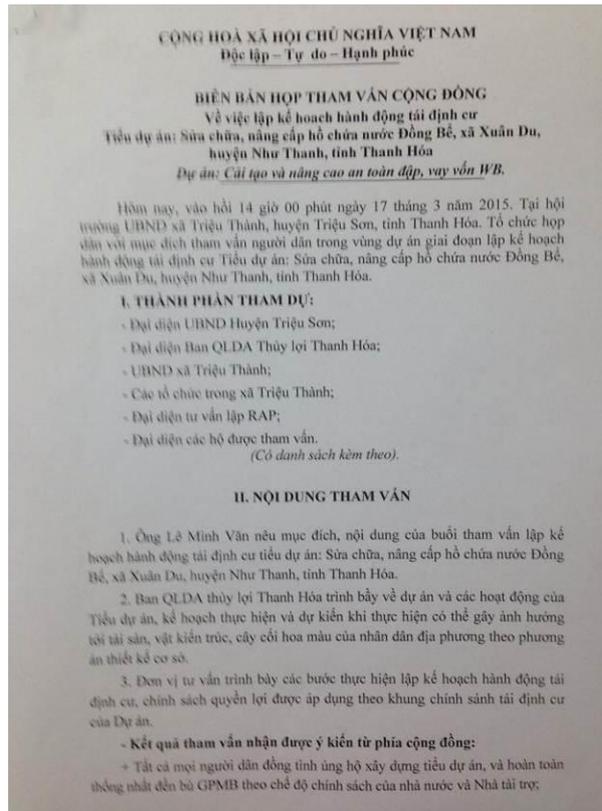
Annex B8. Records of community consultation

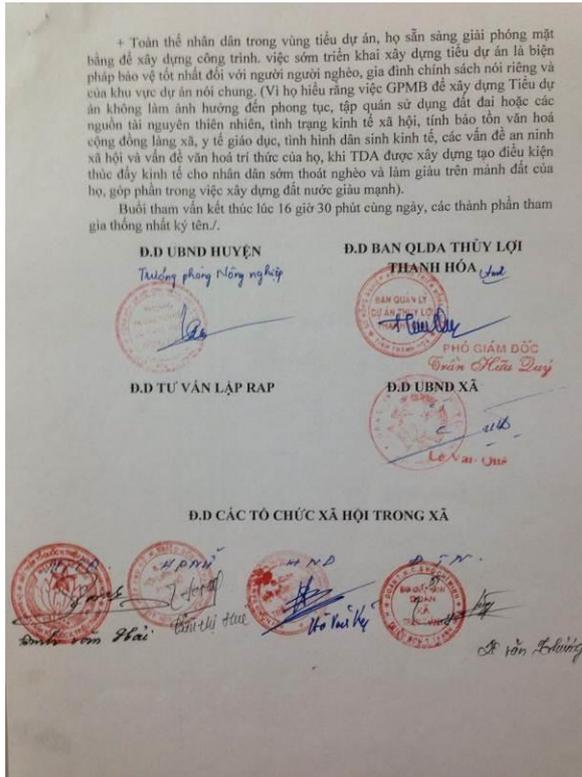
No.	Day	Location	The number of participants	Participants
1	18/02/2015	Trieu Thanh CPC	40	Representatives of the Department of Agriculture and Rural Development; representative of the Department of Natural Resources and Environment; representative of the Department of Culture, Sports and Tourism; representative of the Department of Transportation; representative of the Department of Education; DPC representative Trieu Son; As Thanh District People's Committee representative. Representative CPCs Million Members, Hop Thanh, Xuan Du, Phuong Nghi and represent people in the subproject area.
2	17/3/2015	Phuong Nghi CPC	30	Representatives of the CPC; Commune Fatherland Front Committee representative; associations, mass; representing the people of the villages along the Dong Be reservoir.
3	18/3/2015	Hop Thanh CPC	30	Representatives of the CPC; Commune Fatherland Front Committee representative; associations, mass; representative of the people.
4	19/3/2015	Xuan Du CPC	35	Representatives of the CPC; Commune Fatherland Front Committee representative; associations, mass; representative of the people; households whose land is recovered.
5	20/3/2015	Trieu Thanh CPC	40	Representatives of the CPC; Commune Fatherland Front Committee representative; organizations, social organizations; representative of the people; households whose land is recovered.



DANH SÁCH CÁC HỘ DÂN THAM GIA CUỘC HỌP THAM VẤN CỘNG ĐỒNG
Về việc lập kế hoạch hành động tái định cư
Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Đồng Bể, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa.
Dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB.
(Kèm theo biên bản họp tham vấn cộng đồng ngày 17/3/2015)

TT	Họ và tên	Địa chỉ	Đại diện hộ dân tham gia cuộc họp ký
	Xã Hợp Thành	Thôn Cầu Phụng	
1	Đỗ Văn Sơn		<i>(Chữ ký)</i>
2	Đỗ Văn Nghĩa		<i>(Chữ ký)</i>
3	Đỗ Văn Sơn		<i>(Chữ ký)</i>
4	Đỗ Văn Sơn		<i>(Chữ ký)</i>
5	Đỗ Văn Sơn		<i>(Chữ ký)</i>
6	Nguyễn Thị Xuân		<i>(Chữ ký)</i>
7	Đỗ Văn Sơn		<i>(Chữ ký)</i>
8	Đỗ Văn Sơn		<i>(Chữ ký)</i>
9	Đỗ Văn Sơn		<i>(Chữ ký)</i>
10	Đỗ Văn Sơn		<i>(Chữ ký)</i>
11	Đỗ Văn Sơn		<i>(Chữ ký)</i>
12	Đỗ Văn Sơn		<i>(Chữ ký)</i>
13	Nguyễn Văn Sơn		<i>(Chữ ký)</i>
14	Đỗ Văn Sơn		<i>(Chữ ký)</i>
15	Đỗ Văn Sơn		<i>(Chữ ký)</i>
16	Đỗ Văn Sơn		<i>(Chữ ký)</i>
17	Đỗ Văn Sơn		<i>(Chữ ký)</i>
18	Đỗ Văn Sơn		<i>(Chữ ký)</i>
19	Đỗ Văn Sơn		<i>(Chữ ký)</i>
20	Đỗ Văn Sơn		<i>(Chữ ký)</i>





DANH SÁCH CÁC HỘ DÂN THAM GIA CUỘC HỌP THAM VẤN CỘNG ĐỒNG
 Về việc lập kế hoạch hành động tái định cư
 Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Đông Bể, xã Xuân Du, huyện Như Thanh, tỉnh Thanh Hóa.
 Dự án: Cải tạo và nâng cao an toàn đập, vay vốn WB.
 (Kèm theo biên bản họp tham vấn cộng đồng ngày 14/3/2015)

TT	Họ và tên	Địa chỉ	Đại diện hộ dân tham gia cuộc họp ký
	Xã Triệu Thành		
1	Phạm Xuân Ba	ĐT Đông Mỹ	Phạm Xuân Ba
2	Lê Văn Quý	PB. CT UBND xã	Lê Văn Quý
3	Hà Văn Lộc	KT UBND xã	Hà Văn Lộc
4	Đinh Văn Hải	CT MTTB xã	Đinh Văn Hải
5	Lê Văn Cường	CĐ Văn Phong	Lê Văn Cường
6	Lê Xuân Hào	CN Hợp Tác xã	Lê Xuân Hào
7	Trần Xuân Thủy	KT MTTB xã	Trần Xuân Thủy
8	Trần Hải Cường	CT ĐCĐ	Trần Hải Cường
9	Trần Thị Thu	CT P.V.X	Trần Thị Thu
10	Hà Văn Kỳ	CT UBND xã	Hà Văn Kỳ
11	Lê Văn Trường	ĐT UBND xã	Lê Văn Trường
12	Lê Anh Tuấn	Xóm 4	Lê Anh Tuấn
13	Lê Ngọc Anh	CĐ địa chính xã	Lê Ngọc Anh
14	Lê Thị Tuấn	CĐ Văn Phong xã	Lê Thị Tuấn
15	Phạm Bá Thuận	Xóm 11	Phạm Bá Thuận
16	Lê Xuân Thu	Xóm 11	Lê Xuân Thu
17	Số Sỹ Hiệp	Xóm 9	Số Sỹ Hiệp
18	Như Thị Mai	Xóm 9	Như Thị Mai
19	Trần Xuân Đăng	Xóm 9	Trần Xuân Đăng
20	Bà Văn Thị Bích	Xóm 9	Bà Văn Thị Bích
21	Lê Thị Hằng	Xóm 8	Lê Thị Hằng
22	Lê Thị Ngọc	Xóm 9	Lê Thị Ngọc
23	Lê Thị Ngọc	Xóm 9	Lê Thị Ngọc
24	Đào Chí Dũng	Xóm 9	Đào Chí Dũng
25	Lê Văn Trường	Xóm 9	Lê Văn Trường
26	Lê Văn Tuấn	CĐ địa chính xã	Lê Văn Tuấn
27	Lê Sỹ Cường	Xóm 11	Lê Sỹ Cường
28	Nội Thị Bích	Xóm 11	Nội Thị Bích
29	Nội Sỹ Lâm	Xóm 11	Nội Sỹ Lâm
30	Lê Sỹ Tuấn	Xóm 11	Lê Sỹ Tuấn
31	Lê Sỹ Trí	Xóm 11	Lê Sỹ Trí
32	Phạm Thị Hằng	Xóm 10	Phạm Thị Hằng



CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập – Tự do – Hạnh phúc

BIÊN BẢN

Niêm yết công khai Phương án bồi thường và dự toán chi tiết, tổng thể GPMB thu hồi đất để thực hiện tiểu Dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, tỉnh Thanh Hóa thuộc dự án sửa chữa và nâng cao an toàn đập (WB8) do Ngân hàng Thế giới tài trợ.

Hôm nay, vào hồi 9 giờ 00, ngày 6 tháng 10 năm 2017, tại UBND xã Xuân Du, huyện Như Thanh, chúng tôi gồm có:

I. Thành phần tham gia hội nghị:

1. Đại diện Hội đồng GPMB:

- Ông: ...
- Ông: ...
- Ông: ...
- Ông: ...

2. Đại diện UBND xã Xuân Du:

- Ông: ... - CT UBND - PCTHDGPMB.
- Ông: ... - PCT UBND - TTK.
- Ông: ... - Chủ tịch Hội Nông dân.
- Ông: ... - PCT UBNDTTQ - HD GPMB.
- Ông: ... - CB. ĐC-XD - TV Tổ kiểm kê.
- Ông: ... - Trưởng thôn Xuân Hưng.
- Ông: ...

3. Đại diện cho ... hộ dân bị ảnh hưởng khi thực hiện dự án.

- Ông: ...
- Ông: ...
- Ông: ...
- Ông: ...

II. Nội dung:

Chúng tôi cùng nhau niêm yết, công khai phương án bồi thường và dự toán chi tiết, tổng thể GPMB thu hồi đất để thực hiện tiểu Dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, tỉnh Thanh Hóa thuộc dự án sửa chữa và nâng cao an toàn đập (WB8) do Ngân hàng Thế giới tài trợ với các nội dung cụ thể như sau:

1. Công khai và gửi đến tận tay các hộ bị ảnh hưởng phương án bồi thường và dự toán chi tiết, tổng thể GPMB thu hồi đất để thực hiện tiểu Dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, tỉnh Thanh Hóa thuộc dự án sửa chữa và nâng cao an toàn đập (WB8) do Ngân hàng Thế giới tài trợ.

2. Niêm yết công bố công khai nội dung phương án bồi thường và dự toán chi tiết, tổng thể GPMB thu hồi đất để thực hiện tiểu Dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bể, tỉnh Thanh Hóa thuộc dự án sửa chữa và nâng cao an toàn đập (WB8) do Ngân hàng Thế giới tài trợ, đến toàn thể nhân dân trong các thôn nơi có đất của các hộ bị thu hồi GPMB bằng các hình thức: Niêm yết công khai tại trụ sở UBND xã Xuân Du, Nhà văn hóa thôn Xuân Hưng, toàn bộ nội dung phương án nêu trên trong thời gian 20 ngày.

3. Ý kiến thảo luận của các hộ dân sau khi nghe thông qua và nghiên cứu phương án bồi thường, hỗ trợ, tái định cư:

- Hộ ông Ty: Lê Quang Quyết
 Cây mía được trồng gần 30 m/cây và đã
 trồng 2 năm nay trên 45 m² diện tích và gần
 thật lập nên gần là 18 m² cây
- Hộ ông Nguyễn Văn Thái
 Ông có 2 sào đất từ năm 1984 và hiện nay
 đang chờ thi công lập đất phải có ý kiến
 của gia đình
- Hộ ông Bí: Hồ Thị Đt
 Đất lập nên từ 45 m² diện tích thửa (hồ
 gia đình)

III. Kết luận:

- Trả lời ông: Ty: Lê Quang Quyết
 áp dụng theo chủ trương bồi thường và ưu đãi
 quy định nên chấp hành theo
- Trả lời ông: Nguyễn Văn Thái
 Nếu sau này đất bị thu hồi thì không phải
 kiến kế phải có ý kiến của gia đình
- Trả lời ông: Bí: Hồ Thị Đt
 Xuân Du có 2 sào từ 40 sào đất hiện tại nhà
 bị thu hồi 2 sào 30 m² và hiện tại
 vẫn vẫn chờ thi công quy định của pháp luật

- Các hộ dân tham gia hội nghị ngoài những nội dung nêu trên hoàn toàn đồng ý với nội dung của phương án bồi thường và dự toán chi tiết, tổng thể GPMB thu hồi đất để thực hiện tiểu Dự án: Sửa chữa, nâng cấp đảm bảo an toàn

hồ chứa nước Đồng Bê, tỉnh Thanh Hóa thuộc dự án sửa chữa và nâng cao an toàn đập (WB8) do Ngân hàng Thế giới tài trợ và đồng ý nhận kinh phí bồi thường, hỗ trợ khi Nhà nước thu hồi đất để thực hiện dự án ngay khi có quyết định phê duyệt của các cấp có thẩm quyền để dự án được thực hiện đúng tiến độ đã đề ra.

Nội dung niêm yết công khai phương án bồi thường và dự toán chi tiết, tổng thể GPMB thu hồi đất để thực hiện tiểu Dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đồng Bê, tỉnh Thanh Hóa thuộc dự án sửa chữa và nâng cao an toàn đập (WB8) do Ngân hàng Thế giới tài trợ, là đúng thực tế. Chúng tôi cùng nhau thống nhất lập thành biên bản này báo cáo UBND huyện được biết.

Biên bản lập xong cùng, thông qua cho các thành phần có tên trên cùng nghe thống nhất ký tên. Biên bản được lập thành 06 bản mỗi bên giữ 01 bản có giá trị như nhau làm cơ sở tổ chức thực hiện./.

ĐẠI DIỆN HỘI ĐỒNG GPMB

[Handwritten signatures]
 Đỗ Ngọc Thìn Trịnh Văn Ngọc Cao Thị Tuấn

ỦY BAN NHÂN DÂN XÃ XUÂN DU

CB.Địa chính-XD MTTQ Hội Nông dân Chủ tịch

[Handwritten signatures]
 Nguyễn Thị Kiên Lê Xuân Học Trần Văn Nguyễn Xuân Tiến

ĐẠI DIỆN THÔN

[Handwritten signature]
 Nguyễn Xuân Tiến

ĐẠI DIỆN CÁC HỘ CÓ ĐẤT BỊ THU HỒI

[Handwritten signatures]
 Nguyễn Văn Thái Nguyễn Văn Tiến Lê Văn Tuấn Nguyễn Thị Thu (vợ ông Hải)

Annex B9. outline of implementing emergency preparedness (EPP) for Dong Be reservoir

I. OVERVIEW OF EMERGENCY PREPAREDNESS PLAN

The existence of large dams and reservoirs at the upstream of the residential areas requires the preparation of an emergency preparedness Plan relating to the professional for each dam. The purpose of the emergency preparedness Plan aims to assist the authorities responsible for public safety issues in order to take the proper and necessary measures for preventing injury and minimizing material damages by the accidents predicted in case of occurring the dam failures.

Each dam, reservoir and risk-containing area have its own characteristics, and so each emergency preparedness Plan shall be prepared taking into account the specific conditions of such work. However, there are some general issues need to be mentioned for each work in need of the emergency preparedness Plan.

So far, the Consultant has yet to determine the guidelines of Vietnam on the issue of the requirements for the preparation of emergency preparedness Plan or the directives such as the responsibilities relating to the preparation and implementation of emergency preparedness Plan shall be handed over to anyone.

Finally, an sample estimation for making the emergency preparedness Plan has also been created. It is more difficult to determine the problem of benefit. Generally, it should be considered that if the dam safety management is better and the emergency preparedness Plan is made for all existing dams, the average number of accidents caused by the floods shall be reduced.

II. GENERAL REQUIREMENTS FOR EMERGENCY PREPAREDNESS PLAN

To turn an emergency preparedness Plan into a useful tool for prevention of disasters and mitigation of disasters, it is necessary to have the certainly legal tools in order to allow the relevant authorities responsible for the formulation and implementation of emergency preparedness Plans to implement their necessary powers. These powers shall be decentralized and specified for the urgent conditions relating to legislation. If the current law is proved to be insufficient for this purpose, it is necessary to consider the adjustment of the legal framework.

In principle, the organizations responsible for the management and the operation and maintenance of a certain dam shall also have the primary responsibility for making the emergency preparedness Plan. These organizations should have the reasonable knowledge relating to the risks associated with dams and reservoirs of a certain work. In case of project for supporting the water resources of Vietnam, the hydraulic works management and exploitation Companies shall take primary responsibility for the formulation and implementation of emergency preparedness Plans for each certain work .

The provincial People's Comitees, where the dams are located in, shall be able to play a supervisory role. Other relevant authorities can also be entrusted to set out the rules and regulations, and to make, implement, inspect and promote the emergency preparedness Plans.

The preparation of an emergency preparedness Plan in detail for a dam and reservoir requires the proper maps, data relating to river, dam, topography, hydrology, rural and urban infrastructure, population and the physical assets at risk, etc as well as the special skills and computer programs to assess the potential impacts of various risk scenarios. These tools are not available in the hydraulic works management and exploitation Companies and before making the emergency preparedness Plans of such Companies, it is necessary to have a certain investment and extensive preparation. There are many methods for dealing with this issue, and

they can support the hydraulic works management and exploitation Companies through the National Dam Safety Authority expected or relevant professional Consultants or institutes.

Since there is no (extensive) emergency preparedness Plan for most of the dams and reservoirs, the costs related to the preparation and implementation of emergency preparedness Plans funded by the budget have not been allocated.

If additional resources for the budget can not be from the people, then it is predicted that the relevant authorities shall take advantage as much as possible the existing resources such as human resources, equipment and telecommunication and communication devices etc. This would require a very detailed plan and the close coordination among the telecommunication and communication actions.

The emergency preparedness Plan should be updated annually and submitted to the Provincial People's Committee for approval.

III. EMERGENCY PREPAREDNESS PLAN FOR DONG BE DAM

Currently, the downstream of Dong Be dam is settled and lived and stably produced by the people (including 500 people and 1000 ha of land), and a segment of the Provincial Road 506. If the dam is broken, the losses of lives and property of the people are immeasurable.

IV. OVERVIEW

After completion, the work is expected to hand over to the company of irrigation work management and use for management, this company is responsible for preparing the emergency preparedness Plan for the relevant dams and reservoirs. The emergency preparedness Plan must be prepared on the basis of close cooperation with the provincial authorities responsible for flood prevention, and shall be submitted the Provincial People's Committee for approval. This plan must be updated and the submitted for approval once a year before the flood season.

An outline of the emergency preparedness Plan, with its form is the list of items to be checked with a series of headers relating to the Emergency Preparedness Plan and the actions required. The list of items to be checked can be used for making the emergency preparedness Plan in the future. In general, the following main activities are particularly noticeable upon making (emergency) plans for potential problems of dam.

V. STRENGTHEN SUPERVISION OF HYDRAULIC WORKS MANAGEMENT AND EXPLOITATION COMPANY

The Emergency Preparedness Plan should be started with the detailed guidelines on monitoring the dam and ancillary works of the hydraulic work management and exploitation company's employees, especially the monitoring in the periods of extreme rain in the basin or in the case of the reservoir water level rising. The guidelines should detail the special points in need of observe, especially in the case of rapidly rising the reservoir water level. The work of monitoring consist of the regular observe of seepage along the dam foot and in any position along the dam in the place where is expected that the seepage shall only occur upon the high reservoir water level. Depending on the number of parameters, for example:

- The heavy and widespread rainfall in the basin for a prolonged period;
- The rainfall in the basin of water collected in a short period;
- The water level of the reservoir and the rising of water level in the reservoir;
- The increase of seepage; or
- The cloudy seepage in the downstream slope or at the dam foot;
- The movement of the dam crest and the downstream of dam.

The hydraulic work management and exploitation company should calculate a reasonable alarming level in more detail, and adjust according to the actual situation.

VI. DEFINITIONS AND NOTICE OF ALARMING LEVEL

For each alarming level or a specific situation, it is necessary to initiate the measures that would be widely deployed in the future when the conditions become deteriorated and the situation becomes more serious. These measures shall start with the internal information of the hydraulic work management and exploitation company, and increase in terms of intensity along with increase of the severity of the situation, for example:

- The hydraulic work management and exploitation company's management department must be continuously informed;
- Suspend the annual leave of a certain number of staff of the hydraulic work management and exploitation company;
- Police and local rescue forces must be in alarming condition;
- Some certain staff and operators with the devices transferred to the dam or other locations;
- Notify through local media and radio stations;
- The officials of Provincial People's Committee, the military, the public work department and other departments must be in alarming condition, and must be instructed;
- Mobilize support units (firefighting forces, the army, the red cross society) and equipment;
- Public information and ensure that everyone is informed;
- Block some certain routes, stop or strengthen bus and train;
- Mobilize helicopters, boats and other transport equipment;
- Prepare shelter;
- Request removal for the most dangerous areas;
- Request the entire removal;
- Notify the emergency situation.

The alarming level should be clearly defined, and the definition should be distributed to all staff and agencies concerned immediately after the approval of emergency preparedness Plan. The people need to be fully aware of the alarming levels which shall be clearly informed to them by sirens or similar things. After consulted by the local authorities, the hydraulic work management and exploitation company shall be guided to achieve the best results for alarming people.

VII. DATA COLLECTION

To establish an emergency preparedness Plan, firstly the hydraulic work management and exploitation Company require detailed maps of the entire region which can be affected. The buildings, roads, bridges, high and low areas, dam banks, canals, etc must be presented on the map. Especially for the preparation of dam failure analysis, it is necessary to have the detailed information, including cross section of the river basin, the main obstacles for the progress of a flood wave in the flow of the river or the mudflats, sunken areas can temporarily act as reservoirs, dykes, water dividing roads, ditches, creeks and other topographical factors which can affect flood wave. The terrain maps must extend beyond the project area in order to determine the approach road and areas and works (such as schools and community halls) which can be used as a place for shelter and a place of relocation for the victims of the flood. The hospitals near the flooded areas must be identified and be informed on the tasks which they may have in the event of injury from broken dam problem.

VIII. BROKEN FAILURE ANALYSIS

It is necessary to conduct a dam failure analysis to map the boundaries of the area that may be affected by the flood. The analysis is recommended to conduct many different conditions such as assumption of the normal water level, the full reservoir water level with maximum flood load, a quickly open hole in the dam body, a lot of preliminary cases such as an alluvial flood, and the relatively dry conditions, high surface water flows at the same time from the river tributaries in the downstream.

Moreover, the computer programs, upon analyzing dam failure, can be run on multi coefficient of roughness and possible measures to reduce or otherwise affect flood conditions in some certain locations such as decrease of flooding speed near the residential areas, or lifting to the roads to access or exit some certain areas.

The impact of the obstacles in the flow of a river or mudflats should also be evaluated in the regulatory view to limit the flooding level on the river, not only in the catastrophic cases but also for “normal” extreme point floods. The implementation of most possible measures to minimize the impact of extreme point flood discharge cannot be conducted in the short term, it must be used as tools for planning and policy for the river basin in the future, or it must be gradually implemented.

IX. FLOODING MAP

Dam failure analysis must identify clearly the most dangerous areas in case of occurring disaster. Results of the analysis shall be presented on the flooding maps, describe the possible depth, flood velocity (as a sign of potentially dangerous conditions), the progression of waves interrupted in the basin, and mention the time for salvage activity.

When a preliminary dam failure analysis may briefly indicate above mentioned flooding parameters, sooner or later the dam failure analysis shall be upgraded under the same relevant and better conditions. Especially the influence of the embankment (slightly) improved which is used for road, railway, irrigation canal, flood prevention, sediment piles along the canal, is also notable. In such locations, the maximum flood velocity can also increase making it impossible to access the embankment or the roads and causing the landslides destroying a part or whole of this embankments. A network of high obstacles in sunken areas may divert flood flows and cause more serious conditions at the locations where these conditions are not desired.

The flooding maps for selected conditions must be available to submit to the important agencies relating to the physical planning of the area, and submit to the relevant authorities relating to the salvage activities if possible (province, city, police, firefighting, hospital, military, etc.). Such maps need to be updated and redistributed in cases of determining the conditions with the important changes. Number of agencies and organizations receive such maps (and other information) depend on the severity of the conditions, and generally depend on the water collecting function of the reservoirs, the dam height and areas directly affected.

X. ORGANIZATIONAL ISSUE

Although the hydraulic work management and exploitation Company shall be responsible for preparing and maintaining an emergency preparedness Plan, most of the activities after a catastrophic event shall be carried out by other agencies and organizations. The task of the hydraulic work management and exploitation Company for the dams and reservoirs is that preventing the critical situations. It is assumed occurrence of emergency case, the hydraulic work management and exploitation Company shall take all primary measures possible to avoid a disaster. As long as the conditions become more serious, the hydraulic work management and exploitation Company shouldn't wait for being warned and assigned by the higher levels. In

case of occurring those conditions, it is necessary to clearly define the person who is responsible for their own job. A detailed plan with an extended information system must be continuously sustained until occurrence of disaster.

Firstly the hydraulic work management and exploitation Company must prepare an Emergency Preparedness Plan for the internal purposes in the flood conditions and in case where the expression of the dam shall require more attention. The internal organization of the hydraulic work management and exploitation Company shall immediately deal with at the first alarming level, and inform higher authorities about the concerns and the consequences in case of occurrence.

In the next alarming higher level, it is possible to need the support of other organizations, and a responsibility can be transferred to such organizations. For these cases, it is necessary to have a detailed planning, and the information shall be ready for the necessary actions. It is necessary to be aware that in the bad weather condition, there would have no electricity, the roads can be flooded, the telephone line can be damaged, and the publication of print, photocopy of maps and planing documents or other directives cannot be implemented.

When the situation become serious, the functional authority of the province shall implement all their responsibilities, and shall need to be provided the plan for the actions to be implemented, which were established in the previous stage. These plans should include organizational issues for emergency activities expected, and should state clearly the responsible lines and communication for all activities and actions decentralized (but well-coordinated), depending on the specific situation.

The competent authority under the emergency preparedness Plan responsible for a number of activities and certain inputs in any alarming phase should be fully informed for any changes of the emergency preparedness Plan. And similar to the organizations designated to support activities such as means of transportation, equipment, material resources and other inputs required in the case of occurring disaster.

XI. PROCEDURES

In the lowest alarming level, the relatively simple internal application procedure of of the hydraulic work management and exploitation Company shall remain in effect as action procedure for the monitor and management of dam and ancillary works. When the situation become worse, and the next alarming level starts, the normal operating procedure of the hydraulic work management and exploitation Company shall be supplemented and replaced by a new procedure focusing on the implementation of the emergency preparedness Plan.

The management guidelines of main dam shall be valid, and the dam management shall be implemented by the experts of the hydraulic work management and exploitation Company as specified in the procedure of the hydraulic work management and exploitation Company for that year. Other agencies have no right to make temporary decision where spillway gate or other inlet or outlet gates shall be opened or not.

The procedure for the higher alarming level shall transfer the entire responsibility for the implementation of emergency preparedness Plan to the higher authority levels (preferably PPC). These procedures shall be clearly allocated for the responsibility and the right for the certain agencies with the cooperation or support of emergency activities.

The emergency preparedness Plan should include the clear organization plans for easily following the levels of emergency activities. These plans should also include the main telecommunication and communication lines and procedures in need of following for some certain activities, for example requesting the central government to help and requesting the military forces for more support.

In case where the situation become deteriorated, and the displacement becomes the only option, the area to be relocated shall be protected by the police or other armed forces. The emergency preparedness Plan also proposes some provisions for these conditions, and they shall be discussed with the executive agencies which are responsible for maintaining order and rules. The last provisions should include arrangements for taking the necessary forces (such as the red cross society and similar forces) to the higher residential area in the heart of flooded areas.

XII. COMMUNICATION

Communication is a vital part of any emergency plan. In the very special conditions, most of the means of communication can be damaged. The emergency preparedness Plan should take into account this fact, and identify the means of communication that can be used in the emergency conditions.

The normal telephone lines and mobile phones can not be used in extremely emergency conditions. The communication via radio can solve somehow of the problem. In this regard, the mobilization of police and the amred forces involved in making emergency preparedness Plan is vital.

First of all, the communications between the field of dam and the headquarters of the hydraulic work management and exploitation Company must be ensured safety. These communication lines must be active at all times, and the information about the water level of reservoir can be read at the hydraulic work management and exploitation Company's headquarters at any time. During the regular dam inspections, the dam safety inspector must pay attention to the means of communication established for each dam (or saddle dam).

Secondly, the communication with higher levels should be well structured. When the dam's situation become deteriorated, and when the responsibilities are beyond the capacity of the hydraulic work management and exploitation Company, a higher authority must be able to smoothly receive the responsibilities (or part) and continue to cooperate in the implementation of the emergency preparedness Plan. In such situation, the means of communication are in need of capacity of receiving multiple incoming calls.

The contacts and communication procedures must be clearly and fully documented. All agencies, where have primary responsibility for making emergency plan, shall be received a copy of these procedures as well as the directives and supporting guidances.

XIII. TRAINING AND EXERCISE OF EMERGENCY PREPAREDNESS PLAN

An emergency preparedness Plan shall include the training and exercise of a selected number of components in the emergency preparedness Plan. It is best to have a need analysis as the basis for the program. The exercise program must be prepared in conjunction with other relevant agencies. The training and exercise shall focus on the components that the parties concerned are not familiar.

XIV. THE PARTICIPATION AND INFORMATION OF COMMUNITY

The main beneficiaries of the emergency preparedness plan are the general population who can be affected by the risks of an incident which can occur on the dam. In order to achieve their full cooperation, then the raising of public awareness and support received from the public are essential.

The emergency preparedness Plan must mention the issue of public awareness as an important content, because of the lack of public awareness and support and involvement of the public, all emergency preparedness Plans shall become useless.

After established and approved the draft of the emergency preparedness Plan by the Provincial People's Committee, the public must be informed about the characteristics of the dam, the risks can occur, the measures are implemented and plans are prepared to avoid the negative impacts or mitigate the consequences. For this purpose, the types of information shall be conveyed to the public through the media such as posters and informing to the students, information on Televisions, announcing in the local newspapers and other mass media.

XV. LEGISLATION

After all the plans are established, it is necessary to analyze whether the proposed measures have been backed by a full legal framework or not. In case where the legal system is somehow defective, requesting the competent authority to immediately start adjusting the current law in order to allow the implementation of essential measures. The legislation shall give the authority with the rights to take necessary measures in order to deal with the emergency conditions.

XVI. REPORT

The emergency preparedness Plan should also include requirements for annual report on its objectives, the process of implementation and the problems encountered. The People's Committee of the provinces and the Ministry of Agriculture and Rural Development need this information to be able to identify what is a common problem to be solved, and learn from the hydraulic work management and exploitation Companies. The experience gained is to draw in an adjusted approach for the problem of establish and implementation of the emergency preparedness plans.

The annual reports should be brief and include:

- The plans of the previous year;
- The training and practice has been carried out, the results and recommendations for upgrade and improvements;
- The adjustments required for the emergency preparedness Plan of next year;
- The training program for next year;
- The information and data changed;
- Finalization of the budget of the previous year and the budget of the following year.

XVII. ESTIMATION RELATING TO THE EMERGENCY PREPAREDNESS PLAN

A series of actions and requirements determined above need an estimated budget and allocated approximately one year before the planned activities are implemented in practice.

The degree of costs depends on many conditions. Apart of the costs can be covered from the operating expenses of the hydraulic work management and exploitation Companies, but others may need to be covered by the budget as well as additional funding, and must be allocated specifically for the establishment and implementation of emergency preparedness Plans. The specific costs related to an emergency preparedness Plan include the following items:

- Public information materials;
- Computers, softwares for dam failure analysis;
- The printed materials, instructions, reports, flooding maps, and other materials;
- Means of enhancing communication (telephone, radio);
- Additional transport costs;

- The costs related to the implementation of training and exercise.
- Costs are summarized in the table below:

Table 6-1. Estimation of EPP for 5 years

Year	Basic cost (million VND)	Human resources cost (million VND)	Cost of office operation (million VND)	Total cost (million VND)
1	50	120	30	200
2	20	120	30	170
3	5	120	30	155
4	5	120	30	155
5	5	120	30	155
Total	85	500	150	635

These costs as mentioned above do not include costs for local consultants, because it is not clearly known that the local consultants shall provide services to some extent through this project component.