PEOPLE COMETTEE OF BINH DINH PROVINCE
DEPARTMENT OF AGRICULTURAL AND RURAL DEVELOPMENT

DAM REHABILITATION AND SAFETY PROJECT (DRSIP)

REPORT
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS (ESIA)

REPAIR AND IMPROVEMENT FOR SAFETY OF THACH BAN RESERVOIR, BINH DINH PROVINCE

Binh Dinh, 5/ 2015

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LIST OF ABBREVIATIONS

AH	Affected Household
B, Bt	Width
BĐ	Sludge sample
BDARD	Binh Dinh Department of agricultural and rural development
Binh Dinh DoNRE	Binh Dinh Department of natural reseources and environmental
BOD	Biochemical Oxygen Demand
BTNMT	Ministry of natural reseources and environmenta
Co.Ltd	Limited company
COD	Chemical oxygen demand
CPC	People committee of Commune
CPO	Central Project Office (MARD)
CSC	Construction Supervision Consultant
CV	Type of vehicle
D600	Type of tube, referring in dimension
DARD	Department of Agriculture and Rural Development (province level)
dBA	Decibel (noise measurement unit)
DCST	Department of Cultural, Sport and Tourist (province level)
DO	Dissolved Oxygen
DO	Dissolved oxygen
DO gasoline	Vehicle gasoline
DoC	Department of Construction (province level)
DOET	Department of education and training (province level)
DoIT	Department of industrial and trade (province level)
DoNRE	Department Of Natural Resources and Environment (province level)
DPC	District People's Committees
DRSIP	Dam rehabilitation and safety project
EAP	Environmental Action Plan
EC	Electronic conductivity
ECOPs	Environmental codes of practice
EMDP	Ethnic Minority Development Plan
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMoP	Environmental and Social Management Framework
Fig.	Figure
FS consultant	Feasibility study consultant
GDP	Gross domestic production
GoV	Government of Vietnam
HH	Household
IEMC	Independent environmental monitoring consultant
IMC	Irrigation Management Company
IPM	Integrated Pest management
ITCZ	Inter Tropical Convergence Zone
IUCN	the International Union for Conservation of Nature
IWE	Institute for Water and environmental
K	Compact factor
KK	Air sample
L	Litter

LURCs	Land User right committe
M200	Concreat graged 200
MARD	Ministry of Agriculture and Rural Development
MCM	Million cubic meters
Mill.	Million
MONRE	Ministry of Natural Resources and Environment
MPN	Most probably number
N	North
ND-CP	Legalised document of Vietnam government
NG	Welling water sample
NH	Reservoir water sample
NM	Surface water sample
NN	Ground water sample
ODA	Official Development Assistance
OP/BP	Operating safeguard Policies of the WB
PCR	Physical cultural resources
pH	Acidity
Pic.	Picture
PMU	Project management Unit
PPMU	Provincial Project Management Unit
QCVN	National Technical Regulation
QH13	National assembly
RAP	Resettlement Assessment Plan
RPF	Resettlement Policy Framework
SA	Social assessment
SS	Suspended solid
TCVN	Vietnam Environmental Standards
TDS	Total dissolved solids
TL	Provincial road
TSS	Total suspended solid
TV	television
US$	United state dollars
UXO	Unexploded Ordinance
VFF	Vietnam Fatherland Front Committee
VND	Vietnam currency (dong)
WB	World Bank
WHO	World Health organization
WUA	Water User Association

SUMMARY

1. The "***Repair and Improvement for Safety of Thach Ban Reservoir***, ***Binh Dinh Province"*** is one of the sub-projects being considered for first year implementation under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). This Environmental and Social Impact Assessment (ESIA) was undertaken in order to comply with the requirements of the World Bank's Environmental Assessment Policy (OP/BP4.01) and Vietnam's Law of Environment Protection 2015 (LEP-2015).

2. ***Background:*** Thach Ban reservoir is located in Thach Ban Dong-Cat Son commune- Phu Cat district, Binh Dinh Province. It is 7.5km far from national highway 1A in the West and 40km to Qui Nhon City in the North. The reservoir was built in 1978 with small scale; the designed water store in the reservoir is 772,000m^3. The catchment's area of the reservoir is of 3.0km^2, the construction classified in category II by Vietnam dam classification. The headwork cluster and auxiliary works of Thach Ban reservoir are consisted of four main componnents including:

   - ***Dam:*** It is homogeneous earth dam with the eight of 12.1m, Crest elevation is at +52.50m, length and widthat dam crest are 897 m and 4.0m, respectively.

   - ***Spillway:*** principal spillway with B=30m, following by a chute with 50m and riprap stilling basin

   - ***Outlet works:*** it was built in 1990, the location is on the middle of the embankment, at elevation +43.50m and made of reinforced concrete structure. It is box sewer with regulator tower gate in downstream slope

   - ***Access and management road:*** Route to the dam from Son Loc bridge, current width is of 2.5m; length L = 845.4m. It is earth filled, is slippery in rainy season and difficult to travel.

3. ***The main purposes of the subproject***

The main purposes of upgrading and improvement safety of dam and reservoir are: (i) Ensure the safety of the reservoir during operation, protect 80 households and local infrastructure of Thach Ban Dong village-Cat Son commune; (ii) Ensure original design goals of supplying water for 130 ha of rice and crop plants in current irrigated areas of villages Thach Ban Dong, Thach Ban Tay-Cat Son Commune, modernization of operational management;. The subproject "Repair and Improvement for Safety of Thach Ban Reservoir, Binh Dinh Province" had been proposed for investing and funding by the World Bank, under Dam Rehabilitation and Safety Project (DSRIP)

The subproject has been designed and will be implemented in lines with environmental and social management framework (ESMF) and dam safety framework the Dam Rehabilitation and Safety Project. The Project will also comply with applicable regulations as well as criteria of Vietnam. This Environmental and Social Impacts Assessment (ESIA) report is prepared to assess the project's potential impacts and propose the measures to avoid or mitigate these impacts. Accordingly, an Environmental and Social Management Plan (ESMF) is prepared with proposals on institutional arrangements for impacts management, environmental

monitoring and supervision, reporting requirements, capacity building as well as budgeting for implementation

4. The existing headwork conditions

Due to long time use, the construction has seriously deteriorated. The problems of erosion, water leakage of Thach Ban reservoir included (i) the downstream slope is facing gully erosion, water seepage through the embankment, the left and right abutment of dam and main structure are seriously damaged (ii) The shape of upper stream slope is dramaticallydistorted, localised erosion on the top of the dam made dam narrowed; (iv) sedimentation of the stilling basin; (v) the outlet works are not working and causing water lost, the valve to control water flow has been corroded and difficult to operate. (vi) The 845.4 m earthen access and management road (2.5m wide) is difficult to travel and slippery in rainy season. Although several items had been reinforced, many items of the work have been degraded, capability to store water is low, and there is safety risk during operation.

5. Sub-project description: the proposed civil works under the subproject are: (i) fix seepage in embankment and foundation; (ii) Construct new training spillway walls and rehabilitate concrete spillway; (iii) Replacethe old outlet works with a new concrete structure which is 60m long; (iv) upgrade the 845 access and management road. Material such as cement, steel, etc will be purchased from warehouses in Quy Nhon City, 30-40km distance from the construction site. Around 20-30 workers will be mobilized in the short time (1 month) for preparation and land clearance period. The maximum of workers will be mobilized for the intensive construction. The number of workers is 80 people. 53 set of machines and vehicles will be used for the construction including: bulldozers (110 Cv), excavators, trucks, mixers (250litre), concrete pavers, generators, water pumps, etc.

6. Results of Environmental and Social Screening: Based on environmental and social screening results, the sub-project is belong to Category B under the World Bank classification system. The sub-project is not located within or near critical natural habitats and there are no rare or endangered species in the area. There are also no sites, structures or monuments with cultural, religious or historical signficance within and in the vicinities of the construction site. In terms of ethnic minorities, about ninety-nine percent of the people in the area belong to the Kinh ethnolinguistic stock which currently constitutes the mainstream population of Vietnam and there are no ethnic minorities among those affected by the sub-project. The dam, having a height of 12,1 meters and a reservoir capacity of more than 700.000 cubic meters, is considered a small dam under the World Bank Safety of Dam Policy.

7. The potential impacts of the sub-project:

The project will bring in considerable benefits to local community, such as: (i) Stabilize water supply, facilitate agriculture production and improve the life of local people; (ii) Dam safety improved will be secure about the life and production of people in downstream; (iii) Improve the landscape and microclimate conditions of the reservoir.

However, the subproject will also cause some potential adverse impacts and risks of natural and social environment relating to: (i) Land acquisition, and trees are cut off and vegetation cover are removed during site clearance, (ii) impacts of construction activities such as impacts on agricultural production due to water supply interruption, waste generation, dust, noise and

vibration from excavation, compaction and transportation, water pollution, disturbance to drainage, sedimentation, increased erosion potentials, water supply interruption, safety risks for the workers and community etc. and (iii) operation of the reservoir such as reservoir sedimentation, water polluted by substance degradation or pesticided use, risk of dam safety or water lost, etc.

Land Acquisition. One commune, the Cat Son would be affected by the proposed project. The commune comprises of three villages including Thach Ban Dong, Thach Ban Tay and Hoi Son villages. 23 households (98 people) will be affected by the proposed sub-project due to land acquisition. In which, 1,611m^2 of land (including: 677m^2 garden land, 588m^2 annual crops land owned by 12 households and 346m^2 public land managed by Cat Son commune)will be acquired permanently for widening the access road. 142,893m^2 of land (including 132,893m^2 crop land owned by 11 households and 10,000m^2 paddy rice managed by Cat Son commune) will be temporally acquired for other construction activities; No households are displaced. The subproject would not affect any business, shops, physical cultural resources or ethnic household. Two household will be affected with land acquisition for widening the access road. (Total land acquisition less than 10%). The affected households will be compensated and supported sufficiently according to the project's resettlement policy framework (RPF) and detailedin project's RAP report.

In addition, owned by 355 households (1226 person) will be affected by water interruption in Summer-autumn cultivation period 2016.

99.2 % of people in sub-project area are Kinh people. There is only 0.8% is ethnic minority people. There is no ethnic minority household affected by the project.

Crop trees and plants to be removed: 14,843 Eucalyptus and Acacia trees, twelve coco nut-trees and 96peach trees will be cut down. In addition, 15.348m^2 of cassava cultivation; 425 m^3 of paddy rice field and 49,389 m2 of annual crop land (ground nuts, water melon, etc)... will be temporarily affected

Water Supply Disruption. 355 households (1,226 people) will be affected with with one crop cultivation in 2016 due to water supply interruption during dam rehabilitation. Cultiation land to be affected inclluding 447,774m^2 of paddy rice land and 299,991m^2 crops land (bean, watermelon, chilli...)

Common Construction Impacts.

Waste generation. 120.314m^3 of soil will be excavated and 113.767m^3 of soil will be used for filling in all the construction activities. The borrow pit with capacity of 180.000 m^3 is located at 1 km from construction site Some of the excavated materials will be used for filling, the unused excavated soils and solid waste will be disposed off in the disposal areas which is 100m from construction site

Some potential negative impacts in the construction phase: An estimation of 19 tons of dust arising from the operation and reparation of headwork. This can pollute to air quality and impact to the 80 worker's health on site, also impacts to 10 households living around the waste or material transportation roads. Noise: the residential area located 1km away from the construction site and then the noise generated from machine operations can not be impacted to the location, only workers on site can be direct impacted by this issue. Wastewater, an about

3m - 5m^3 of wastewater generating perday, as the resutls of wastewater samples analysed show that, TSS, pH and other concentrations in wastewater are low concentration, so that the pollutant is insignificant impact to surrounding environmental. The amount of waste oil generated: approximatelly 8,478 liters of waste oil can impact to environment, the impacts of this ussue assessed at high risk to environment but the impact on the environment can limit if it applying a good hazardous waste management plan on the site. When construction is taking place in rainny season, it will increase erosion progress and increase the amount of sewage overflows in the construction area. However, the construction activities are operating in the dry season, so the impact is expected to low level. The activities of excavation, leveling, drainage water in reservoir, spillway construction, waste generation and oil leaking are impact to water quality and increase water turbidity, and expected to aquatic species and their habitats changing. However, the aquatic cultural in Thach Ban reservoir is prohibited, so that this impact assessed at low level.

The potential operation Impacts: Increased sedimentation behind impoundment will lead to downstream impacts. However, this process taks a long time, it can be monitored and limited through the control activities and in creas the protective afforestation areas to reduce erosion and sedimentation by plant trees in watershed of the reservoir, limiting activity on slope land in upper stream. The risk of water loss due to seepage of the reservoir will reduce the water supply for 130ha of paddy rice in drying season. However, after completion of repairs, reinforced dam this issue can be negligible.

8. Mitigation Measures: As the assessment and evaluation, these impacts are temporally and localized influenced, therefore it can be minimized and mitigated by the following measures:

- Social impact mitigation measures: the compensation of land acquisition of 23 households and disruption of irrigation and other public service: 75 ha/355 HH of Thach Ban Đong and Thach Ban Tay have to follow the RAF of the sub-project. Creation of temporary jobs or business opportunity to the affected households to increase income. Limit speed and avoid the transportation activities in rush hours and at vulnerable areas (resident living areas and schools). Using local labour and develop a worker management plan. Restrict the use of trucks with load up to 7-10 tons to avoide local road damage.

- Environment impact mitigation measures: install mobile toilet on site, cover the transportation vehicles, material storage areas to avoid dust partical speading out, Often waterring on surface roads. Arrange for regular waste collection and disposal following regulation. Retain waste soil for reinstatement at the heardwork and other disturbed areas. The transportation vehicles, equipment must be maintained periodically. Workers using adequate protective clothings while working.

9. Implementation Arrangements

Central Project Office (CPO) takes responsibility for supervision overall project and progress of the subproject. Including the implementation of environmental protection measures proposed in ESMP.
The Sub-Project owner (PPMU) and Contractors are the key entities responsible for implementation of this ESIA. Key responsibilities of PPMU and the contractors are as follows:

(a) PPMU

- PPMU is responsible for ensuring that the ESIA is effectively implemented. The PPMU will assign a qualified staff to be responsible for checking implementation compliance of Contractors, include the following: (a) monitoring the contractors' compliance with the environmental plan, (b) taking remedial actions in the event of non-compliance and/or adverse impacts occur, (c) investigating complaints, evaluating and identifying corrective measures; (d) advising to the Contractor on environment improvement, awareness, proactive pollution prevention measures; (e) monitoring the activities of Contractors on reppling complaints; (f) providing guidance and on-the-job training to field engineers on various aspects to avoid/mitigate potential negative impacts to local environment and communities during construction.

- PPMU has responsibility for preparing monitoring reports to submit to CPO.

(b) Contractor

- Contractor is responsible for carrying out civil works and informs PPMU, local authority and community about construction plan and risks associated with civil works. As such, contractor is responsible for implementing agreed measures to mitigate environmental risks associated with its civil works.
- Contractor is required to obey other national relevant legal regualtions and laws.

Capacity Assessment and proposed training program:

- Sageguards policies of environmental and social of the sub-project
- Improving knowledge on environmental protection
- Building capacity on ESMP and ESMoP
- Training on environmental health and safety measures
- Training on improving of gender equity
- Trainning on IPM

10. Public consultation

In the process of preparing the ESIA report, the consultations were carried out. The consultation results showed that, the community totally supports to the sub-project for implementing (100% of participants). At that time, the investor are also committed to follow the local regulation, as well as manage staff and the workers during the contruction process, compensation for infrastructure damage, the transport via rural area has to follow ECOP in accordance with the policies of the World Bank and the Government of Vietnam on environmental protection.

11. . Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is: VND: 45,365,800,000. Budget for ESMP implementation including:

- Mitigation measure (VND):	1,464, 000, 000
- Independent monitoring (VND):	1,044,000,000
- Capacity building (VND)	590,000,000

PART 1: INTRODUCTION

1.1 General information of the project

DRSIP 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 will consist of the following components

- Component 1: Dam safety rehabilitation (US$ 385 million
- Component 2: Dam safety management and planning (US$ 60 million)
- Component 3: Project management support (US$15 million)
- Component 4: Disaster contingency (US$ 0 million - no fixed allocation, but not to exceed 20% of the total project cost)

DRSIP will be implemented in 31 provinces in the North, Central and Highland regions of Vietnam. Up to 400 dams will be selected for consideration under the project based on agreed selection criteria aimed at prioritizing those interventions that address the safety (?) risks within an explicit poverty and inequality framework**.**

The proposed project will be implemented over a period of six years – from December 01, 2015 to December 01, 2021. The project is required to comply with applicable Vietnamese legislations and the Bank safeguard Policies. The project Environmental Management and Social Framework (ESMF) and the draft Environmental and Social Impact Assessment (ESIA) of the first year subprojects will be ready for disclosure prior to Project appraisal. The ESIA of the subsequent years' subprojects will be prepared once the ESMF has been agreed by the Government of Vietnam and the World Bank.

The Ministry of Agriculture and Rural Development (MARD) will be responsible for overall implementation and management of the project. The Central Project Office (CPO) within MARD would 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, would be decentralized to the provincial level authorities. The provincial Department of Agriculture and Rural Development (DARD) would be lead agency at the provincial level. Provincial project management unit (PPMU) of DARD in each province will response to manage and monitor the sub-project under MARD supervision

The project will support the physical rehabilitation of the existing irrigation dams most of which were built during the 1980s and 1990s. About 90%o of the dams to be rehabilitated are earthen structures and are considered as small dams with height of less than 15m and design volume of 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).

The rehabilitation of the Thach Ban irrigation reservoir is one of DRSIP's subprojects that will be implemented in the first year. This ESIA is prepared for the subproject.

1.2 Objectives and methods of environmental and social assessment

- The objectives of this ESIA is to carry out the environmental and social assessment of this specific sub-project so as the sub-project's potential social and environmental impacts can be identified at early stage of subproject preparation, the measures to avoid or mitigate the potential negative social and environmental impacts can be proposed for implementation.

- The key contents of this ESIA include assessments on the potential social and environmental impacts of the proposed rehabilitation works on the Thach Ban Irrigation Reservoir; an environmental and social management plan (ESMP) which includes environmental monitoring and supervision plan, and reporting mechanisms. Through the ESIA, communication channels have been established to allow local communities to be informed about sub-project proposals and involve the decision making process

e) Method

- *Survey and field investigation*: the Consultant team conducted 2 field surveys *(1st phase)* Januray 28th, 2015 to February 12th, 2015 and (*2nd phase*) on March 06th, 2015 to March 15th, 2015

- *Sociological survey:* interview 123 households (affected directly and indirectly, benefit) Cat Con commune, Phu Cat district of Binh Dinh province, 13 local leaders in the level of commune/ ward and city.

- *Statistical method:* data collection, processing and analysis: (i) the meteorological, hydrological and environmental data for many years in the project area; (ii) The reports and data on the socio-economic and gender in 3 consecutive years of Cat Con commune, Phu Cat district of Binh Dinh province.

- *Inherited method:* inherit the research results of the relevant projects.

- *Expert method:* consultancy unit participated and organized the meeting, the exposure 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.

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

- *Rapid assessment method:* use the pollution factors of the World Health Organization (WHO) to estimate the amount of waste and pollution forecasting.

- *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.

- *Figure model method*: using Figure model to calculate and forecast the average concentration of pollutants in the exhaust gas of material transports 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.

1.3 Approaches and methods of social assessment

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 positively and adversely). The research techniques employed for this SA include 1) review of secondary data, 2) field observations; 3) focus groups discussions/ community meetings, 4) key informant interview, and 5) households survey (Please see Appendix B1 for how the Sampling Frame). A total of 149 of respondents participated in the ESIA exercise for this subproject, of which 123 people participated in the households survey (quantitative), and 29 people participate in focus groups discussions, community meetings, key informant interview (qualitative).

In section 4, 5 we will present the findings of the SA (positive and positive impact), including the result of the gender analysis. In Section 6, we will brefly perform the results of SA along with the recommendations on the basis of the SA results. Please note that a gender action plan and gender monitoring plan are presented at Appendix B4 of this ESIA), and the public health intervention plan and public consultation and communication plan were presented at Appendix B2 and B3, respectively). Complaint settlement proess were presented at Appendix B5 and Information announcement and social and monitoring accountability were presented at Appendix B6

1.4 Project Owner and Budget

TheProject owner is the Irrigation Provincial Project Management Unit (PPMU) of Department of Binh Dinh Agricultural and Rural Development (BDARD) with contact details as below

Director: Sơn Nguyen Van
Postal address: 301, Bach Đang str., Quy Nhon city, Binh Đinh
Tel: +84 (0) 914035127

e) Total cost estimation:

The total estimated investment budget is ***VND 47, 123, 100, 000*** (Forty seven billion, one hundred and twenty three million, one hundred thousand Vietnamese Dong)

Table 2. 1: Investment cost estimation

Unit: VND

No.	*Category*	*Value*
1	Embankment repair	29,708,364,000
2	Site clearance and compensation	3,794,617,000
3	Project management	526,372,000
4	Construction consultant	4,753,145,000
5	Others	678,668,000
6	Mitigation measure	1,464,000,000
7	Independent monitoring	1,044,000,000
8	Capacity building	590,000,000
9	IPM training	280,000,000
10	Budget contingency (10% of total)	3,946,107,000
	Sum	**47,123,100,000**

Sources: Project Investment report 2015

1.5 Consultant organisation

- Organisation name: Institute for Water and Environment (IWE)
- Contact person: Dr. Doan Tuan, Doan. Position held: Director
- Tel: +84 (04) 3.5634809; Fax: +84 (04) 3.5634809
- List of expert involve to ESIA report

No	*Name*	*Qualification*	*ESIA's position*
1	Vu Quoc Chinh	Msc	Team leader/environmental expert
2	Nguyen The Quang	Dr	Environmental expert
3	Dao Thanh Ha	BSc	Ecological expert
4	Nguyen van Hung	MSc	Hydrology
5	Dang Bao Khanh	MSc	Socio expert
6	Cac Thi Hien	MSc	Policy expert
7	Nghuyen Thi Ha Chau	MSc	Assistant staff
8	Nguyen Kieu Oanh	MSc	Assistant staff

PART II: SUBPROJECT DESCRIPTION

2.1 Overview

The Thach Ban Irrigation Reservoir Repair and Upgrade Subproject (hereafter called "the Sub-project" is located in Thach Ban Dong village, Cat Son commune, Phu Cat district of Binh Dinh province. The subproject is located at 7.5 km from the west of the Highway 1A and 40km from Quy Nhon city on the North; The subproject geographycal coordinates are) $13^0$53'33.98" north longitude and $109^0$13'50.53" east latitude

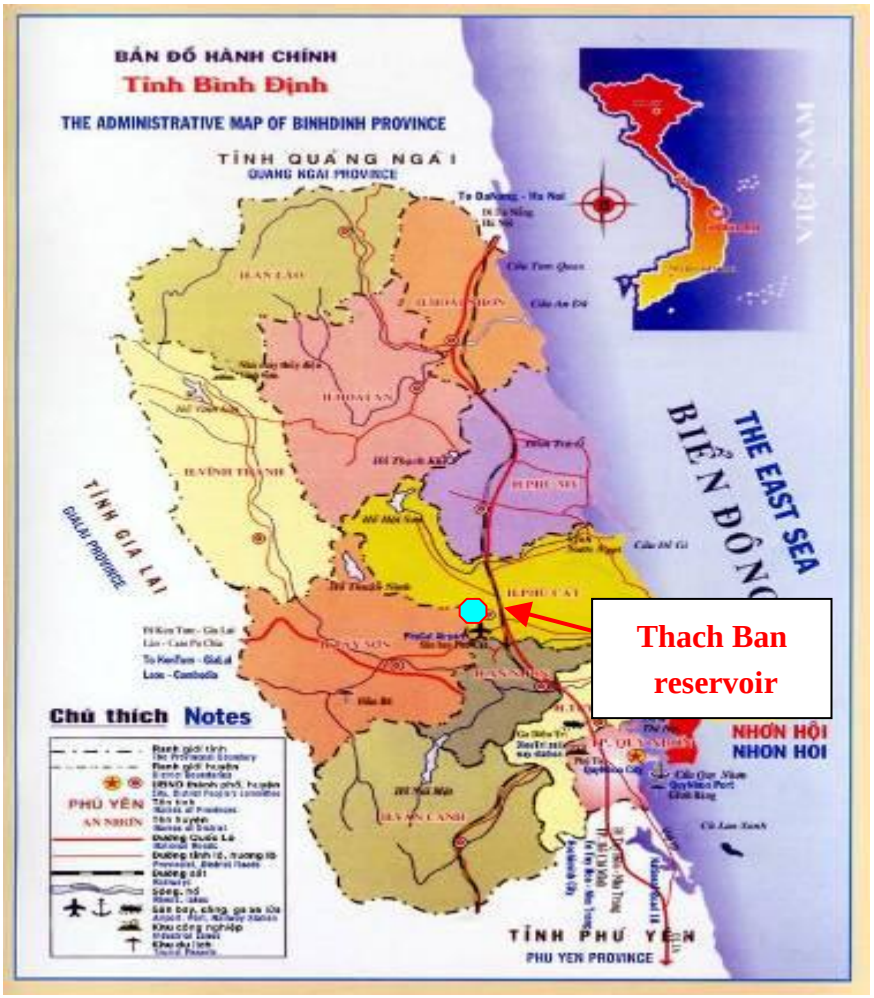


Figure 2. 1: Map showing Thach Ban Subproject location

The reservoir was built in 1978 with small scale, the designed water storage of 772,000 m^3. The catchments areas is of 3.0 km^2, total water surface of the reservoir is 25.6 ha at normal water levelling, irrigation with P=85%, the designed flooding peak is $Q_{1,5\%}$ = 77.17m^3/s, total annual flow W_0 = 2,7066.$10^6$$m^3$. The irrigation can supply irrigation water to 130 ha of agricultural land of Thach Ban Dong village. The terrain of irrigation areas is gradually sloping toward the La Tinh and the Nha Que rivers. The dam is 12.1 m high.

The objectives of the Thach Ban sub-project are:

- Recover full irrigation functions of the reservoir for 130 hectares of agricultural land in Thach Ban Dong village, Cat Son commune; improve the strengthen reservoir operational management.

- Enhance safety of the dam and reservoir, protect the residents and the existing infrastructures in downstream.

- Improving the landscape in the areas.

2.2 Proposed Scope of Work

2.2.1 The Dam

Currently the earthen dam has been deteriorated. The downstream slope is facing with gully erosion, lacking of drainage at the toe of downstream slope. Water seepage through transverse cracks of the main body of dam can be observed. Depressions sink holes, longitudinal cracks are also observable at the left abutment of the embankment). In the outerlayer of the upstream slope, rock displacement has happened due to the lack of adequate support. The materials in the inner layers have been washed out due as the result of erosion from structure degradation and wave movements. Severe depressions and sinkholes or beaching up to 50-60cm deep occurred at 2-2.5m of the free board of embankment. The dam is in lack of parapet-wall (Figure 2.3). Some sections on the top of the dam are at not at designed elevations but varies between +52.50m to 52.90m. Dam surface has been eroded with many traversed cracks. The thickness of the dam at its top has been narrowed down due to erosion and material degradation. The existing status of the dam is illustrated in Figures 2.2 below:

The downstream slope: erosion gully and water seepage through transverse cracker

The upper stream slope Outer layer: the riprap is placed and lateral spreading

Dam crest has been narrowed down at some sections

Figure 2.2: Photos showing the existing condition of Ban Dam

The proposed scopes of work on the dam are:

- Reinforce upstream slope with concrete slabs casted on-site graded M200 with size of (2x2) m, thickness 12cm contain drainage holes, the particle layer thickness of 10cm beneath and the last layer construct by geotextile liner.

- Repair, reinforce downstream slope: remove 0.5 to 1m of top soil, termite treatment, refill the slope by soils reinforce the slope by grass planting. Build drainage cells (6x6)m, construct drainage channels at the toe of the slope.
- Dam crest: harden dam crest by concrete with thickness 20cm, crushed stone size 2 x 4 (cm) used for making the concrete. Build concrete parapet wall with 0.8m high, 0.4m m thick at upstream.
- Total volume of soil excavation is 110,073 m^3, earth fill: 104,382m^3. In which 6,795 m^3 of excavated materials will be reused, the remaining will be transported to disposal site
- Proposed construction method are:

    - Earth work (soil excavation and filling): remove mateirals on top layer in both toes of the dam, and transport waste to the disposal site. Transport filling material to the constructing site for filling.

    - Using bulldozers to remove the top soil in the borrow pits, use an excavator to load materials to the transporting vehicles.

    - Use vibrating compactor to cut-off repairing and/or the groin zone of the dam.

    - Reinforcing the riprap of the up stream slope by stone and concrete (machine and manual works)

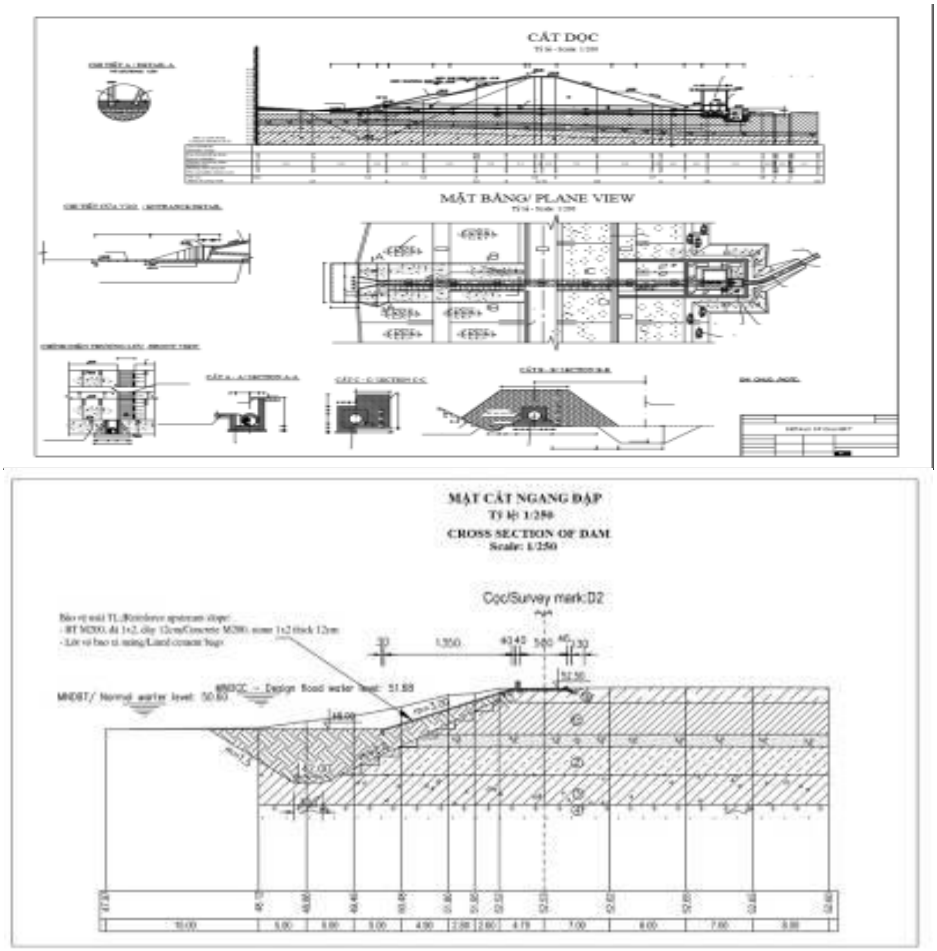


Figure 2.3: Plan view and cross section of Dam rehabilitation

2.2.2 Spillway

The width of spillway crest is B=30m. Spillway slope: L =50m. Stilling basin (plunge basin) structure is made of rock fill structure and has been sedimented.

Proposed work on the spillway:

- Keep the section of stonework facing (at the start section) with length 35.45m, rebuild spillway training walls by using concrete M200 L= 35,45m (at the starting point of the chute) by concrete M200.
- Lengthen the chute with length of 5m and its walls by using concrete M200.
- Construct a new water staircaise from the top of the existing spillway to the chute with length of 11.1 m and training wall by concrete M200; concrete the section of the chute from 39.8m and its walls to the starting point of stilling basin by using concrete M200.
- Reinforcing the part of the construction (from middle of the spillway to the starting point of stilling basin, includes spillway training walls) with L= 39,8m by concrete M200.
- Total volume of excavation is 1,490m^3, filling volume is 1,607m^3, in which excavated materials to be reused is 501m^3
- Proposed construction method and activities:
    - Earth work: remove the materials on top layers of the spillway and transport to the disposal areas. Transport filling materials and rocks to the constructing site
    - Use mixing machine (capacity: 500-700 litters) to fill concrete to indicated zone.
    - Machine and manual works for construction

The stilling basin (plunge basin) of the spillway sedimented

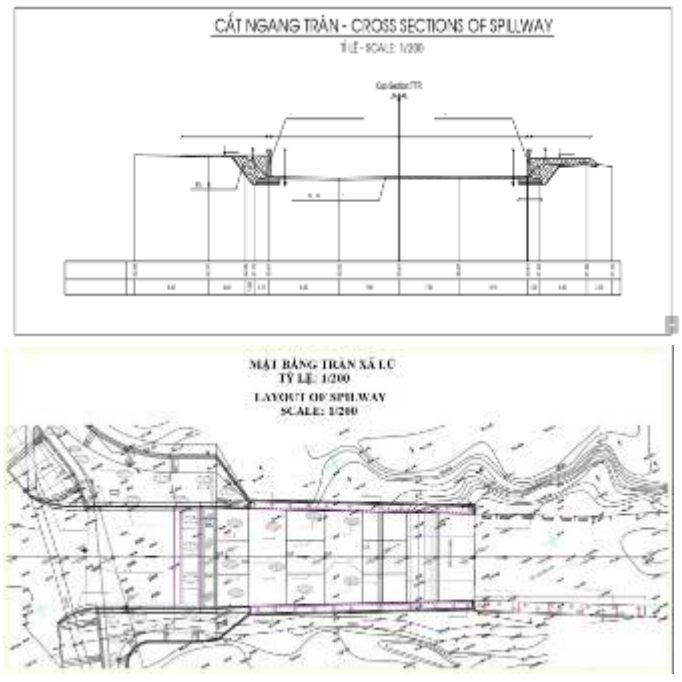


Figure 2.4: Spillway: existing condition and proposed rehabilitation work

2.2.3 Outlet work

The outlet works was built in the 1990's. The outlet works and its components have been deteriorated thus causing water lost of the reservoir. The valve has been corroded, difficult to operate to regulate water flow.

Proposed repair and upgrade outlet works: Replace existing pipes with new D600 steel pipes, build the concrete M200 sleeves, and install a new valve at outlet section. Total volume of excavation to remove the old outlet works is 7,451m^3, filling is **7**,671m^3, all from borrow pits. All excavated materials will be disposed off at the disposal site. Construction will be carried out with machine and manual works.

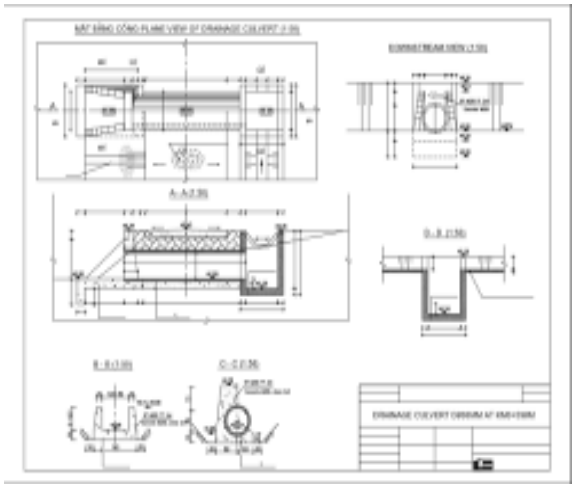


Figure 2.5: Outlet work: Existing condition and proposed rehabilitation work

2.2.4 The Access Road

The existing access road is started at Son Loc bridge and ended at the dam site. It is 845m long, in which 750m is earth filled. The road is 2.5m wide with road 0.5 m shoulder 5m at each side.

The access road (earth fill) saturated during wet season

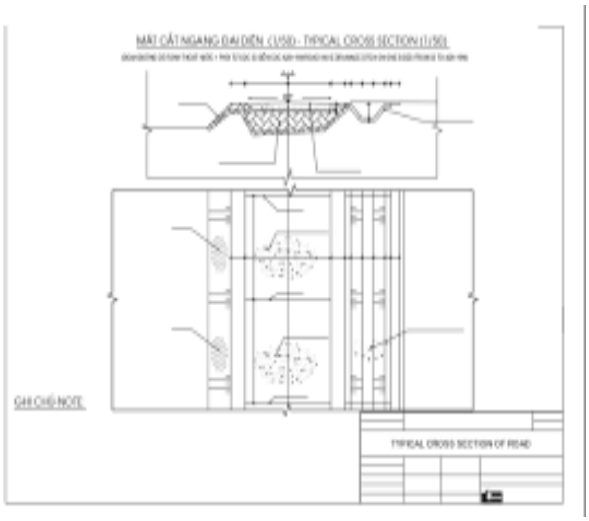


Figure 2.6: Access Road: Alignment, existing condition and proposed typical cross section design

Table 2.2 below summarise the key parameters of the four main work items before and after the project.

Table 2. 2. Technical Parameters of current construction

No	*Content*	*Unit*	*Parameter*	
			current status	*after repair*
I	**Construction category**		III	III
II	**Reservoir**			
2	Total Capacity W_o	10^3m^3	772	772
3	Total effective capacity V_h	10^3m^3	707	707
4	Death capacity of reservoir V_c	10^3m^3	65	65
III	**Embankment**			
1	Dam Crest elevation	m	52.50	52,50
2	Height of dam	m	12.1	12.6
3	Length (included spillway)	m	897	897
4	Top-width	m	4.0	5.0
IV	**Spillway**			
1	Spillway crest elevation	m	50.60	50.60
2	Spillway (length)	m	58.3	58.3
3	Stilling basin elevation	m	+42.92	+43.12
4	Stilling basin length	m	10.17	11.55
V	**Outlet works**			
1	Elevation of outlet works	m	+43.50	+43.50
2	Length	m		60,0
VI	**Access and management road**			
1	Length	m	845.4	845.4
2	Road surface (width)	m	2.5	4
3	Concrete (hardnosed)	m	0	3

After repairing, capacity of reservoir, width and elevation of spillway, outlet works do not change; the height of dam is increased from 12.1 m to 12.6 m because of supplementing parapet wall for avoiding risks (top dam crack rtransversy, erosion); the elevation of stilling basin increases from +42.93m to +43.12m because of addtion a concrete layer in repairing, stilling basin length is extended from 10.17m to 11.55 m to stablize water flow at downstream

2.2.5 Anciliarry Items

Workers Camps. The proposed Workers Camp site and storage areasis located in the crop land (watermelon) owned by one local household. the temporally land area used for these sites is 2,000m^2.

Figure 2. 7: Proposed camp site

- **Material Storage Area.** Two zones, 1000 m2 each, were proposed for material storage area. Zone 1 is located in downstream slope areas, close to the access road and is 100 m from construction site. It is 1 km from the nearest residential area. The zone is for dam repair and outlet works. Elevation of the zone is +44m. Zone 2 is located at 100 m from the spillway. It is prposed for storing the material for spillway rehabilitation. Elevation of the zone is +51m. Zone 1: is next to construction site 100m and 1km to resident areas.

Figure 2. 8: Proposed material storage areas

Disposal Site. The proposed disposal site is 10,000m^2 located at downstream areas of the dam. Tis area is public land and being managed by Cat Son commune but contracted to households to rice culitvation. The nearst resident areas is 1.2 km from the site, and is 1km from the La Tinh river.

2.2.5 Proposed resources Used

Filling Materials. Two borrow pits have been proposed to use

- *The Main borrow pit:* Go Chuong areas, locates in right bank of dam stream, 1 km from construction site. The total land area of this borrow pit is 6.0ha. This is a new pit, has capacity of 180,000m^3 and can be excavated to 3.0m deepth. Existing land uses is plantation or cultitvation land foreucalyptus, cassava, watermelon. There are no residents or houses in the areas. To open this borrow pit, 30,000m^3 of top soil will need to be removed

- *Standby borrow pit (only use when the main borrow pit is insufficient):* nearby the right abutment of spillway about 100m/ Ddistance to construction site: 1.0km. Total areas of the pit are around 7.0ha. Existing land use is Cassava, watermelon cultivation land. Neither resident areas nor local house lives in the areas. Distance to construction site: 1.0km. This borrow pit has capacity of 175,000m^3 and can be excavated to 2.5m deep. To open this borrow pit, 35,000m^3 of top soil will need to be removed

From the main borrow pit to central of the construction site, total length of transportation road is 1.000m, this is belong to Cat Son commune and it does not require land acquisition.

Construction Materials: Cement, metal, steel will be purchased from agents in Quy Nhon city, 30 km from the construction site. The materials will be transported on National road 1A, provincial road 634 and access road. Stone will be purchased from Nhon Hoa licensed quarry which is currently being operated by Binh Son co. Ltd. The distance to construction site is 45km in which the section going through Cat son commune is 1.25km including 0.4km of concrete road and 0.85 km of earth road. Sand will be bought from the material construction kiosk , 3km from the construction site, transportation route goes through Cat Son commune.

Table 2. 3. Estimated Resources to be used

No.	*Items*	*Material used*					
		Stone (m^3)	*Cement (tons)*	*Sand (m^3)*	*Steel (tons)*	*Soil (Exca.) (m^3)*	*Soil Filling (m^3)*
1	Embankment repairing	9,625	1,272	3,048	2,159	110,072	96,779
2	Spillway repairing	1,105	28	657	69	1,490	1,607
3	Culvert repairing	1,331	75	145	14	7,451	7,671
4.	Access road	660	200	543	0.6	1,300	2,010
	Total	**12,721**	**1,575**	**4,393**	**2,242.6**	**120,313**	**108,067**

The project will need to temporarily acquire 129,893m^2 of annual crops land (including 60,020m^2 at the main borrow pit and 69,873m^2 at the standby borrow pit). Ten local households will be affected with temporary land acquisition.

- List of machine use

Table 2. 4. List of proposed machines and equipments

TT	*Type*	*Key function*	*Quantity*
1	Excavator 0.8 – 1.25 m^3	Excavation	04
2	bulldozer 110CV-140CV	Remove the top soil in the borrow pit and quarry	02
3	Track tamper	road compacting	02
4	Dump truck	Material transportation	09
5	Concrete batching plant 30m^3/hour	Concrete mixing	02
6	Concret container	Concrete containing	03
7	Reedley vibrator	Concrete compacting	10
8	Truck mixer	Transport mixed material	03
	Weller	Metal welling	02
10	Cutting and bending machine	Cut & bend metal	02
11	Crane 15Tonnes	Material lifting	02
12	Generator	Energy supplying	02
13	Water pump	Water supplying	04
16	Jumping jack compactor	Surface compacting	02

2.3 Construction Schedule

Table 2.5. Construction Schedule

Scope of works	*First year*												*Second year*							
	Jan.	*Feb.*	*Mar*	*Apr.*	*May*	*Jun.*	*Jul.*	*Augt*	*Sept*	*Oct.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar*	*Apr.*	*May*	*Jun.*	*Jul.*	*Augt*
1. access road																				
Earth fill																				
Road surface concrete																				
2. Outlet works																				
3. Embank ment																				
4. Spillway																				

[Source: investment report, 2015]

PART III. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORKS

Subproject of "Repairing and improving safety of Thach Ban Reservoir of Binh Dinh province" does not impact to the ethnic minorities groups, the sub-project areas does not have 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 Applicable National policies, legals and administrative frameworks

a) Environment

Law on environmental protection no.55/2014/QH13, on Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment. Environmental report should be carried out simultaneously with the establishment of investment projects (Feasibility study report). Requesting time for EA report making, delivery and appraisal are specified in section no.2 of Article no.13 of Decree no.21/2011/ND-CP. Environmental screening steps (typical environmental assessment to the project) should be done in accordance with the list of projects type in Annex 2 of the Decree no.18/2015/ND-CP

Environmental impact assessment (EIA). 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 organise 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 100,000m^3 or more.

Environmental protection plan. Chapter 5 of Decree no.18/2015/ND-CP on date 02/14/2015, from Articles no. 18 and no.19 and the Annex II of this Decree defined that a new project implementation, or scale extension, increasing capacity have to identify the affecting objects and have to make a plan of environmental protection

According to the regulations of Vietnam Government, the subproject "*Repair and Improvement for Safety of Thach Ban reservoir- Binh Dinh province*" have to perform the report of Environment Impact Assessment.

b) Dam safety regulations

Decree no. 72/ND-CP on date 07/05/2007 of the government of Vietnam 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 m^3 (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.

c) Land acquisition by the State and Resettlement policies

Land Law no. 45/2013/QH13, effected on 07.01.2014, this law prescribes the regime of land ownership, powers and responsibilities of the State in representing the entire-people owner of land and uniformly managing land, the regime of land management and use, the rights and obligations of land users involving land in the territory of the Socialist Republic of Vietnam. The law also gives the guidance on Land acquisition, recovery and compensation, resettlement and the requirement to ensure safety of dam corridor and reservoir, irrigation works, etc.

3.2 Selected environmental and legal safeguard policies of WB

The safeguards policies of World Bank given in the form of operational policies (OPs), which includes 10 triggered policies, included the important policy OP 4:01 environmental assessment. Here are a summary of World Bank's policies that's related to the sub-project:

Table 3. 1. Selected environmental and legal safeguard policies of WB relate to the sub-project

Policy	*Objective*
OP 4.01 Environmental Assessment	- To ensure the environmental and social soundness and sustainability of investment projects. - To provide decision makers with information on potential environmental and social impacts related to the project. - To enhance the transparency and participation of affected communities into the decision making process. - ESMF is prepared for the Project, and ESIA is prepared for this Thach Ban first year subproject so as the potential impacts are predicted, and mangement plan are prepared for avoiding or management of the identified impacts.
OP 4.09 Pest Management	- To ensure that the potential environmental impacts and health risks related to the use of agrochemicals are avoided or managed. - The subproject will not purchase any pesticide, however, the rehabilitation of the dam will bring about improved water storage cpacity of the reservoir, thus additional crop land will be irrigated. The project will include pest management training activities to address the potential impacts related to agrochemical used in these additional irrigated crop lands.

OP4.11 Physical Cultural Resource	- To ensure that the potential impacts on known physical cultural resources (PCR) are avoided or mitigated - The Project will not affect any known PCR, however, as the project involves significant amount of earthwork, this policy is triggered and include a Chance Find Procedure
OP 4.37 Safety of Dams	To ensure that dam safety issues are adequately addressed, especially for high and/or risky dams: - The policy involve to new dams construction - The issues occurs by the existing dams and dams under Construction he - The other important issue: dam height, reservoir capacity, suitability of safety standards
OP 4.12 Involuntary Resettlement	- To ensure that the following policies will be applied: - Avoid or minimize involuntary resettlement and impacts on economic activities, including loss of livelihoods - Provide transparent compensation procedures during involuntary taking of land and other assets - Provide sufficient investment resources to enable the persons displaced by the project to share in project benefits (implemented through the Resettlement Action Plan) - Restore and improve the standards of living of persons affected by the project - Provide prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project. Development of Resettlement Plan and mitigation measures must be carried out based on consultation with affected populations and participatory approaches.

PART IV. ENVIRONMENT AND SOCIO-ECONOMIC CHARACTERISTIC OF THE PROJECT AREA

4.1 Physical conditions

Climate condition and hydrological regimes: Thach Ban Reservoir basin is located in the central areas of Vietnam. It has a tropical monsoon climate which can be divided into two distinct seasons. The dry season starts from January to August. During this period, highest rainfall occurs in May, caused flooding "grain full". The wet season (rainy season) starts from September to December in the same year. The rainfall in the period covers 70%-80% of total annual rainfall. Also, from October to November the areas has receive intensive rainfall and caused a high flood risk. The rainfall in Phu Cat areas has an average of 1.922mm (intensive rainfall recorded in 1987, 1999, 2003, 2009, 2013[1]). However, the rainfall obtained in this place is lower than the other places in Binh Dinh province in comparison.

Temperature: Average temperature in the areas is 26.9^{o}C. Warmest month (29-30^{o}C) is in June, July and August. The lowest temperature 19 ~20^{o}C is in December and January (source: Binh Dinh DoNRE, 2015). In general, the area represents an average high temperature range and the constantly gradient change.

Humidity: an average humidity in the areas is 56,4%, relative humidity varies significantly with an average of 83-84% in the wet season period. In addition, in summer time, the air humid value is approximately 33-34% due to the Foehn wind influenced. Water precipitation is 1000mm/year covering 60-70% of total annual rainfall (source: Binh Dinh DoNRE, 2015).

Table 4. 1. Climate conditions in the areas- Phu Cat meteor station (5years statistical)

Month	*Temperature (^{o}C)*	*Humid (%)*	*Rainfall (mm)*	*Wind speed (m/s)*	*Evaporation (mm)*
January	23.2	60.5	37.6	2.3	75.3
February	23.8	47	13.0	2.0	61.7
March	25.3	62.5	23.5	2.2	73.5
April	27.7	62	23.5	2.0	73.4
May	29.1	54	100.6	1.7	92.1
June	29.9	51.5	81.8	2.0	112
July	30.1	50	61.7	1.8	122
August	29.8	50.5	93.6	2.0	141.5
September	28.2	54	233.6	1.5	84.3
October	26.6	62.5	585.6	2.2	73.1
November	25.2	61.5	506.9	2.8	64.8
December	24.1	62	159.7	2.7	69.5
Average	**26.92**	**46**	**1922**	**2.1**	**1043**

Source: Sub-project Investment report, 2015

In the areas, the two big water resources are the Thach Ban and Hoi Son reservoirs, and the La Tinh River. The La Tinh river is the one of 4 main rivers in the province and it starts from Hoi Son Reservoir. A total water run of the river is about 54km length, river basin: 719km^{2}, the slope of basin is 0.15^{o}. A part of the river (3km in length) is in Cat Son areas.

[1] – source: Binh Dinh DoNRE, 2015

Hoi Son is the biggest irrigation a reservoir in the local and was built in 1985, and is next 6 km to Thach Ban reservoirs. The reservoir capacity designed to store 45MCM of water and supply water to 10-30ha of agricultural land of Thach Ban Dong village.

The storage capacity of Thach Ban reservoir is 772,000m^3 of water and irrigates 130ha of agricultural land of Thach Ban Dong and Thach Ban Tay village of Cat Son commune. At the present, Thach Ban irrigation reservoirs can not work at full designed functions, hence the reservoir can cover only 60 ha of paddy rice cultivation in winter-spring (from November – March of the following year) due to degradation with normal water level of + 50.80m. The summer – autumn crop (from April - July) depending on weather conditions of each year, in case of low rainfall, the water level in reservoir is decreased leading to decrease irrigation area. In the autumn – winter crop (from July - October) water is deficit, because the water level is below the range of reservoir function.

*Flooding regime***:** The project area is influenced by flooding occurrence from Central region. Flooding season begins in September and ends in mid-December. In some year, the flood come late and lasted from January of the next year. Flood occurs in Central to Northern later matching the movement of tropical storms converging. The flooding time is dependent on the movement of the Inter Tropical Convergence Zone (ITCZ). Based on the results observed from An Hoa hydrological observation station from 1976 to now on the rainfall day/night during the main flooding time (from September to December), the flooding regime and its flow discharges to Thach Ban reservoir is expressed in table below:

Table 4. 2. Flooding peak Qmp measurement

The design of flooding frequency	*0.01%*	*0.2%*	*0.5%*	*1.0%*	*1.5%*	*2.0%*	*5.0%*	*10.0%*
Rainfall (mm)	627.52	551.2	500.32	474.88	447.32	377.36	337.08	328.6
Qmax (m^3/s)	142.62	113.33	95.04	86.30	77.17	55.66	44.49	28.52
Flooding peak M (m^3/km^2)	47.54	37.78	31.68	28.77	25.72	18.55	14.83	9.51
W (10^6m^3)	1,456.65	1,256.15	1,123.58	1,057.69	986.62	807.93	706.37	535.47

Source: Sub-project Investment report, 2015

Topography: the local has relatively complex forms of topography. There are 2 forms of landscape

- Low mountain landscape with mineralised slop: The majority of project area is covered by the steep mountains (East-South and West-North). The terrain surface is strong separated by the internal river systems. Most of the original vegetation covers have been replaced. Therefore, the erosion and sedimentation process increased in the areas, especially in the rainy season.
- The food plain landscape: The elevation of the areas is from +250m to +35m following the upper stream to downstream and from North to South directions. The landscape is flat and local people cultivating on the areas.

Geological characteristics

A geological characteristics of the area have been discovered, on which the soils formation on magmatic complexes, on sedimentary-metamorphic rock complex and on Quaternary sediments complex. The geological characteristics of the areas can divided into:

Earth fill: two types of earth fill: Sandy loam light – medium soil: containing gravel and crushed stone. The soil has multi colour, such as yellow, brown, red, gray and white, thickness 1.5-5.5m. The soil has low humidity, tightly structured Sandy loam, medium heavy to light clay soil: gray-green colour; moisture, plasticity and tightly structured medium (K=0,80÷0,85), less water permeability coefficient. Thickness of soil is 4.5-13.5m.

4.1.2 The existing quality of surface water

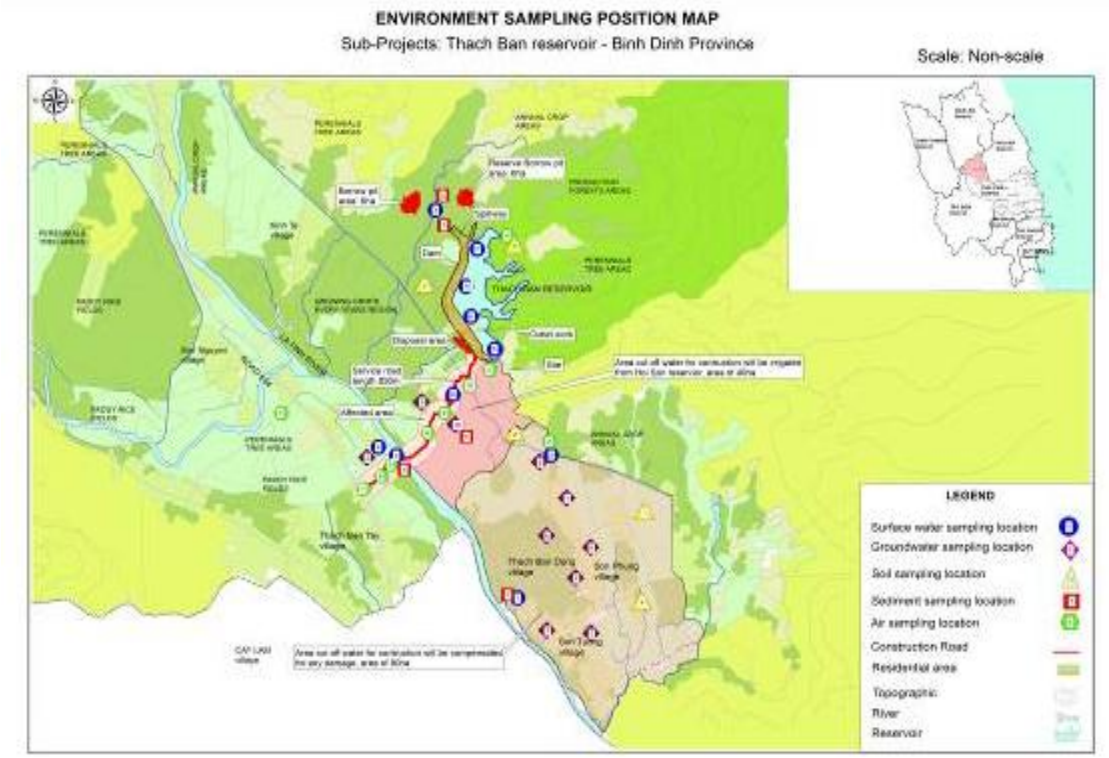


Figure 4. 1: Sampling localtion map

a) Surface water

La Tinh River and Thach Ban reservoir are the main water sources for irrigation. Several households living along the bank of river La Tinh are using water directly. The water quality examination results via 10 collected samples at high risks of pollution areas due to the project implementation, show in table 4.3

Table 4. 3. Water sampling position description

No.	*Code*	*Location*	*Position*	*Observations at sampling*
1	NM1	At the Thach Ban bridge, the position will be affected by water release from reservoir during reparation of spillway	N $14^0 6' 42.18''$ E $108^0 58'6.33''$	Fresh water, odourless, medium flow.
2	NM2	In the irrigation channel from the reservoirs to paddy field (crossing to access road).	N $14^0 6' 19.37''$ E $108^0 59' 3.21''$	Shallow water, no flow, contains suspended solid, odourless
3	NM3	At the confluence position of Latin river and streamline, the	N $14^0 7' 7.19''$ E $108^0 58' 40.30''$	Fresh water, medium flow,

		position will be affected by water release from reservoir during construction		odourless contains suspended solid (tree braches)
4	NM4	At the Son Loc bridge Thach Ban Tay village the position will be affected by water release from reservoir during reparation of spillway r	N $14^0 7' 7.33''$ E $108^0 58' 40.30''$	Fresh water, weak flow, odourless.
5	NH1	At the left abutment of embankment (proposed camping site and material storage areas)	N $14^0 6' 38.72''$ E $108^0 58' 50.36''$	Fresh water, weak flow, odourless, flooding around the sampling position
6	NH2	At the outlet work intake, the position will be affected by water release from reservoir during reparation of Outlet works	N $14^0 6' 43.77''$ E $108^0 58' 48.35''$	Fresh water, odourless
7	NH3	At the stilling basin of the spillway, the position will be affected by water release from reservoir during reparation of spillway	N $14^0 6' 59.15''$ E $108^0 58' 49.01''$	Fresh water, odourless
8	NH4	In the reservoirs, next to the borrow pit , the position will be affected by water release from reservoir during reparation of earth works	N $14^0 6' 19.60''$ E $108^0 59' 4.01''$	Fresh water, odourless
9	NM5	At the irrigation channel (downstream slope side), the position will be affected by water release from reservoir during reparation of construction activitiy	N $14^0 6' 28.12''$ E $108^0 58' 41.02''$	Shallow water, odourless,
10	NM6	At the embankment's slum the position will be affected by water release from reservoir during reparation of construction activities	N $14^0 6' 52.25''$ E $108^0 58' 45.50''$	Water turbidity, odourless

Source: Field survey results, 2/2015

The parameter analyze in Lab for water examination:

- Physical parameter: temperature, turbidity, pH, DO, EC, SS, TDS, COD, BOD_5, NO^-_2, NO^-_3, NH_4^+, SO_4^-, PO_4^{-3} , Cl^- and Fe_{ts}
- Micro organisms: Coliform
- Heavy metal: As, Pb, Cd

The analyzed parameters will compare with:

- QCVN 08:2008/BTNMT, column B1: National technical regulation on surface water quality, water irrigated agriculture and aquatic cultivation.

- QCVN 39:2011/BTNMT: National technical regulation on Water Quality for irrigated agriculture

The analysed results (table 2.1, Appendix A2) show that the water quality of the samples NM2, NM5, NM6, water from River La Tinh (NM1, NM3, NM4) from Thach Ban reservoir (NH1, NH2, NH3, NH4) have BOD_5, NO_2^-, NO_3^-, PO_4^{3-}, SO_4^{2-} and heavy metal concentrations (As, Pb, Cd, Fe) in lower than the acceptance level of QCVN 08:2008/BTNMT, column B1: National technical regulation on surface water quality, water irrigated agriculture and aquatic cultivation.

Some parameter of water sample exceed the standard are: COD (sample NM4) higher than standard 1.2-1.3 time; NH_4^+ concentrations of samples of NH_4^+ concentrations of NM2, NH1, NM5, NM6 are exceed from 1.1 to 1.5 times, at the water canal and proposing camping site. The coliform index of NM1, NM2, NM3 samples are higher 1.1- 2 times in comparison with B1/QCVN 08:2008/BTNMT-the standard water quality to irrigation and aquatic cultivation.

According to QCVN 39:2011/BTNMT, the results obtained show that pH, DO, SO_4^{2-}, As và Cd are in acceptable level, and water can be used for irrigation purpose.

Summary: all results show that all measured parameters are below the standards level. There are some parameters of water surface which are slightly higher than water standards, such as NH_4^+, coliform, but it slightly polluted, the main reason of the issue is comes from human activity, livestock waste generated discharging direct into river and run-off fertilizer. In general, people living in areas are relatively satisfied with the quality of water in the region.

b) The existing quality of groundwater.

According to the survey results, ground water stores in Deo Ca complex aquifers at the depth of 5-15 m from surface. Ground water is the main water resources to the human activity and livestock in the areas. Ground water quality: generally, water quality in the areas is relatively good and suitable for the growth and development of plants as well as for life activities.

Assessing the quality of underground water in 10 wells of 10 households in the affected villages of Thach Ban Dong and Thach Ban Tay show in Table 4.4

Table 4. 4. Ground water sampling position description

Sampling unit: 10

No.	*Code*	*Location*	*Position*	*Inspectorial*
1	NG1	From the well pit of Mr. Nguyen Van Trung household, Thach Ban Dong village, Cat Son commune, Phu Cat District	N $14^0 6' 7.67''$ E $108^0 59' 3.38''$	Odourless, clean water
2	NG2	From the well pit of Mrs. Nguyen Thi Ngon house, Thach Ban Tay village Cat Son commune, Phu Cat District	N $14^0 6' 24.08''$ E $108^0 58' 26.48''$	Odourless, clean water
3	NG3	From the well pit of, Thach Ban Dong village, Cat Son commune, Phu Cat District	N $14^0 6' 29.08''$ E $108^0 58' 37.44''$	Odourless, clean water
4	NG4	From the well pit of Mr. Phan Van Luan house, Thach Ban Dong village, Cat Son commune, Phu Cat District	N $14^0 6' 26.12''$ E $108^0 58' 44.28''$	Odourless, clean water
5	NG5	From the well pit of Mr. Nguyen Van Binh	N 14° 6'25.29"	Odourless,

		house, Thach Ban Dong village, Cat Son commune, Phu Cat District	E 108°58'45.51"	clean water
6	NG6	From the well pit of Mr. Le Van Trung, Thach Ban Dong village, Cat Son commune, Phu Cat District	N 14° 6'28.50" E 108°58'44.89"	Odourless, clean water
7	NG7	From the well pit of Mr. Phan Van Phi house, Thach Ban Dong village, Cat Son commune, Phu Cat District	N 14° 6'21.47" E 108°58'37.57"	Odourless, clean water
8	NG8	From the well pit of Mr. Phan Quang Manh house, Thach Ban Dong village, Cat Son commune, Phu Cat District	N 14° 6'23.34" E 108°58'37.45"	Odourless, clean water
9	NG9	From the well pit of Mr. Vo Van Dau house, Thach Ban Dong village, Cat Son commune, Phu Cat District	N 14° 6'28.38" E 108°58'50.48"	Odourless, clean water
10	NG10	From the well pit of Mrs. Luong Ngoc Anh house, Thach Ban Dong village, Cat Son commune, Phu Cat District	N 14° 6'29.83" E 108°58'49.75"	Odourless, clean water

Source: Field survey results, 2/2015

The parameter analyze in Lab for water examination:

- Physical parameter: temperature, turbidity, pH, DO, EC, SS, TDS, COD, BOD_5, NO_x, NO^-_3, NH_4^+, SO_4^-, PO_4^{-3} , Cl^- and Fe_{ts}
- Micro organisms: Coliform
- Heavy metal: As, Pb, Cd

Results of 10 ground water samples analyzed of wells in subproject area (table 2.2, Appendix A2) showed that most of the physical-chemical parameters such as COD, NO_2^-, NO_3^- , Pb, As, Fe concentrations and the pH, coliform index of the samples within limited threshold of National Technical Regulation on groundwater quality (QCVN 09:2008/BTNMT)

In general, people in the project areas are satisfied the surface water and groundwater qualities. This areas is less impacted by the industrial and urban developments in the region.

4.1.3 Air quality

Assessing the current state of air environment in the project area by taking sample at 10 positions, these areas may be affected by the sub-project construction activities, transport material from borrow pit and quarry areas (table 4.5). The project area does not have any factory, industrial facility or mining activities, the traffic density in the local on the inter-village roads is low.

The results obtained from analysis of 06 sample (on vibration, noise, dust, total, SO_2, NO_2, CO) in Table 2.3, Appendix A2, shows that air quality in the project area is relatively good, the noise level below the permitted threshold of QCVN 26: 2010 / BTNMT, the parameters of CO; NO_x; SO^2; suspended dust are within permitted levels of National technical regulation of QCVN 05: 2009/BTNMT.

Table 4. 5. Air sampling position

No.	*Code*	*Location*	*Position*	*Inspectorial*
1	KK1	At the junction of TL634 (the beginning point to Thach Ban village)	N 14° 5'52.07" E 108°58'31.93"	Gentle wind, few road user
2	KK2	At the beginning point of the proposed access road	N 14° 6'19.55" E 108°59'3.85"	no wind, less transporters and road users, fresh air
3	KK3	At the proposed camping site (left abutment of the embankment)	N 14° 6'38.70" E 108°58'49.79"	Gentle wind, few road user, fresh air
4	KK4	At the proposed borrow pit	N 14° 6'52.97" E 108°58'51.34"	No wind, fresh air
5	KK5	At the road across to Son Loc, Thach Ban Tay village (next to the proposed material storage areas 200m)	N 14° 6'16.54" E 108°58'29.50"	Gentle wind, earth road
6	KK6	At the junction of Son Loc bridge and the road via Thach Ban Tay village	N 14° 6'19.78" E 108°58'34.55"	Gentle wind, few road user, fresh air
7	KK7	At the local road from CPC's house to Thach Ban reservoirs	N 14° 6'27.26" E 108°58'7.47"	Sunny, gentle wind, few road user, fresh air, concrete road type
8	KK8	At the local road–Thach Ban Dong, Cat Son commune	N 14° 6'28.66" E 108°58'40.54"	Sunny, gentle wind, few road user, fresh air, concrete road type
9	KK9	At the proposed material transportation road	N 14° 6'33.70" E 108°58'43.19"	Sunny, gentle wind, few road user, fresh air, concrete road type
10	KK10	At the agricultural areas of Thach Ban Dong village	N 14° 6'35.38" E 108°58'46.36"	Sunny, gentle wind, few road user, fresh air, earth road type

Source: Field survey results, 2/2015

4.1.4 Soil environment

The total land area in the subproject area is 11,358.42ha. In particular, the area of agricultural land of annual crop is 874.27ha (7.69% of total agricultural land), perennial crop land is 995.27ha, (8.76% of total agricultural land), forestland area is 7,138.7ha, accounting for 62.8% of the total land area. Unused land area is 145.42ha accounting for 1.28%, there was no aquatic cultivation land.

According to the land use planning in subproject area, there are two main soil groups in this region. Detail is as following: Grey soil group (X) found in the upper stream of the reservoirs, acidity soil, average humus, The soil group is suitable for sugar cane, mango, pineapple cultivation, etc. Gley soil group (G) found in downstream of Thach Ban reservoirs, total areas of the group soil is 226.3ha, it suitable for paddy rice cultivation, Five soil samples and 5 sludge sample have been collected to exam and predict the negative impacts of the project implementation to soil quality or by the impacts of flow change and/or sediment load. The collecting positions of samples are show in table (table 4.6).

Table 4. 6. The samples positions

No.	*Code*	*Location*	*Position*	*Inspectorial*
I	***Soil sample***			
1	Đ1	At the areas near the proposed disposal areas	N 14° 6'42.25" E 108°58'43.98"	Plasticity, yellow grey soil
2	Đ2	At the crop land areas, closed to proposed access road	N 14° 6'20.22" E $108^0$59.765'	Porosity, yellow grey soil
3	Đ3	At the areas near the proposed borrow pit	N 14° 6'51.65" E 108°58'52.73"	Plasticity, yellow grey soil
4	Đ4	At the agricultural land in the downstream of the reservoir (to monitor soil quality due to project implementation)	N 14° 6'51.04" E 108°58'41.28"	Plasticity, dark yellow grey soil
5	Đ5	At the right abutment of the dam, (impacting by earth work)	N 14° 7'1.39" E 108°58'48.04"	Plasticity, yellow grey soil
II	***Sludge***			
1	BĐ1	At Thach Ban bridge position (river La Tinh's sludge)	N 14° 5'48.65" E 108°58'51.61"	Sandy structure, odourless
2	BĐ2	At the stilling basin of spillway	N 14° 7'4.28" E 108°58'43.62"	Smoothness structure, back colour and smell
3	BĐ3	At the connecting point of stilling basin to the irrigation channel	N 14° 7'6.78" E 108°58'39.43"	Sandy structure, smell due to degradation of leafs i
4	BĐ4	At the Son Loc bridge potion (Thach Ban Tay commune)	N 14° 7'7.33" E 108°58'40.30"	Sandy structure, odourless
5	BĐ5	At the basement of a pond in Thach Ban Dong, Cat Son commune	N 14° 6'25.66" E 108°58'46.11"	Smooth structure, black colour and smell

Source: Field survey results, 2/2015

The parameters of soil and sludge analyse on:

- Physical and chemical: pH_{H2O}, pH_{KCl}, Humus total, N_{total}, P_{total},K_{total} $N_{Potential}$, $P_{Potential}$, $K_{Potential}$
- Heavy metals: As, Pb, Cd, Cu, Zn;

Evaluation of analysis results of 5 sludge samples *(table 2.4, appendix 2)* shows that PH of sludge is low (pH_{KCl} = 4.76-5.92), mechanical compositions mainly are sand, mud with medium content (1.370-2.1%); total Nitrogen is low to medium (0.069-0.23%); total Phosphorus is low (0.031-0.04%), Digestable Potasium is low (0.188 – 0.208%), that is poor nutrion soil. Mobile aluminium is 0.154-0.2 mg Al/100g of soil.

The result obtained from laboratory show in Table 2.5, Appendix A2, acidic soil with pH from 5.63 to 6.48, soil structure is sandy loam soil. Low humus content, from 1.03 to 1.73%. Total nitrogen is poor (0,034- 0.064)%, P_{total} value low, ranges from 0.014 to 0.029%, total potassium in average (0.153 to 0.237%). Overall, the land has poor nutrition due to strong mineralization occurs.

Content of heavy metals such as Zn, Pb, Cu, As, Cd in soil and mud are within the maximum limits of heavy metals following to (QCVN 03:2008/BTNMT).

Summary: according to the results of air, water, soil and mud sample analyse, the physical environmental conditions in the project areas show good quality in comparison with nation standards. Some parameters such as Coliform index and NH_4^+ in water are slightly exceeded to the national standard level of water examination. Nutrient in soils is poor and facing to soil degradation due to mineralizing progress.

4.2 Biological

In general, the biological resources in the province of Binh Dinh are relatively rich, on the basis of the statistics from previous shows:

Fauna: the wild life in Binh Dinh province included 7 Mammalia group/19 family, 38 species, 13 bird group/37families, of which 77 species belong to Kong Ha Nung (Gia Lai), Ba To, Tra Bong (Quang Ngai), Tra My, Phuoc Son (Quang Nam) biological systems. In the high land areas of province, there are several mammalia groups: *macaca arctoides, rhesus macaque, macaca mulatta, lesser mouse deer (Tragulus javanicus), asian tiger, vulpes (urocyon cinereoargenteus), bear, sus scrofa, pholidota, cervidae, cervus unicolor, capricornis sumatraensis, cephalophinae, rodentia, gekko gecko, cynocephalus variegatus, eupetaurus cinereus, pythonidae , elephant* with few number and living in River Kon water shed – in the West-North of Vinh Thạnh and in the West- South of An Lao districts

Aves species are diverse includes: *pavo muticus* species is a high economic value, but has a few individual, they live in watershed of Kon River. *Phasianidae, sturnidae* are living in all the forest areas of the province. *Gallus, perdix, chloropseidae, streptopelia, zosteropidae, red-breasted parakeet, oriolus oriolus, gracula religiosa, fringilla coelebs, and apodidae* are found in the island of Qui Nhon City, 40km is next to Phu Cat district. However, in the project areas there are no threatened or conservative species found.

Vegetation: The forest types in Binh Dinh province is tropical rainforest, moist deciduous and semi-evergreen seasonal forests receive high overall rainfall with a warm summer wet season and a cooler winter dry season. Topical rainforests can be characterized in 3-4 layers, flora species in the province is diverse, and there are 66 Order, 175 Family 1848 Species. The vegetation species in a forest included: *Dalbergia cochinchinensis (Dalbergia), Pterocarpus macrocarpus, dipterrocarpus, Beech, Erythrophleum fordii, Madhuca pasquieri Canarium album (Lour.) Raeusch, Spinus tristis,* etc. But rich forest with big trees nowadays remains a few areas in the province.

Forest areas: 7,094.13ha, covering 62.46% of total natural land in the project areas. Of which: productivity forest areas is 2,187.03ha (30.83% of total natural forest areas), protective forest areas: 4,907.1ha (covering 69.17% of total natural forest areas) with common plant species, in subproject was surveyed and identified with: Ormosia *balansae Drake, Tetranthera, Diospyros rubra, Betula Alnoides*…the plants can be used for paper industrial or reduce soil erosion progress.

Surrounding to Thach Ban reservoirs is secondary forest, mainly eucalyptus and acacia mangium. The highest tree is around <4m. The vegetation covers of the project areas which are constituted mostly by bush vines, grass. The project area has not bilogically valuable, rare or endangered species base on the criteria for classification of plant species being threatened, in the Vietnam's Red Data Book (2007) and IUCN Red List (2011) of endangered species (according to the Government Decree No. 32/2006/ND-CP).

Figure 4. 2. Natural vegetation in project areas

Figure 4. 3. Accassia plantation in the project areas

4.3 Socio-economic conditions

4.3.1 General features

In recent years 2014, the district has made some progress together with the overall economic development of the province and the country. Statistics showed that the economic growth rate of the subproject area represented by Cat Son's gross domestic product (GDP): VND 101.288 Mill., incomes per capita is VND 19.178 Mill. (VND 1,926,000/capita/year in comparison with year 2013.

Cultivation is the main production sector and is gradually developing towards increasing quality, productivity and efficiency; close cooperation between factors such as: the application of advances in breeding, strengthening pest control measures, appropriate planting seasons. However, adverse weather, complicated disease, irrigation systems have affected productivity and crop yields. The situation in the livestock disease is fairly complicated, besides volatile prices is reason leading to unstable scale of livestock and poultry

Small-industrial andcommercial - services are accounting for 1.9% of economic structure; they are promoted to develop, contribute significantly on local economic gorwth, but the scale is minor.

4.3.2 Population

The total population of Cat Son commune in the subproject area is 5,303 per 1,450 households, of which, men 2,742 people (51.7% of total population) and women is 2,561 people. Total number of workers in the subproject area is 3,128, accounted for labour under and over age are 2,175 (covers 69.5% of total worker in the areas), people/ household: 3.65, worker/household: 2.15

The natural population growth rate in 2014 of the areas was 1.39%. The average population density is 47 persons/ km^2. Poverty rate is reduced to 2.2% by 2014 in comparison with year

2013. Among the 84,379 households in the subproject area, there is over 97% of the households participating in agricultural and forest activities; and the Commercial services 1.1%, and others: 1.9%

According to the survey data *(table 4.7),* the average number of people in a households is 4,5 people/ households which is higher than average number of people in a household of country with 3,89 (Statistic year book, 2013). The average number of people in household is different from villages, group of income, and gender of householder (3.8 people/ household for fenale and 4.6 people/household for male)

Table 4. 7. Size of households according to the member

Contents	*Average member of a households*	*Size of household (%)*			
		1-2 people	*3-4 people*	*5-8 people*	*9 people and more*
Total	**4.5**	**2.6**	**48.2**	**48.2**	**1.0**
I/ Village					
Thach Ban Dong	4.4	2.1	51.6	46.3	0
Thach Ban Tay	5.3	0	30	60	10
Hoi son	4.6	14.3	28.6	57.1	0
II/ Ethnic					
+ Kinh people	4.5	2.6	48.2	48.2	1.0
+ Minority	0	0	0	0	0
III/ Householder's gender					
+ Male	4.6	2.0	49.5	47.5	1.0
+ Female	3.8	20	20	60	0
IV/ Group of income					
Group 1 (rich)		0	0	66.67	33.33
Group 2		11.61	58.93	30.36	0.00
Group 3		0	63.64	36.36	0
Group 4(poor)		33.33	50	16.67	0

Source: Survey data in March, 2015

4.3.3. Occupation

Table 4.8 shows the survey results on the main occupation of 539 people of 123 affected households:

- There were 289 people (53.6%) engaged in farming (rice and vegetables), breeding of cattle and poultry (cow, cocks, duck, etc.)
- 141 people (26.1%) at school age
- 9 government officials, accounting for 1.7%
- 17 workers) accounting for 4.9%. In addition, the data also showed that
- 17 people (3.2%) losing labor health,
- 35 people are not working age, accounting for 6.5%
- 18 people are employees, accounting for 3.3%

Therefore, the main occupation of local people in project area is farmer, so the impacts due to cut – off water for construction will affect most of people in project area

Table 4. 8. The main occupation of the affected households

No.	*Contents*	*Number of people*	*Percentage (%)*
1	Loss of working capacity	17	3.2
2	Agriculture, forest, fishery	289	53.6
3	Trade, servuce	2	0.4
4	Official staff	9	1.7
5	Student	141	26.1
6	Worker	17	3.2
7	Military	5	0.9
8	Housework	2	0.4
9	Employer	18	3.3
10	Unemployment	4	0.7
11	Children	35	6.5
	Total	**539**	**100**

Source: Survey data in March 2015

4.3.4 Income and living standards of households

Impact on society improvement:

The survey and assessment results show that the income of people in the subproject areas comes from agriculture production and activity, counting for 85% of total affected households (378 houses), the household bases on livestock development covered 75% of total surveyed households in the areas (Sources: survey result, 2015).

The deteriorated headwork of Thach Ban reservoir is the main constraint to socioeconomic development in the areas. Findings from social surveys shows, the average income in the project area is very low and often below poverty threshold. Most of the poor households think that their situation came from the water shortage for agricultural production. Water supply in winter – spring season is sufficient to crops but countable in summer – autumn season.

As a likely consequence of economic growth, about 3% of total survey household is living in poverty condition. Hardly, the poverty households in project area can access the local infrastructures and public utility services as well as educational. The poor households in project area have very limited access to the local existing infrastructures, services as well as education. An about 5.5% of total children under school age is uneducated or illiterate. Project communes are dominated by single women groups, it means that heavier manual works are carried out by this group .The proposed project will create job opportunity for this group, to help them to earn additional incomes.

The survey results of 123 households in table 4.9 show that the average income of the affected households varies from 3 million VND-5 million VND accounting for 59.4% and income is 5 million/ month accounting for 22.7%. The income level is low, living conditions of local peole in project area face with many difficulties.

Table 4. 9. Monthly average income of the affected housheols in each group

No.	*Contents*	*Number of households*	*Percentage (%)*
1	From VND 1,000,000 to VND 2,000,000	7	5.7
2	From VND 2,000,000 to VND 3,000,000	15	12.2
3	From VND 3,000,000 to VND 5,000,000	73	59.4
4	Higher VND 5,000,000	28	22.7
	Total	**123**	**100**

Source: Survey data in March 2015

b) Households generate income by relatively diverse activities, including:

The survey results in table 4.10 show that agricultural production activities have generated the most income (accounting for 73% of total income), salary/wages (20%), trade/services (6%) and the rest of sources with very small percentage (1%). Fluctuation range of the total average annual income of households is quite large (from 20 million to 200 million VND.

Table 4. 10. People's income rate

No.	*Source of income*	*Number of households*	*Percentage (%)*
1	Agricultural production activities (cropping, farming, aquaculture, afforestation)	90	73
2	Trade, service, business	7	6
3	Handicraft	0	0
4	Salary/ wages	25	20
5	Savings, donations, deposits		0
6	Policy/revolution credited family support		0
7	Other sources	1	1
	Total	**123**	**100**

Source: Survey data in March, 2015

c) Self –assessment of living standard

Family life is commonly self-rated as not high; only 4 households (3.0%) self-rated as well-off, 113 households (84%) rated as medium, 12 households (10%) as needy and 3.0% as poor (table 4.11)

Table 4. 11. Self-evaluation of family life

Content	*Self - evaluation*			
	Wealthy	*Medium*	*Needy*	*Poor*
Number of household	4	103	12	4
Percentage (%)	3	84	10	3

Source: Survey data in March, 2015

d) Issue of food

The survey results of 123 affected households show that 103 household (84%) are not in food

lack, 11% of households in food lack from 1 to 2 months, only 5% of households in food lack for 3-4 months and no households in food lack for over 4 months/year (Table 4.12).

Table 4. 12. Food issue in the affected household

No.	*Lack of food*	*Number of households*	*Percentage %*
1	Yes, from 1 – 2 months	14	11
2	Yes, from 3 – 4 months	6	5
3	Yes, more than 4 months	0	0
4	No	103	84
	Total	**123**	**100**

Source: Survey data in March, 2015

e) Change of living conditions

The survey results in Table 4.13 show that, 113/123 households (accounting for 92%) state that living condition is better over past 3 years, 8% of households stated that living condition does not change and no households stated that living condition becomes worse. Because of the main income from agricultural production, there is a different between female householders and male householders.

Table 4. 13. Living condition in over past 3 years

Content	*Living condition*		
	Better	*no change*	*worse*
Number of household	113	10	0
Percentage %	92	8	0

4.3.5 Education

There are two primary schoods, one secondary school and neither high school nor volcational training school in project area. Education issue in project area has been improved in recent years; eduction at primarty level achieved 100%, secondary level achieved 99.54%. Percentage of skilled workers is 20%, of wich, primary level (3 months and more) takes 60%, college level takes 35%; university level takes 2%. Percentage of workers get job after training: 90%. Results of educational level survey of affected households (Table 4.14) show that, in total 539 people, there are 245 people (45.5%) subject to secondary education; 132 people (24.5%) subject to primary education. The number of college/university graduates is 44 (8.2%); and there are 30 people (5.5%) subject to under 6-years children or in the school age but never went to school. This shows that people are less interested in learning, the number of those pursuing higher education for work is few.

Primary and secondary educational attainments takes higher percentage compared to other educational groups (24.5% and 45.5%). The situation of children dropping out of school in the province is not high (1%). Dropouts here are mainly because they do not want to learn. The commune has made universal primary education and 100% of children of 5 years old are pre-schooling. However, universal primary education has been made for only children born in 2005 onwards; hence, uneducated/illiterate situation still occur with children born in 2004 backwards. The educational activities and community training centre have positive contribution to education issue at the local. The educational motivation group

collected budget of VND 13,805,000, timely support to poor students. However, the education system is not uniform; literature quality is not high. The infrastructure for education is limited; number of students in local is low. The scale of educational base is limited that leading to significant impact on education quality

Table 4. 14. Educational levels of household members

STT	*Contents*	*Number*	*Percentage*
	Illiteracy	6	1.1
	Primary education	132	24.5
	Secondary education	245	45.5
	High education	69	12.8
	Intermediate	13	2.4
	College, university	44	8.2
	No schools ever	30	5.5
	Total	**539**	**100**

Source: Survey data, March 2015

Table 4. 15. Number of school-aged children dropping out of school

Children dropping out of school	*Percentage*
Yes	8
No	92

Source: Survey data in March, 2015

Table 4. 16. Causes of dropouts

Causes	*Boy (%)*	*Girl (%)*
Economic difficulties	0	0
Productive labour	0	0
No want to learn	67	100
Poor learning capacity	0	0
School far way/ difficult travel	0	0
Needless of high school	33	0

Source: Survey data in March, 2015

4.3.6 Land

a) Total production land area of households

According to the report on socio-economic, security and defense situation in 2014, the total area of cultivated land in Cat Son commune is 1,256/1,869ha. Most households (99%) have local production land, 2,000m^2 and 112,000m^2 is the smallest area and biggest area, respectively (according to the quantitative survey).

b) Land use right certificate and undersigned person

A land use right certificate certifies the rights of land use to the granted, while confirming the ability to access land resources as well as other resources related to which this certificate is regarded as a condition (e.g. as financial resources). Consulting on the issue: "Who is named

on a land use right certificate. Consultant was advised that families today have agreed on the fact that this is not imperatively husband or wife. In addition, even if one is named, the purchase, sale, mortgage must be signed by both spouses. Thereby equality can be confirmed in access to resources in the province.

As reported, CPOs makes annual submissions to the DPC on LURCs issuance to local people (including residential land and production land). Thus, the percentage of those not having a LURC certificate is not high: 4.5% for residential land; 1.8% for production land.

4.3.7 Health and access to health services

a) Health service infrastructure

Cat Son commune has a medical centre, the place has only one medical station with 2 beds and 8 function rooms service. The station was built in the areas of 1.129,5 m2, of which the herbal plantation areas: 80 m2. Total employer of the medical station are 6 staffs, including 1 medicine doctoral, nurse: 3, midwife: 1, population statistic: 1. Ten (10) public health care and family planning programs have been implemented to reduce the spread of diseases. Medication examination for high school students and olders are carried out regularly.

During construction, 80 workers will be mobilized. With such an infrastructure of health service, first aid and simple disease can be cured.

b) Sickness situation

Table 4. 17. Sickness situation over the past 12 months

Sickness	*Number of household*	*Percentage (%)*
Yes	118	96
No	5	4
Total	***123***	***100***

Source: Survey data in March, 2015

Within 1 year, 96% of respondents said that they have had sickness, common health problems often include (table 4.18):

Table 4. 18. Morbidness

Health problems	*Percentage (%)*	
	Yes	*No*
Cold	91	9
Respiratory disease	4	96
Fever	1	99
Cholera/dysentery	0	100
Hepatilis	1	99
Poisoned	7	93
Accidents/injuries	3	97

Source: Survey data in March, 2015

c) Health insurance

55% of respondents have health insurance coverage, 45% have no health insurance. There are still a large number of people without insurance participation, this is a big disadvantage for

the people in the project area. Thus, policies should be concerned because the percentage of households in sickness is high in the project area.

d) Places of health examination

Private medical facilities and self-medication at chemists' are chosen places of local people for minor sickness and no health insurance; going to higher routed hospitals has less percentage because of difficult conditions of the project area for being located far from Provincial and District Centres for health care.

Table 4. 19. Place of health examination

Places	*Percentage (%)*	
	Yes	*No*
Commune Heath Stations	30	70
Inter-commune clinics	0	100
District hospitals	9	91
Provincial hospital	2	98
Central hospitals	1	99
Primate health care facilities in the commune	70	30
Self-medication at chemist's	10	90
Treatment with traditional medicines	0	100
Home treatment with traditional leaves	0	100
No treatment/self-recovery	0	100

Source: Survey data in March, 2015

Factors that decline health of people include: 100% of interviewees said that diseases are from unsafe fruits and vegetables and other factors account for low percentages.

4.3.8 Sanitation and house condition

Housing is considered as one of the important criteria for assessment of the living standard of the people. Housing is also one of the criteria towards "new rural development" of localities. According to the "Report on implementation results of national target program of new rural development in 2014 and Orientations and tasks in 2015" by Cat Son CPC, the commune has 87.7% of houses reaching the Ministry of Construction's standards and there is no temporary, dilapidated housing. According to the project survey results: 100% of the households are living in semi-permanent houses

4.3.9 Rural infrastructures

Rural transportation. Transportation throughout the project areas is in relatively good condition. Currently, total length of the provincial road 634 (from North to South direction) is 6km with 100% of concreted road. The total length of existing inter-village roads are 21 km, include 7.5 km is concreted, and the entire of inter-road is mainly soil base. The field-interior roads are 13.0 km in length, are often difficult to access communes as the road networks are mainly unpaved, restricting transportation and trade, especially during the harvesting season

Electricity, 100% of households within the p roject area are connected to the national grid via Phu Cat power station. Some connecting points of the power grid from distribution

transformer station to household should renovate. Some connecting points of the power grid from distribution transformer station to household should be renovated. In case of construction, power supply of workers and machine operation will be connected with power grid of Cat Son commune.

4.3.10 The social, religious organizations:

The social, religious organizations of Cat Son commune include womenunion, farmer union, youth union, educational encouragement, Buddhism association. The proportion of female is 10 – 20%

4.3.11 Physical and non – physical culture properties:

Cat Son areas have 3 physical cultural resources including (i) Mieu Son Nguyen with 3,179m^2; (ii) Mieu Son Van, land area of 974m2; and (iii) Cay Roi church, 797m2, total land areas of this site is 4,150.1m2. All physical cultural resources in the place located in Thach Ban Tay village and far away from the construction.

4.3.12 Other services

At the central of commune, waste is collected to a centralised disposal site of commune. The waste from other areas is not treated. There is no centralized wastewater drainage system wastewater from domestic and production is discharged directly into lake and river.

There is no clean water supply in Cat Son commune. Ground water is the main source of water for domestic use in region; water for production is taken from Thach Ban reservoir and Hoi Son reservoir via La Tinh river and irrigation system. In case of construction, water for domestic use of workers is well – water constructed by construction unit.

Cat Son commune agricultural cooperative responses to supply water to irrigate and dredge canals in the local. Irrigation costs subsidized under the regime of the state, the cost of water to irrigation is VND 500,000/ha/crop, currently.

4.3.13 Minorities and vulnerable households

Approximately, 0.8% percent of population of Cat Son commune is comprised of ethnic minority groups. The population within the project area is comprised of one main ethnic groups of Ba Na (11 household/38 person). The households are not being affected by the project implementation. In total of 23 affected households due to land acquisition, there are 2 vulnerable households including 01 single mother households and 01 poor household who are acquired land for service road, but total area of acquired land is less than 10% of total current area

4.3.14 Gender features in the project area

Gender issues in the province have been improved since the Law on Gender Equality, for instance, no serious domestic violence occurred in recent years, women have been more involved in the family issues as well as social activities, gender discrimination has no longer existed in education and health... It should be noted that in the project area, people are all Kinh, no ethnic minority people so there is no different customs, habits of gender.

Table 4. 20. Labour arrangement in the family

Involvement in production activities	*Percentage*		
	Both	*Male*	*Female*
Crop production (rice, vegetables)	99	1	0
Breeding	98	1	1
Afforestation/ forest cares and protection	84.7	15.3	0
Forest products utilization	57.1	38.1	4.8

Source: Survey data in March, 2015

Table 4. 21. Labour arrangement in the family

Involvement in family activities	*Percentage*		
	Both	*Male*	*Female*
Childcare	97	0	3
House cleaning	89	0	11
Cooking/housework	76	0	24

Source: Survey data in March, 2015

Table 4. 22. Labour arrangement in the family

Involvement in community work	*Percentage*		
	Both	*Male*	*Female*
Community meeting	92	8	0
Training on production	83	17	0
Social and political activities	76	24	0

Source: Survey data in March, 2015

Table 4. 23. Labour arrangement in the family

Decision making	*Percentage*		
	Both	*Male*	*Female*
Decision making on big family expenditures (shopping valuable assets, weddings, etc.)	98	2	0
Decision making on children's study, profession	98	2	0
Decision making on investment, production activities	89	11	0

Source: Survey data in March, 2015

To indicate the results of gender analysis in the province, the consultant collected data, synthetized and analyzed gender issues in local decision making process and other qualitative and quantitative research results for the analysis of gender issues in the province.

a) Gender issue in politics

Gender in politics is evaluated based on the summary of civil officials, full-time and non-full-time of communes in the same project. Because the data collected is not really sufficient, analysis only based on statistics collected by Cat Son commune. Overall, the percentage of women participating in the staffing system/full-time/non full-time is low. In two full-time female officials, one is in charge of culture and society, one is the president of Commune Women's Union. Secretary and Vice-Secretary of the Party Committee, CPC President and CPC Vice president in charge of economy are men. In five female civil officials, 2 work in

office administration, 1 accountant, 1 in charge of Justice/Births-deaths-marriages and 1 in charge of culture. In three local land survey officials, none is female.

Thus, the percentage of female participation in communal government system is low, and women are not positioned to make decisions, both economically and politically. Besides, participants positioned to make decisions are Kinh people (Party Secretary, CPC President, 2 CPC Vice presidents).

b) Participation in family and community activities

Labour arrangement is seen as by gender in the project area. Although all activities are participated by both women and men, there is different arrangement in each field; in agricultural activities, men involve the most in earth work, transportation, and women involve the most in care and breeding work. Labour arrangement in the province is not quite different from studies, analysis of existing labour arrangement in Vietnam: Women participate in production, reproduction and care activities while men are mainly engaged in manufacturing activities.

Community activities such as community meetings, training on production activities and political organization activities, participation percentage of both spouses were approximately 50%, participation rate of men is higher than women (8% in community meetings: 17% in training on production; and 24% in political organization activities). Thus, key role in community activities participation is occupied by men. And this reflects the restrictions on women's access to information, knowledge, including information, knowledge of production, family economic development.

There is a link between active groups in labour arrangement by gender as follows: When women have to spend too much time on caring and reproduction activities, they will have no time for production and community activities; moreover, limited knowledge and information due to lack of time to participate in community activities makes it difficult to engage in production activities. Meanwhile, only production activities generate income and area assumed as more important activities. Clearly, the involvement of women is limited than men on project activities related issues, such as consultations, information disclosure, detailed measuring survey, compensation... Inequity will make women more vulnerable when there is no opportunity to participate.

Although the percentage of women and men altogether engaged in family decision making is over 80.0% (98% for family large spendings, 98% for children's study/career, 89% for production investment), more men than women make decisions on family work, for instance, production investment is nearly definitely decided by men.

c) *Female heads and gender issue in families*

In female headed families, husband and wife area equally involved in care and production work, female participation in community meetings and social and political organizations is higher than male participation. In the consultation process, questioned on invitation for community discussions on issues of land, project or production activities, the Consultant was advised that household heads are often invited; is this the reason for more opportunities to access information will be given to whom as household heads. For families headed by women: women who area heads also play a more decisive role than men in their families. Regarding family large spending in female-headed families, 70% decided by the couple and 30% decided by the wife, men are not engaged in deciding the matter. Regarding chosen

career, percentage of women and men in decision making is 30.0% and 10.0%, respectively; Women deciding on production investment accounted for 35.0% compared with men of 10.0%.

4.3.15 Communication on the project

Communication is one of the critical issues affecting the project success. An assessment on the project communication will contribute to the development of communication strategies, provided information and capacity building for people in the project area. Most representatives of households (household heads) are knowledgeable about the project implementation. Such good source of information is mainly disclosed in village meetings (68%), hearing from CPC officials (27%), no available sources of radio, newspapers, TV.

4.3.16 Management features of construction

The task of Thach Ban reservoir is to irrigate 130 ha of arable land in Cat Son commune, Phu Cat district according to the design. Irrigation Project Management Unit under Deparment of Agricultural and Rural Development of Binh Dinh province is assigned to manage and operate directly Thach Ban reservoir for regular supervision, maintainance. However, because of limitation of budget, maintenance, reparing do not meet the requirement that leading to serious deterioration of headworks of Thach Ban reservoir, which may increase loss of safety for downstream, drecrease effective use of water

4.3.17 Existing conditions of the reservoirs and dam

Thach Ban reservoirs was built in 1978 for irrigation purpose.The reservoir is designed to store 772.000m^3. However, the main construction and the appurtenant structures of the dam have been deterioratedas detailedbelow:

Embankment, The downstream slope with erosion gully, lacking drainage layer, later seepage through tranverse cracke due to erosions progress. Many depressions, sink holes or longitudinal cracks at the left abutment of the embankment have been occurred.

The upper stream slope Outer layer: the slope upon which the riprap is placed and lateral spreading or dislodging of one large rock may cause displacement of the surrounding rock due to a lack of adequate support. The inner layers (filter layers): are removed due to wave action erosion and degradation. Severe depressions and sinkholes or beaching with size of 50-60cm in depth have been occurred at 2-2.5m of the free board of embankment, lacking parapet-wall. Several parts of the top of dam are irregular elevation, change from +52.50m to 52.90m. Surface of the dam is eroded and have many traversed cracks. Top width (top thickness) of the dam is narrowed due to erosion progress and material degradation.

The spillway has crest width of B=30m and slope L =50m. Stilling basin (Plunge basin) structure is rockfill structure and is sediment.

The Outlet works was built 1990's, the water intake and outlet work have been deteriorated which lead to seepage formation and water lost. The valve of the outlet work intake has been broken and un-controllable.

Existing land use at the proposed disposal site is paddy field. The land has been being managed by the Cat Son community authority and leased to local households for rice

cultivation. The two proposed borrow pits are currently either eucalyptus plantation or annual crop land for cassava or watermelon. There is no eixsting resident or local house in these sites.

Access road: total length is 845m, with 750m of earth road, width of road is expected to extend to 2.5m to 4m, including 3m of reinforced section and 0,5m buffer zones each side. This road goes through paddy field with 10 households living along two sides of road

Figure 4. 4 Paddy filed is along service road

Figure 4. 5: Crop land is along service road

Transportation road from construction site to borrow pit: the distance from borrow pit to dam is 1km, this soil managed by People's Committee of Cat Son commune does not affect land acquisition two sides of road is crop land, there is no households living in there and no public construction.

Figure 4. 6: Crop land is along road from construction site to borrow pit

Waste transportation road: distance from disposal areas to construction site is is 100m, this land is managed by Cat Son CPC, and local poeple use to cultivation via a constract with local authority. Along the road is unused land and there is no local house exisitng

Figure 4. 7: The road to the disposal areas

PART V. ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT

5.1 Environmental and social eligibility screening of the sub-project

5.1.1. *Environmental and Social impacts screening*

The scope of work under this subproject include: (i) dam repair, seepage treatment, excavation, surface dams harden, upstream and downstream slopes reinforcement, erosion control; termite treatment; (ii) new drainage layouts at the toe downstream slopes construction or reparation; (iii) spillway rehabilitation, stilling basin extension, spillway crest reparations; (iv) outlet works replacement; (v) upgrading access roads.

According to the result obtained from environmental and social screening of the sub-project (see Table 4.1, annex 5) and the result from potential impacts screening for environmental and social (table 4.2, annex 5), Most potential impacts of the proposed sub-project assessed at medium to low level and reverseable. Following the screening results, required documents to complete Thach Ban sub-project must be done with:

- ESIA report and its annexes:
    - Gender Action Plan
    - Public Health Intervention Plan
    - Public consultation, Participation and communication strategy
    - Grievance Redress mechanisms
    - Information disclosure, accoutability and monitoring
- Resettlement action plan (RAP) report
- Dam safety report

5.1.2. Ethnic minority screening

As part of the social assessment, where ethnic minority (EM) peoples are present in the subproject area –as confirmed by the EM screening (as per Bank's OP 4.10), consultation were carried out in a free, prior, and informed manner, to confirm if there is broad community support from affected EM peoples 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).

The results of ethnic minority screening showed that there are not any ethnic minority people living in the subproject area (including affected communities and beneficiaries). Therefore, it need not to prepare a ethnic minority development plan for this subproject.

A gender analysis was also done as part of the SA to understand underlying gender dimensions (from project impact perspective), and to enable gender mainstreaming to promote gender equality, enhance further the development effectiveness of the subproject, as well as the whole project. A gender action plan was prepared in the Appendix B4 of this Report).

5.2 Potential positive social and environment impacts

Thach Ban sub-project implementation provides some potential positive impacts to environment and social aspects, they are:

Enhance Safety for the dam. The rehabiliation of the dam under the sub-project will reduce the safety risk related to dam failure.

The rehabilitation of the spillway will bring about improved flood control, better dapatation to climate change.

Improved irrigation service: The repair of the headwork will contribute to regulate the flow of water in rainy and dry season, provide improved water supply for agricultural production and domestic use in dry season. The area of cultivation land to be irrigated in each crop will be increased as indicated in the Table 5.1 below:

Table 5.1. Crop structures before and after project implementing (ha)

Contents	*Winter - spring rice*	*Summer- autumn rice*	*Spring summer rice*	*Winter – spring crop*	*Summer – autumn*
Without sub-project	45	45	15	15	15
With sub-project	85	85	40	45	30
Difference	+40	+40	+25	+30	+15

Source: subproject investment report, 2015

Total profit that the subproject brings about with regard to agricultural production is estimated at VND 5,251,000,000 per year

Table 5.2. Summary of effectiveness crops before and after project

Contents	*Without sub-project*		*With sub-project*	
	Area (ha)	*Total income (VND x106)*	*Area (ha)*	*Total income (VND x106)*
Winter-spring paddy rice	45	611	85.0	1,643
Summer-autumn paddy rice	45	531	85.0	1,562
Spring-summer paddy rice	15	67	40.0	712
Maize	9	101	25.0	784
Cassava	6	237	15.0	2,098
Total		**1,547**		**6,799**

Source: subproject investment report, 2014

Impact on society improvement:

The survey and assessment results show that the income of people in the subproject areas comes from agriculture production and activity, counting for 85% of total affected households (378 houses), the household bases on livestock development covered 75% of total surveyed households in the areas.

The damaged headwork of Thach Ban reservoir is the main reason affects to economic – social development of the areas. Surveys illustrate that average income within project area communes is very low and often below poverty standards. Most of poverty households think that their situation came from the water deficit to agricultural production. Water supply in

winter – spring season is sufficient to crops but countable in summer – autumn season. As a likely consequence of economic growth, the survey and assessment results show that the income of people in the subproject areas is not so high, about 3% of total survey household is living in poverty condition. Hardly, the poverty households in project area can access the local infrastructures and public utility services as well as educational, an about 5,5% of total children under school age is uneducated or illiterate. Project area communes are dominated by single women groups, it means that heavier manual labour is carried out by the group in a village. Therefore, with project implementation, creating the opportunity to the group and increase their incomes.

5.3 The potential negative social and environmental impacts

5.3.1 The historical negative impacts and mitigation actions

The historical accidents: Thach Ban reservoir was built in 1978. Since then, there is no serious accident happened. However, since 1991, the appurtenant structures of dam have been deteriorated and not functioning:

- The original outlet works was not designed designed properly, it was not safe and risky for the operators, large amount of water was leak and it was not possible to control water for irrigation

The original width of the spillway was 20 m and was insufficient for floof water release during flood. The downstream of the spillway has been eroded deeply due to the floodwater dischargedthrough the spillway.

Leakage through the outlet work reduced the reservoir's storage capacity. The reservoir only has enough water to irrigate the first half of the summer – autumn crop. Water for the autumn - winter crops is dependent on rain water thus unrealiable, affect the crop productivity and livelihood of 355 households in the serviced the areas.

In 1991, the work has been rehabilitated with:

Removed the old 20 m wide spill way and relocate the new spillway to the right abutment of the embankment. The width of the new spillway is Bt = 30m, clay training spillway with thickness of 45cm was built for leakage treatment.

- Increased the length of dam from 510m to 850m toward the end of right abutment of embankment. The new extended section with length of 700 m is treated by claywith thickness of 40-50 cm to prevent seepage.

- Outlet works was re-constructed with sluice-type controlled by stop valve V5 with working bridge on top

- In 2006, the spillway crest was rebuilt with length of 70m, width of 25m by concrete, training spillway walls are stone.

The remain issues needs to be addressed in the subproject

- The body of outlet works concrete has cavity, there are seepages along the outlet causing water lost to the reservoir

- There are many sinkholes within the embankment caused and safety risks. There is no rain water collection system on dam slople. As the result, downstream slope has been eroded significantly. Dam surface has not been hardened with concrete in accordance with the new safety design standard.

- The access road servicing road which will also be functioning as rescure road is still earth fill and saturated in rainy season. This is an obstructruction for rescuring activities in emergency.

5.3.2 Land Acquisition and Gender Impacts

Land acquisition and resettlement. There are two type of land acquisition: temporary and permanent. The project will:

Land acquisition.

It is estimated that 1,611m^2 of land will be permanently acquired for access road expansion and rehabilitation. This will include 1,265m^2 of garden land, annual crops land owned by 12 households and 346m^2 public land managed by Cat Son commune.

142,893m^2 of land will be temporarily acquired for construction sites including borrow pits, worker camp, material storage area and disposal site. This includes 132,893m^2 of crops land owned by 11 households and 10,000m^2 paddy rice areas being managed by Cat Son commune.

In 23 affected households due to land acquisition for opening access road and auxiliary structures, there are 2 vulnerable households (1 single-mon household and another is poverty household) with total land acquisition below 10%. During public consultant, the affected households would like to get cash for their properties-lost (land, house), it does not effect much to the household because the land acquisition by the state < 20% of total land, they still have another alternative for cultivation. The affected households of sub-project want to use the compensation budget to feed their children, and save money in a bank to get monthly interest.

Potential social conflict: rapid numbers of workers. The influx of up to 80 workers could potentially lead to social conflict between local villagers and construction workers due to different cultural background, living standard and income levels. These services may cause social conflicts with local villagers as the demand increases.This impact is manageable through communication activities.

Impact on gender: women dominated 23 households who are acquired land in Cat Son commune and they have to find another income sources to keep their household economic in balance. Therefore, the project owner have to create an opportunities to them to find a job during the project implementation

355 households of Thach Ban Tay village will be affected by the interruption of irrigation during the rehabilitation of the outlet works (5 months). Women in the areas have to find a job to earn money as alternative income source to pay for the household expenses. However, the impact assessed at moderated and will be addressed through the project RAP (total compensation budget to 355 affected households is VND 1,621,875,000 due to water interruption of Summer-autumn cultivation period).

Impacts on Income and living standard of local resident: The establishment of construction camp with 80 workers could put additional pressure on the existing infrastructure and community services such as community services and staff for medical care, emergency, safety, etc.), markets sanitation service, food and water supply.

5.3.3 Construction Impacts

Generally, there are a number of socio-environmental impacts. Which occur during the rehabilitation and upgrading of a dam project. Landscape will be altered by construction works, exploitation of construction materials and waste disposal. Trees and vegetation cover will be removed from the land to be acquired. Dust, noise and vibration will be generated from dam and access road rehabilitation and transportation. Solid waste and wastewater will be generated from construction sites and workers camps. Irrigation service will be disrupted during the replacement of the water intake. Loss of vegetation cover, changes in drainage pattern, erosion potential and possible sedimentation would be issues of concerns at borrow pits. The introduction of workers and construction plants to the project area would cause social disturbance to local community. Construction activities, transportation, unloading or disposal of construction materials and wastes would cause safety risks to both local communities and the workers.

Impacts assesment will be made based on the resources to be mobilised and the volume of work under subproject listed below.

Table 5. 3: Estimation of construction volume

Work item	*Number of Worker*	*Equip. (set)*	*Excavated materials ($1000m^3$)*	*Filling (m^3)*	*Other materials*	*Transport distance*
Dam rehabilitation	30	17	110,000	97,000	13,000m^3 and 3,400 tones	Soil: 1 km Construction materials: 30 km
Outlet works	10	9	7,500	7,700	1,800m^3 and 96.8 tones	Soil: 200m Cement, steel: 30 km
Spillway	20	17	1,500	1,600	1,500m^3 and 89 tones	Soil: 500 m. Cement, steel: 30 km
Access road	20	11	1,300	2,000	1,200m^3 and 206 tones	Soil: 500m; Cement, steel: 30 km
Total	**80**	**53**	**120,300**	**108,300**		

The key potential impacts of the subproject are discussed below:

Landscape modification. Major landscape will be occurredin borrow pits and disposal areas . The permanent landscape change may not only impact on landscape but also on wildlife and their habitats, drainage patternincreases erosion potentials, landslide risks and affect accessibility to the surrounding areas of disturbed areas... These potential impacts are not avoidable but manageablethrough engineering design measures and construction site management.

Biological impacts. The main biological impacts of the subproject is mainly related to tree cutting during site clearance at borrow pits, workes camp site, storage area with total land area of approximately 144.504m^2. This impact mainly occurs at pre-construction or at early stage of construction. The trees to be removed under subproject include 14,383 eucalyptus and cacia trees, 12 coconut trees, 96 peach trees planted on the land to be acquired. Although these trees have economical rather than biological values, removal of trees and vegetation cover, ground disturbance as well as other construction activities may disturb wildlife in the area. However, this biological impact is insignificant as no species or areas of bilogical important are affected. One the other hand, the subproject also acquire some crop land, including 15,348m^2 of cassava planting land, 425m^2 of paddy rice field, and 49,389m^2 of annual crop land (ground nuts, water melon, etc). Seasonal vegetation cover will be lost, this impact is unavoidable but reversible in temporarily acquired land.

The activities of excavation, leveling, drainage water in reservoir, spillway construction, waste generation and oil leaking are impact to water quality and increase water turbidity, and expected to aquatic species and their habitats changing. However, the aquatic cultural in Thach Ban reservoir is prohibited, so that this impact assessed at low level. Another issue from tree cutting and removal of vegetation cover will increase soil erosion progress. Dust generating from construction activitiy and material transportation will impact to greenbelt along the roads (access and transportation roads). The dust speading over 20m around construction site and 10m around the transportation road. But the impact assessed at low level, because the most plant along the road are short-period cultivation plants and the rain will wash the dust on the leaves. These effects are relatively clear, but localized and short-term influence to the ecological system.

Increased level of dust, gas emission, noise and vibration.

- Dust

Increased level of dust may be resulted from site clearance, excavation, leveling, truck hauling, loading and unloading loose material, waste disposal, road rehabilitation, and transport vehicles. Concrete batch mixing and road traffic on unpaved roads combined with idling of vehicles can generate air born dust (suspended particulate matter) and gaseous emissions such as NO_x, SO_x and carbon monoxide. Dust can be released from unwashed machine and transportation vehicles, especially in a sunny days or drying season the dust clouds can upraise to 200m height in the air.

Dam. The volume of construction materials includes 3,048m^3 of sand, 9,625m^3 of stone, 1,272 tons of cement, 2,159 tons of steel. These materials are transported from Quy Nhon city with distance of 30km transportation to construction site via national high way 1A, provincial road (TL) 634 to the Son Loc bridge. The transportation route will also pass the Cat Son school.

The outlet work. The volume of construction material includes: 144.8m^3 sand, 1,331m^3 stone, 75 tons cement, 14 tons steel.

Spillway. The volume of solid waste need to carry out is 1,490 m^3. The volume of materials transporting to construction site: 657 m^3 of sand, 1105m^3 of stone, 27.8 tons of cement, 69 tons of steel. The material transportation routes will increase dust contents into environment of Thach Ban Dong village.

Access road rehabilitation. with transportation volume of 1,300m^3 of waste soil from construction site to disposal site (distance 500m), and transportation construction materials: 200 tons of cement, 0.6 tons of steels, 543m^3 of sands, 660m^3 of stone.

The estimation volume of dust generating from each of the above component are 17.8 tones from the main dam rehabilitation, 167 kg from the access road road, 84 kg from the outlet rehabilitation and 250 kg from spillway rehabilitation as shown in Table 5.3 below:

Table 5.4. The estimated dust volume

No.	*Content*	*Emission (g/m^3)*	*Transportation volume (m^3)*	*Estimated volume of dust (kg)*
A	***Main Dam Rehabilitation***			
1	Earthworks, ground leveling	1-100	171,800	17,180
2	Material off load (cement, soil, sand, stone…) by using machinery.	0.1-1	173,072	173
3	Cement mixing, concrete casting	0.1-1	1,272	1
4	Construction material falling down from transport vehicle	0.1-1	16,104	16
	Sub-Total		**362,248**	**17,790**
B	***Spillway***			
1	Dust generating due to material unloading process (cement, soil, sand, stone…)	0.1-1	2,455	245
2	Dust generating due to construction, cement mixing, concrete casting	0.1-1	41.7	0.04
3	Material construction trucks drop soil, sand, etc on road surface generating dust.	0.1-1	3,519	3.5
	Sub-Total		**6,015**	**249**
C	***Outlet work***			
1	Dust generating due to earthworks, ground leveling	1-100	7,452	74.5
2	Dust generating due to material unloading process (cement, soil, sand, stone…)	0.1-1	7,502	8
3	Dust generating due to construction, cement mixing, concrete casting	0.1-1	50	0.05
4	Material construction trucks drop soil, sand, etc on road surface generating dust.	0.1-1	2,264	2
	Sub-Total		**17,268**	**755**
D	***Access road***			
1	Dust generating due to material unloading process (cement, soil, sand, stone…)	0.1-1	1,507	151
2	Dust generating due to construction, cement mixing, concrete casting	0.1-1	1,783	1.8
3	Material construction trucks drop soil, sand, etc on road surface generating dust.	0.1-1	14,063	14

No.	*Content*	*Emission (g/m^3)*	*Transportation volume (m^3)*	*Estimated volume of dust (kg)*
	Sub-Total		**17,353**	**167**
	TOTAL			**Approx. 19 (tons)**

The total dust generated from these activities from the four main construction activities is estimated at approximately 19 tons. It may cause decreases in air quality and also affect the health of the construction workers and the communities living in the vicinity of the project area, particularly along the access road, borrow pits and the disposal sites.

Total dust generating from those material will be 2.3tons. Dust (include high contents of NO_2, CO, CO_2) can cause respiratory and skin diseases, general supspended particles in the air maycause nuisance, constraint visuability and harmg the worker health on site and local resident living nearby.Tthe impact assessed at moderate level.

- Gas emission

Dam. 94,580m^3 soils will be transported to disposal site by using diesel engine trucks with distance of 1km. Thus, in order to transport all the waste soil to disposal site, it need 22,500 trip of transportation vehicle (loading rate 7 tons per time). The construction materials (sand, cement, steel) will be transported to construction site by using 10 tons truck and al so need 23,746 times of transportation.

Spill way. In order to transport 1,490m^3 of solid waste to disposal site with distance of 500m, approximately 394 times of 7 tons truck are required; to transport construction material, 799 times of 10 tons truck are required entering construction area.

Outlet work. In order to transport 7,451m^3 of waste soil, approximately 2394 times of 7 tons truck are required, transport construction material, 352 times of 10 tons trucks.

Access road. With an approximately 499 trips of transportation by 7 tons trucks in distance of 500m to disposal site, the volume of exhausted gas generating by 606 times of transportation of 10 tons truck for material transportation.

The estimated volume of exhaust gas emitted from the project is shown in Table 5.4 below.

Table 5.5: Estimation of gas emission from transportation

No.	*Contents*	*Number of trip (trip)*	*Estimation of emission volume (kg/ton of waste oil)*		
			SO_2	*NOx*	*CO*
I	**Main Dam**				
1	Emission generating from soil transportation	22,500	8.3	20.8	8.35
2	Emission generating from material transportation	23,746	871	2184	881.5
	Sub-Total	**46,246**	**879.3**	**2,204**	**889.8**
II	**Spillway**				
1	Exhausted gases generating from soil transportation	394	243	609	243,9
2	Exhausted gases generating	799	29	74,4	29,8

No.	*Contents*	*Number of trip (trip)*	*Estimation of emission volume (kg/ton of waste oil)*		
			SO_2	*NOx*	*CO*
	from material transportation				
	Sub-Total	**1,193**	**272**	**683.4**	**273.7**
II	**Outlet**				
1	Exhaust generating from soil transportation	2,394	0.87	2,187	0.876
2	Exhaust generating from material transportation	352	13,033	32.67	13.10
	Sub-Total	**2,746**	**13.90**	**33.857**	**13.97**
III	**Access road**				
1	Exhaust generating from soil transportation	499	0.3	0.76	0.3
2	Exhaust generating from material transportation	606	21.78	54.6	21.9
	Sub-Total	**1,105**	**22.08**	**55.36**	**22.2**
	TOTAL	**51,290**	**1,187**	**2,976.62**	**1,199.67**

Increased noise level and vibration

In pre-construction phase, three types of construction machines will be used. Average noise of bulldozer varies from 77-95 dBA, soil excavator is 72-96 dBA and truck is 70-96 dBA, while the permitted noise for bulldozer and excavator is 90 dBA, truck is 88 dBA. Thus, the level of noise generated from these construction machines will be below the allowable level.

During construction phase, with a set of 53 machines and equipment working on site, this impacts generating from clearing, grading, excavation, levelling, truck hauling, stockpiling, waste disposal, road development, transport vehicle, and on site construction. It contributes an inconvenience condition to the people living around the sites and to the workers. If high frequency and high level of noise in long time exposutr, some negative impacts will occur to the people and worker, reduce the yield of words, causing fatigue, stress, etc. But these impacts are most likely insignificant impact due to the resident areas located far away from construction areas (1km).

The duration of impact is anticipated to be low as appropriate mitigation measures shall be applied during the construction phase.

Solid waste from site clearance and excavation. Solid waste will be generated from site clearance, removal of top soil layer, debris from construction and campsite;

During pre-constsruction phase, solid waste will be generated from tree cutting, removing the top soil layer, debris from camp and storage area sites; 30,000m^3 of waste soil, broke stone are expected to be generated. be generated by refill the excavated areas in the borrow pit. The tree cutting in the clearing areas handled by household, because the compensation plan included the cost of tree cutting to the affected household and clearing ground. 10 workers are expected to work at pre-constructionwill generated 5 kg of solid waste each day.

During construction phase, the volume of excavated materials from *dam rehabilitation* is estimated at 110,073m^3. A total of 6,795m^3 of excavated material will be reused for filling

(758m^3, access road 2,240m^3, coffer dam 5,700m^3). The remaining unused excavated materials, 94,508 m3, will have to transport to disposal site with distance 1 km from main construction site. The volume of top soil, stone and concrete demolished for construction of *spillway* is approximately 1,490m^3, the transportation distance to disposal site is about 500m. The volume of solid waste generated *from the outlet work* is 7,451m^3. This volume will be transported to disposal site by using 7 tons truck with distance of 200m.

20 workers and staff will be working onaccess road, the estimated volume of domestic waste generating is 10 kg of waste /day (equal 0,5kg of waste/person/day). Therefore, the volume of construction solid waste generted under the subproject to be disposed of under the subproject will be approximately 105,000 cubic meters (from the dam, spillway and outlet) plus domestic waste from workers camps. With the 10,000m^2 of disposal site, the dump will be approximately 5m higher than the existing ground elevation, equivalence 55.000m^3 of wastes generation dumping into landfill areas, the rest will be used to fill the excavated part in borrow pit. Social and environmental implications associated with solid waste disposal site may include:

- Loss of existing vegetation cover and trees planted at the disposal site
- Erosion potentials related to new barren soil surface exposed to win and surface runoff
- Disruption to existing drainage pattern and potential localised flooding by rain water
- Slope stabilistation issues
- inrterupt access to the nearby cultivation land, houses, and existing infrastructure, if any
- Safety risks to workers and local community along the 1 kilometer transporation route and nearby the disposal site

Solid waste: the volume of solid waste from removal of top soil cover is 104,821m^3 and domestic solid waste from camping site is (80 workers) 40 kg/person/day-night. The impacts assessed at high level, however the volume of solid waste is small volume and can handle in good way. Risks caused by catastrophic landslides*:* in the construction phase, land slide may be occurred, especially in the borrow pit. Run-off from construction site is a major factor to increase water turbidity and local rivers sedimentation of Cat Son commune.

Construction wastewater. Construction wastewater is generated mostly from the activities such as concrete mixing, vehicle washing, machine and equipment cleaning, and construction material preparation. The estimation volume of construction wastewater at each site is from 3m^3 to 5m^3/d. Construction wastewater contains high suspended solid, inorganic matter and debris, low pH. The main small impacts of this wastewater are causing sedimentation in local canal systems and downstream areas and can be managed through site management measures. But with low wastewater

According to the research of Centre of environmental engineering of Ha Noi University of construction, the discharge and concentration of pollutant factors in wastewater are shown in table 5.8:

Table 5. 6: Discharge and concentration of pollution substance in construction wastewater

No	*Sources*	*Discharge (m^3/day)*	*COD (mg/l)*	*Grease (mg/l)*	*SS (mg/l)*
1	Wastewater from cleaning machine	5.0	50-80	1.0-2.0	150-200

QCVN 24:2009/BTNMT (B)	**6.3**	**100**	**5**	**100**

(Source: Centre of environmental engineering of Ha Noi University of construction)

Waste and wastewater from workers' Camps. Calculation of domestic waste and watewater generated by workers will be based on 0.5 kg of solid waste per day and 48L of wastewater per day. As indicated in the first chapter of the report, construction of access road take place in January and February of the first year and June to August of the following year while the works in the other items will be executed from April to August of the first year, and from January to August of the second year. Taking the most disadvantage case, i.e. one group working on each work item most of the time there will be up to 60 workers working at the site and most while the last three months in the second year there will be up to 80 workers working at the site.

Items	*Number of workers (persons)*	*Construction duration (months)*	*Domestic waste (kg)*
Dam	30	13	*30 persons * 0.5 kg/d * 30 days * 13 months = 5850 kg*
Outlet	10	5	*10 persons * 0.5 kg/d * 30 days * 5 months = 750 kg*
Spillway	20	13	*20 persons * 0.5 kg/d * 30 days * 13 months = 3900 kg*
Road	20	5	*20 persons * 0.5 kg/d * 30 days * 5months = 1500 kg*
Total			**12,000 kg**

Up to 40 kg of solid domestic waste will be generated from the camp each day. Improper management of such waste may pose health risks to workers and cause environmental pollution. Domestic waste storage, collection and disposal should be carried out properly under camp management plan (collect, storage and transport have to follow the regulation to protect environment and sanitairy)

Items	*Number of workers (persons)*	*Construction duration (months)*	*Domestic wastewater (m^3)*
Dam	30	13	30 persons * 48L/d * 30 days * 13 months = 561m^3
Outlet	10	5	10 persons * 48L/d * 30 days * 5 months = 72m^3
Spillway	20	13	20 persons * 48L/d * 30 days * 13 months = 374m^3
Road	20	5	20 persons * 48L/d * 30 days * 5months = 144m^3
Total			**1,153 m^3**

Domestic wastewater contains high suspended solid, organic matters, nutrient (nitrogen and phosphorus), and micro organism. Discharge of untreated domestic wastewater may cause pollution to soil and water. However, even with 80 workers at the site, the daily generation rate from construction camp will be 3.5m^3 (80*48L) of wastewater which is quite small and easy to mange through camp management plan.

Table 5.7. The estimation of domestic wastewater generating in phase (Counting for 80 worker and staff on site)

No	*Contents*	*Unit*	*Volume*[2]	*Estimation*
1	BOD_5	g/person.day^{-1}	45 – 54	3.6 – 4.3 *(kg/day)*
2	SS	g/person.day^{-1}	72 – 102	5.7 – 8.1 *(kg/day)*
3	TSS	g/person.day^{-1}	70 – 145	5.6 – 11.6 *(kg/day)*

[2] Sources: Environmental management in developing countries, series 1

No	*Contents*	*Unit*	*Volume*[2]	*Estimation*
4	NO3-	g/person.day^{-1}	6 – 12	0.48 – 0.96 *(kg/day)*
5	Coliform	MPN/100 ml NT	106 – 109	8,480 – 8,720 MPN/100 ml NT

The subproject will manage the waste and wastewater from workers camp through contractor's contractural obligations.

Overflow of rain water (run-off): the overflow of rainwater is likely occurring at construction site in the rainy seasons with he average rainfall in the areas is 1,922 mm/year. However the construction phase only takes place in dry season (from April – August in the first year and January – August in the second year), so the wastewater generating from overflow of rain water can be negligible.

Hazardous Waste Generation.

Hazardous Waste Generation. For dam rehabilitation, 17 machines and equipments will be used in which, 13 items use DO gasoline. Hence, the volume of wasted oil generated is 13 items*18L*13 months = 3.042 litters (equal 18 litters of DO/month/machine and equipment). For the spillway, 17 machines and equipment will be used in which, 14 items use DO gasoline in 13 months. Hence, the volume of wasted oil generated is 14 items*18L* 13 months = 3.276 litters litters (equal 18 litters of DO/month/machine, equipment).

For the access road, 11 machines and equipment are required, of which, 8 machines and equipments use DO gasoline in 5 months operation. Hence, the volume of waste oil generated is 8 items*18L* 5 months = 720 litters (equal 18 litters of DO/month/machine, equipment). For the outlet work, 9 machines and equipments will be used if which 5 machines and equipment use DO gasoline in 5 months. Hence, the volume of waste oil which may discharge into environment is approximately 450 litters of waste gasoline (equal 18 litters of DO/month/machine, equipment). Therefore, the total volume of waste oil generated will be approximately 7,488 liters. The pollution level of gasoline is high volume and, the impact on the environment can limit if it applying a good hazardous waste management plan on the site before returning it to the gasoline supplier.

Changing water flow pattern or water quality: the activities of the project in this phase can be modified the local flows patter due to increase water discharge into La Tinh River and Nha Que stream. Wastewater generating from domestics activities in workers camps, washing equipments, vehicles and concrete mixing shall be a main pollutant sources to soils, surface water a and ground water resource. Wastewater containing high pollutant factors such as high TSS, organic matters, and pathogens. Also, run-off water (from construction site) can be an extra pollutant factors. The volume of wastewater generating from camp site and onsite is 1,153m^3. Untreated wastewater or inadequacy treatment method can pollute water and soils resources in the local area. On the other hand, the potential impacts on water quality of underwater activities under the subproject will be very limited with the installation of 570m long coffer dams. Hence, the mitigation measures for the issues related to site and camp management are necessary to manage the impacts of solid waste and wastewater.

Increased risk of erosion and sedimentation and localised flooding risks. With large amount of earth work, erosion may occur in construction phase of dam repair, spillway and access road rehabilitation, at borrow pits and disposal areas. Especially, localised flooding may happen at construction site, borrow pits or disposal areas if exsiting drainage pattern is disruppted. Floodwater runoff through excavated slopes may cause incrases in erosion risks

and that turbird water flow cause increased turbidity and sedimentation in receiving rivers or canals downstream of Cat Son commune. This potential impact and risk is manageable through site management plan.

Traffic disturbance and increased traffic safety risk: rapid increase in number vehicles in a small area will increase pressure on traffic condition in area, especially in the transportation routes along the 845.4 m of the access road, the roads to the borrow pits and disposal site. It is estimated that 51,290 trips of vehicles with loading rate from 7 to10 tons will travel via Cat Son's local road in 15 months, an average of 110 transportation times per day causing increased traffic safety risks to the local residents. Particularly, the section passing the Cat Son primary school (470 pupils) may be affected with traffic disturbance and have higher traffic safety risks to the students and their parents, and teachers in school starting and school over times in school months, from January to May in two school years. However, this impact is manageable.

Damage to local roads and exitsing rural infrastructure. Approximatly 51,000 trips of contruction vehicles travelling through the access road, between the construction sites and borrow pits, disposal sites would cause damages to the existing road. Particularly, the exiting the 400 m unpaved local road from TL364 to Son Loc bridge, local roads to borrow pits and disposal sites can be easily damaged by heavy trucks. The roads would become muddy in rainy season, dusty in hot weather, become difficult and unsafe for local people to travel. On the other hand, most of existing rural infrastructures such as power poles, drainage channels, or irrigation canal are weak can be damaged easily. The areas of worker camp, borrow pit and lanfill are located in unused land areas, and therefore the local infrastructure won't impact by the activity. The potential impacts on the road is unavoidable but reversable with road surface resinstatement when construction is completed, damages to other existing infrastructure can be avoidable or reversible.

Heath and Safety risks. During pre-construction phase, tree cutting, site clearance and ground leveling may cause accidents to worker or local people. Health risks for workers and local people can be from a number of sources and reasons. These can be (i) Domestic waste and wastewater generated from the workes camp and other construction sites but not being managed properly; (ii) Stagnant water, wastewater attracts and create breeding ground for mosquitoes, flies, the diseases transmission vectors, infectious diseases could break out from the polluted environment; (iii) The hazardous material such as termite chemicals, oil if not managed properly can direct enter water sources and cause harm to the health of users; (iv) Residents living along transportation route and workers at construction site can be affected by dust, noise and vibration. These impacts can be managed by applying appropriate mitigation measures.

During construction phase, heavy trucks travelling on local roads will increase the traffic accident risks, especially along sensitive parts such as schools or resident areas. Improper operations of machine may also lead to accident to workers and/or local people present at the site. This potential impact is at high level but can be minimised by an appropriate mitigation measures, particularly the application of IFC's guidelines on Environment, Health and Safety.

On the other hand, there are also safety (fire and accidents) risk related to the generation, usage, storage or handling of electricity, flammable liquids, vapours, and gases, and combustible dusts.This risk is manageable through Site Safety measures.

Unexploded Ordinance (UXO). Some unexploded mines and explosive materials may be left from the war and pose safety risks to the workers if these are not cleared before

construction is started. Thach Ban reservoir was built in 1978, after Vietnam wwar, so that most areas in the project are cleaned from land mines and explosive materials. But in the areas of landfill, access road and borrow pit still require to clean, total expectation of land is 144,504m^2. In additional, these areas are in the unused land and fra awy from resident areas, so that risk of OXO assess at low level, just happened only to squard team. The project will have to contract specialised defence force to carry out mine clearance before construction commencement.

Sedimentation. The auxiliary areas and borrow pit are located in downstream of reservoir hence it is a not sources of reservoir sedimentation. But it is a main problem to irrigation canals and Nha Que stream- 1km distance from constructin site. However, these activities are implemented in dry season, so these impacts are assessed at low level.

Borrow Pits. Opening of new borrow pit will cause negative impact on the landscape, affectexisting natural drainage pattern, increase erosion potentials when the existing vegetation cover is replaced with barren soils, cuts and fills, slopes are created. Landslides and sedimentation risks may also be increased in the borrow pit area. Discharges from borrow pits, dust and debris created during transportation of materials can significantly impact surface and subsurface waters because of the sediment in water and runoff from material storage and handling areas. For the Thach Ban sub-project, the borrow pits are located in downstream of reservoir, thus addition of sedimentation loads from the borrow pit to the reservoir will not happen. Abandoned borrow pits might spread vector-born diseases, especially when stagnant water accumulates. These impacts can be managed by appropriated mitigation measures

To mitigate impacts in the construction area, land gradients and drainages shall be maintained for proper discharge of wastes. Measures shall be taken to confine activities to designated locations and to minimize the creation of dust and debris during transportation. Protective measures shall be implemented during transportation (i.e. covering loads, reduced travel speeds etc.). All disturbed areas shall be properly reclaimed after construction and, slopes shall be re-contoured and proper drainage facilities will be maintained.

Disruption to water supply. The Thach ban reservoir does not supply water to domestic users, only for irrigation. It was built to supply water to irrigate 130ha of agricultural land. Due to the deterioration of the headwork, currently it only irrigates a total of 75ha crop land including 447,774m^2 of paddy rice and 299,991m^2 of other crops land such as bean, watermelon, chilli etc. During construction phase, water in the reservoir has to be released below the range of reservoir function from March to August in the same year.

Water cutoff during construction phase may disrupt agricultural production on these land, which affect the job, income and livelihood of 355 households or 1226 people. While this impact is unavoidable and will happen in Summer-autumn crop in 2016, it is reversible as the outlet works will be completed before rainy season (starting at the end of August) and the embankment is raised to allow the reservoir to storage water up to level +50.80m. Construction schedule of each work item should be planned with careful considerations and coordinated to minimise the impacts on affected household. Details about the proposals on construction schedule with the aims of minimising the impacts on agricultural land is discussed in the next chapter of the report.

Termite Treatment. Specific chemical will be used by authorised licensed consultant for termite treatment. Handling and usage of such chemical may pose health risks to the worker

and the environment. Annex-Termite Treatment Procedures provide basic informatin on termite treatment process as well as safety requirements.

Impact on aquaculture, tourism and inland water way transportation at downstream: These activities are not known to be exitsing at downstream. Therefore the sub-project would not have any impact to these activities.

5.3.4 Impacts assessment in operation phase

Most of the potential impacts during operation phase are expected to be positive during operation phase. Temporary construction impacts such as dust, noise and vibration etc. will be stoped during operation phase. When the construction is completed, the land use, landscape, local income and social economic tend to be stabilised. Improved dam safety and improved irrigation service would promote socioeconomic development and livelihood improvement for downstream communities. Some will change the status quo than in the past.

Pest Management in relation to increased irrigated crop land. The area of crop land to be irrigated will be increased after the reservoir's headworks have been rehabilitated. Meanwhile, the use of agrochemicals in agriculture is popular in Vietnam. Imporper usage and handling of agrochemicals may harm the environment and cause health risks to the farmers. The sub-project will include Integrated Pest Management training for farmers to reduce the risks related to agrochemical use in extended serviced areas of the subproject.

a. Affected objects

- Landscape and ecological environment: improving the ecological environment, local traffic conditions and aquatic system.
- local economic development, increasing and stabilizing agricultural and aquatic cultivations
- Community health and safety: improving local health and safety
- Air, water and soils. May increase the pollution due to use chemical to agricultural activities.

b. Impacts on environment and social aspects

Sedimentation: during operation phase, several impacts can be occurred, such as increased sedimentation in the reservoir and may be caused alteration of existing fish species. Increased sedimentation behind impoundment will lead to downstream impacts. As the sediment load increases, fish habitats will be modified (e.g. rocky river bed to mud cover), destroy spawning areas, and reduce primary production and fish food. Measures will be implemented to protect forests of the Thach Ban watershed to reduce erosion leading to sedimentation of the reservoir. Continuous monitoring and modelling of sedimentation shall also be carried out.

The duration and magnitude of the impact will be high as sediment load is expected to increase throughout the operation phase resulting in loss of fish species and poor water quality. The geographic extent of the impact will be moderate as there will be direct impacts on downstream users and aquatic life. The likelihood of occurrence of the impact will be high if sediments will decrease the quality of water and destroy breeding and spawning areas. The reversibility is considered low. The residual impact has been assessed to be high as impacts will occur throughout operations. It will bring significant changes to aquatic and human environments.

Wastes generation from agricultural, forest and aquatic cultivations: Water quality shall be maintained in accordance with Vietnamese standards. This will help in maintaining species composition and productivity of the local. Agricultural activities can be generated waste such as use chemical, fertilizers and hazardous material, these releases to environmental (water and soil). Sustainability of natural resources management, agricultural practices shall be maintained through education and awareness programs. The residual impact has been assessed to be low if impacts are considered negligible subject to the application of mitigation measures during operation phase.

Domestic wastes release: if impacts are considered negligible subject to the application of mitigation measures during operation phase.

Ecological balance: implement mitigation measures proposed in the Impact Assessment Report by Binh Dinh irrigation. Project management on the diversity of fish and fisheries has been taken place and shown that, the duration, magnitude, likelihood of occurrence and reversibility will be low if appropriate mitigation measures shall be applied during operation. The geographic extent of the impact is expected to be moderate as food source and income will be altered. The residual impact has been assessed to be low subject to the application of mitigation measures during operation.

Emergency water release: thank to project designed to release water to River La Tinh in emergency. In additional, the areas located in steep topography, hence the flood disappears quickly by time, another reason can be high flooding level occurring in rainy season, at the time the cultivation is not active, therefore community living in downstream is not affected in case of flood flow uncontrollable.

Risk of water lost: Water losses mainly of evaporation and seepage occur under pre-project conditions and are reflected in the stream flow records used for estimating water yield over 130ha arable land. The construction of new reservoirs and canals is often accompanied by additional evaporation and infiltration. Estimation of these losses may be based on measurements at existing reservoirs and canals. Seepage losses from reservoirs and irrigation canals may be significant if these facilities are located in an area underlain by permeable strata. Avoidance in full or in part of seepage losses may be very expensive and technical difficulties involved may render a project unfeasible. The residual impact has been assessed to be low if impacts are considered.

Risk of dam safety: risk assessments and other dam safety studies often require that an estimate be made of the number of fatalities that would result from dam failure. To assist in this effort, an extensive evaluation of dam failures and the factors that contributed to loss of life was conducted. Dam failure can cause loss of life (80 household in Thach Ban Dong village), property damage, local hydrologic change cultural and historic losses, environmental losses as well as social impacts. The suggested mitigation measure to minimise impact is mentioning in Part VI.

PART VI. ALTERNATIVE ANALSYS

Several alternatives have been considered in feasibility study of the sub-project, includes:

6.1 No project implementation

The main purpose of the subproject is to ensure and safe for the people living in downstream areas of the dam, to provide reliable irrigatiion service to 130ha of arable land of Thach Ban Dong and Tach Ban Tay villages of Cat Son Tay commune, modernization operational management, improve ecology systems condition and freshwater aquatic cultivation combination.

Thach Ban Irrigation reservoir was built and used since 40 years ago, it brings high economic efficiency to the local resident and improve social conditions. To date, the headwork of the construction was damaged and degraded. Without the project, the risk of dam failure is high and is a threat to the live and livelihood of 80 households living in flood plain of Thach Ban Tay village. Without the project, 130 ha agricultural land owned by 355 households living in Cat Son commune would not be benefited with improved irrigation service, productivity would be less. If dam failure happen, not only the lives and livelihood of 80 households are threaterned, damages would be caused to local existing infrastructures, particularly the 60 km of exisitgng rural road, 21 km of irrigation canals, 3 schools, one health care centre, one CPC office buidling wou In the long termit also be be more efficient for the exploitation of the reservoir for sustainable development in the region.

6.2 With the project

a) Borrow pits alternatives:

During the preparation of the subproject, the alterivatives on borrow pits were considered.

The first borrow pit location considered were located at the bank and upstream of the reservoir, about 1 km from the dam site. If this site is selected it requires permanent acquisition to 4ha of annual cropland owner by 02 households. The other key potential impacts would be incrfeased erosion potentials from site during construction phase and when it is abandoned. As the result, increased water turbidity and sedimentation load to the reservoir would lead to negative impacts on aquatic ecosystems, etc. Then the second borrow pit located downstream of the reservoir and next to 1km to construction site were considered. This borrow pit requires temporary land acquisition of 6ha of 10 local households. Although area if land and the number of affected households would be higher than the first option, the second option of the borrow pit would have less environmental impacts. Especially reduce negative impacts on aquatic system in the reservoir and water quality.

b) Access and management road detour

Two options for access road alignments were considered during feasibility.

In the first option, the access road has starting point at from the existing inter-village concrete road to dam construction site with length is of 850m. The transportation of materials from Quy Nhon city to the construction site will damage the existing concreted road surface with length is of 2.3 km, causing damage to the pavement. On the other hand, this route runs through the resident areas of Thach Ban Tay village and 01 rural market place. Therefore,

environmental consultants proposed another transportation road. The alternative road starts from Son Loc bridge to the dam with road length is of 845.4m. This road impacts only 400m in length of the existing concreted road (former plan impacts to 2.3km), this is also the new rural road that‘s mentioned in rural development plan of the local.

Scenario 1: the access and management road connectes original from iner-road to the dam position with total length of 850m. Material transport from Qui Nhon City damanges to 2.3 kilometers of local road (concreted) . On the other hand, this route runs through the residential area of Thach Ban Tay village and rural markets.

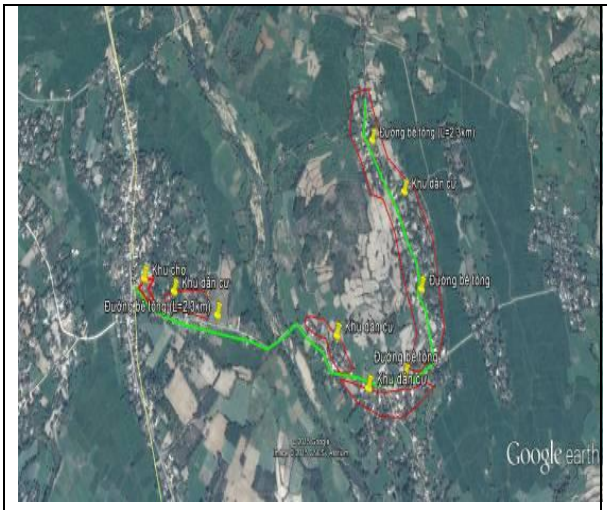


Figure 6. 1:Secnario 1

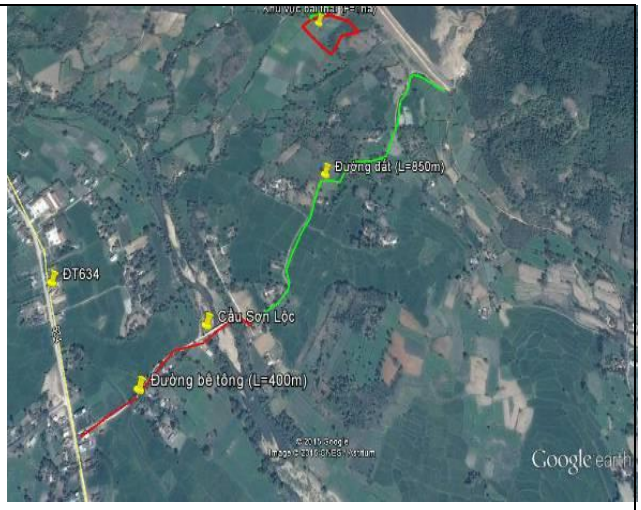


Figure 6. 2: Alternative plan

Alternative plan: Environmental consultants have proposed an alternate road, it starts from Son Loc bridge with total length of 845,4m. This alternative was selected, because it only impacts to 400m of the existing road (former plan impacting 2,3km), also this road is planned in the new rural planning of the commune

PART VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.1 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

7.1.1 Consultation on environmental impacts and mitigation measures

Two consultation rounds with Phu Cat local communities and communes were carried our:

The first consultation was carried out On January 28th, 2015, Binh Dinh irrigation project management unit (PPMU) organised the meeting to share information about the environmnetal and social impacts by the sub-project. 15 participants attended the meeting, including:

- Representatives of DARD, DoNRE, DoC, DCST, DOET, DoIT.
- Representatives of CPC of Phu Cat, Agriculture division, Natural resources and Environment division, CPC of Cat Son, leader of villages
- Representatives of Phu Cat Irrigation Exploitation co.Ltd
- representatives from ffected households and communities about project impacts
- Environmental and social consultants and engineering consultant

Content of the first consultation:

- Summary of subproject information: objectives, components, scope of works of the sub-project, the household to be affected and financing plan.
- Vietnamese government and WB safeguard management requirements.
- Possible impacts and mitigation measures.
- Environmental management plan and environmental monitoring program.
- Commitment by subproject owner/PPMU.
- Discussion and opinions and feedback of subproject owner/PPMU.

The secondconsultation about measures to minimize the environment and social impacts of subproject was carried out on March 6th, 2015 at conference room of Cat Son commune, 40 participants participated in the discussion, including: people's Committees, Fatherland Front Committees Cat Son commune, veterans, Women's Unions, youth Unions, farmers' associations, cooperatives, village leaders, the affected households in the areas.

At that time, the environmental consultants discussed on the potential negative impacts on the environment and society during project implementation, identified the objectives and scope of works, proposed a mitigation measures to limit the negative effects of the listed impacts. The participants raised their ideas relating to the impacts, consultants and investors considering the suggestion and incorporating them into the report of ESIA.

In addition, Binh Dinh irrigation project management has also sent the official letter and related documents on the project components, solutions to protect environment and local community to the People's Committee and Fatherland Front Committee Cat Son commune to make a request of consultation for environment and social impacts assessments process of the project. The recommendations of the participants are sent to CPC of cat Son commune by official documents (see appendix…). Also, the subproject' investors has been received the comments from the affected communities, and from the local authority on the proposed mitigation measures.

Figure 7. 1: Photos of some consultation activities

Feedbacks received

- Agreement for implementation of subproject: participants participated (100%) in the meeting agreed to implement the sub-project, because it will be ensured to handle the of Thach Ban reservoir in a good condition. The sub-project implementation also reduces the risks for local residents in the rainy season, stables water irrigation to 305 ha arable land of Cat Son commune.
- The negative impacts of subproject on environment and society: the affected households, People's Committee and Fatherland Front Committee agreed that the negative effects could be harmed to the environment and society such as the land acquisition, dust and noise increasing, the health safe etc, have to limit in order to keep a good environment and social conditions.
- The proposed mitigation measures to reduce negative impact on environment: CPC and the VFF of Cat Son Commune and the affected households agreed with the mitigation measures to reduce negative impact on environment that has been proposed on the sub-project EIA report:

- The transporting materials should avoid rush hours, the vehicle have to cover during material carrying, watering water on road.
- The earthworks activities should aware about the rainy season.
- Land occupation for site clearance should be limited.
- Announcement the transportation time schedule on the media and public.

- Based on the systematic analysis of the scope of works, negative impacts, mitigation measures to the sub-project, Cat Son authority gave some advices for the project owner, are:

  - Hoi Son reservoir can cover to 40 hectares arable land during construction time
  - Consideration the alternative transportation road via Son Loc bridge to avoid impacts to resident living areas.
  - Compensation for damage to road and infrastructure due to construction activities
  - Assessment the risk to downstream areas in case of emergency water release.
  - Transportation of wastes, construction material have to follw the regulations.
  - Project owner have to follow the laws, regulations, loca authority and community sugesstions to protect environmental and social aspects in the ESIA report.

Table 7. 1: Feed backand respsonse from environmental consultation

Date	*Venue*	*Feedback*	*Responsible agent*	*Mitigation measures*
28/1/2015	Binh Dinh IPM, 301, Bach Dang, Quy Nhon city	100% of participant agreed with the implementation of the sub-project		Compensation for 02 households by land acquisition and 80 affected households by water cut for construction
6/3/2015	CPC Cat Son headquarter	Consider to irrigate 130ha of agricultural land during construction from Hoi Son reservoir		Hoi Son reservoir can cover only 10-40ha of arable land. Hence, the project owner have to response to the entries of non-irrigated areas during construction phase
		Consider alternative road alignment via Son Loc bridge to avoid impacts to resident areas	The project owner have to calculate, design and select the alternative road (1.1km long)	Compensate to 1500m2 arable land
		Repair the damaged road if necessary	The project owner have to response the issue	• Remove damaged layers • resurface and hardnosed
		Assessment the risk to downstream areas in case of emergency water release	Calculate the water release volume	The project design have to consider to build a canal connecting to stream Nho Que and to river La Tinh to minimize the impact

7.1.2 Consultation of social impact assessment

Summarise of Social public consultation for social impact assessment

Table 7. 2: Social public consultant

	Date	*Venue*	*Participant/ women*	*Content*	*Participants*
1	9/03/2015	Cat Son CPC	- 136/65	- Objectives, proposed financed components; - Positive and negative social impacts	- Local authority - Project owner - Environment Consultants - Binh Dinh PPMU - Affected households
3	24/03/2015	Cat Son CPC	- 132/56	- Introduce draft ESIA - Discuss on the consensus for implementing the project; - Discuses affected areas, positive and negative social impacts - Mitigation measures - Monitoring and management plan in operation and construction phase	- Local authority - Project owner - Environment Consultants - Binh Dinh PPMU - Affected households

Summarise of the social consultant feedback

Table 7. 3. Social consultant feedback

Date	*Venue*	*Feedback*	*Project owner responsibility*	*Response*
9/03/2015	Cat Son CPC	- All participants agreed to implement the sub-project, because it will be ensured the of Thach Ban reservoir in a good condition		
		- Compensation for affected households	- Calculate and compensate	- Compensate in accordance with national regulation and law
		- Ensuring the security during construction phase	- Apply mitigation measure	- Register worker to CPC - Worker management and working hour plan

Date	*Venue*	*Feedback*	*Project owner responsibility*	*Response*
24/03/2015	Cat Son CPC	- Added feedback after date on 6/03/2015 and 24/03/2015		
		Ensuring safety for workers on working site, community health	Apply and monitor mitigation measure	Protect clothing and equipment, avoid rush hours
		In the project area, there are several vulnerable groups such as children, women, aged and disable person. The owner project should take care of these group	Monitoring and mitigation measure application	Public media, job creation, increase income and training, awareness of their need and demand, sice have to develop a suitable pant to help the group
		The sub-project will lead to expose disease in the small areas, from worker to local person	Monitoring and mitigation measure application	Training to local people on disease, social evil avoiding and treatment.
		Conflicts may arise between households living in watershed and household in downstream due to unequal water supply. Conflicts may arise between the affected households with non-affected households due to compensation	Ensuring sufficient water supply to domestic users and to irrigation	Public communication plan is needed, beside of that, the project owner have to discuss with the local people about the advantage of the sub-project and compensation of affected households, about water supply during construction phase, etc

Response and committmenst of Project owner

- Project Owner acquires contribution ideas and has timely adjustment in design documents and simultaneously commits doing well the measures to mitigate negative impacts by subproject's activities
- Project Owner responses to the effected households, damaged local infrastructures, environment pollutions in accordance with Vietnam and World Bank policies and regulations
- Project Owner responses to contact with local authority regularly, prepare worker management, health and safe plans
- Project Owner responsible to local traffic condition
- Project owner committed to take water from Hoi Son reservoir to irrigate 130ha of agricultural land of Thach Ban Dong and Thach Ban Tay villages. The project owner have to response to the entire of non-irrigated areas during construction phase
- Project Owner responses to cconsider the alternative transportation road via Son Loc bridge to avoid impacts to resident living areas
- The project design have to consider to build a canal connecting to stream Nha Que and to river La Tinh to minimize the impact risk to downstream areas in case of emergency water release

The public consultation document, the recommendations of the CPC's, the commitment of Binh Dinh irrigation project management Unit response to report on the evaluation of environmental and social impacts are in the appendix .

7.2 Information Disclosure Plan

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

The report of ESIA of the sub-project will be published in Vietnamese version on the website of the Ministry of Agriculture and Rural Development, CPO, People's Committee of Binh Dinh province. ESIA summary will be sent to the Department of Natural Resources and Environment of Binh Dinh, Phu Cat District People's Committee, the CPC Cat Son to the community and interested organizations can access, monitor the plan of ESMP implement.

The report of ESIA of the sub-project in English will be published on Information Centre of the World Bank in Hanoi

PART VIII. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The details of negative/positive impacts of Binh Dinh sub-project were discussed in part V. The Thach Ban sub-project will not increase the water storage capacity of the reservoir. Most of the potential impacts and risks will be in the construction phase. The negative impacts generated from site clearance, excation and other construction activitites, handling and transporation of materials and waste, waste disposal, borrow pit and camp operationetc. Changes in landscape in disturbed areas, particularly the borrow pits and disposal site, generation of large amount of stockpiles, increased level of dust, noise and vibration from construction activities and transportation, domestic waste and wastewater from camps, social disturbance related to the mobilisation of workers to the sites, safety and health risks for workes and local community, disruption of irrigataion service are the key issues of concerns during construction phase. These impacts would mostly be at low to medium level, localized and reversible, and manageable. This management plan is proposed to manage these potential negative social and environmental impacts. The subproject-s RAP report with detail plan will address the impacts related to land acquisition.

8.1 Mitigation measures

The key potential impact and mitigation measures of direct construction-related impacts are summarised in the table 8.1 below:

Table 8. 1. Potential Impacts and Mitigation Measures

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
			Design/preconst.	*Construction*	*Operation*
I	PRE-CONSTRUCTION				
1	Land acquisition: Permanent: 1,611m^2, 12 HH affected (access road) Temporary: 142,893m^2, 11 HH affected	• Detailed in the RAP report: VND 1,184 Millions VND was budgeted to pay for compensation and support to the affected households	Binh Dinh CPC Phu Cat CPC Cat Son CPC, VFF		
2	Safety risks related to Unexploded Objects (UXO)	• Estimate cost	FS consultant		
		• Contract specialised defence force for mine clearance	PMU		
II	CONSTRUCTION				
1.	Social impacts: potential conflicts with the introduction of 80 workers to the project area and construction activities; impacts on household income, gender impacts from land aquision	• Register the workers to local community • Contract obligate the use of local labour for manual work • Inform and allow land owner to collect the trees and crop before site clearance to get income from these crop products or make use of these materials • Follow Complaint redress procedures for conflict resolution • Plan to supply food to serve workers • Facilitate if local people (women, poor) has willingness to supply food to worker for improved household incomes • Engage local mass organisations unions on rights and responsibility to the ESMP monitoring and monitor the compliant of construction contractor	FS consultant, PMU Compensation committee	Contractor	

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
		• Networking between with mass organisation and local authority, PMU, construction contractors and supervision contractor in order to receive any information on impacts on time			
2	Gender impacts Women and children of 23 effected household due to permanent land acquisition and 355 other households being effected by water interruption in construction phase	• Implement Compensation plan • Create an opportunity to women and affected households to get a job to cover their economic lost in construction phase • contract local resident to supply foods and water to worker on construction site if feasible			
3	Landscape modification	• Retain fertile top soil for reinstatement at the borrow pit, disposal areas and other disturbed areas • Minimise volume of waste by collecting and use cut down trees for beneficial purpose.			
4	Biological impacts • vegetation clearance, tree cutting, dust affect growth of plants • disturance to wildlife from dust, noise and vibration from construction activities • Impacts on aquatic lives by underwater construction activities, changes in water quality, water level	• Limit site clearance within designated land area and cutting down the trees outside the approved construction area is forbidden • the use of chemical for site clearance is prohibited • Build coffer dam during construction phase to minimise impacts on water quality and aquatic life		contractor	
5	Increased level of dust and gas emission from excavation and transporation 80 workers Local households along the	• Watering road surface to reduce dust • Water vegetation covers around the site • Watering transportation roads,			

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
	transportation route	• Cover the material storages areas • Cover the truck during transporting (avoid the materials falling down on road). • Cover soil and material storages areas			
6	Noise and vibration 80 workers 10 households living along the access road	• The transportation vehicles, equipment must be maintained periodically. • All vehicles transport materials have to avoid their activities in rush hours and at night time			
8	Solid waste management	• Reuse the removed soil layer to plantation and ground levelling • Collect, reuse and recycle excavated materials and construction wastes where possible • Levelling and compact the disposed waste to reduce volume and avoid subsiden risk • Dispose the waste in designated areas only;		contractor	
9	Domestic waste and wastewater generation from camp	• Build adequate sanitation facility at the camp, including septic tank toilet and drainage to ensure there is no stagnant water surrounding the camp • Provide sufficient containers with lids for temporary storage of domestic waste (40kg/d) from the camp • Arrange for regular waste collection and disposal			
10	Hazardous generation	• Collecting and handling wasted oil following the hazardous material management regulation • Waste oil are stored in safe containers and			

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
		away from workers camp • Waste oil containers are stored on water-proof base and protected with roof, warning signs and restrict access • Contact the recycle company for hazardous material management • Return wasted oil to fuel supplier • Do not maintain or repair vehicles at the sites, but in workshop or service business			
11	Changes in flow pattern, water quality in reservoir, La Tinh rive, Nha Que stream and canal system at downstream	• Minimize the solid or rocks falling into reservoir • Install toilets on construction site and camping site. • Wastewater has to collected and treated in accordance with QCVN 09-2009 before discharge to environment. • After completed construction, all toilet and recycle bin have to sealed off and move out of the construction site.		contractor	
12	Increased erosion risks, sedimentation	• Selection the site of borrow pit downstream of water sources	FS consultant		
		• Avoid clearance activity in the rainy weather • Creat and maintain embankment around the borrow pit • Cover excavated and construction materials where possible. • Construction must be started in dry season • Disposal areas have to compact regularly.		contractor	

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
		• The disposal areas, borrow pit, workers' camping site, material storage areas should be reset in original status			
13	Traffic disturbance and increased traffic safety risks, particularly along the 845.4 m access road crossing Thach Ban Dong village; 10 households and Cat Son school	• Announce the construction schedule on public media • Avoid Cat Son primary school during rush hours • Limit speed at section crossing Cat Son primary school and allocate personnel to direct traffic at pre-class and class over time. • Install and maintain instructions, warning and signage boards • Install and maintain warning and lighting system at night		Contractor	
14	Damages to existing local road and othe existing rural infrastructure 400m concrete roads of Cat Son commune.	• Restrict the use of trucks with load up to 7 tons • Any damage to local infrastructure has to report to local authority and should be repaired as soon as possible. • Compensate to local roads, infrastructures if damaged.		contractor	
15	Health and Safety risks for workers	• Comply with safety regulations according to Viet Nam Labour law and construction management regulations • Appoint staff responsible for environment, health and safety • Install barrier, fence, warning signboards, restrict access to construction areas		Contractor	

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
		• Arrange safe and adequate accomodation for workers with clean water supply and sanitation facilities • Provide first aid kit at the camp • Provide safety training and adequate protective clothings for the workers			
16	Health and safety risks for local community	• install protection fence, warning signs, traffic lights to avoid accidents, particularly in sensitive areas			
17	Disruption of irrigation and other public service 75 ha arable land/355 households of Thach Ban Đong and Thach Ban Tay villages will be affected	• Budget of VND 1.621,8 Bill. were proposed to support 355 effected households affected • Inform the affected households in planning stage	FS consultant PMU		
		• Reinform during construction phase no later than two weeks before irrigation service is disruptted and at least 2 days before other services are disruppted • Use alternative water supply sources from Hoi Son reservoir to irrigate 40 ha agriculture land		CPC	
18	Pest management related to termite treatment	• Training on IMP for farmers in the area		consultant	
III	OPERATION PHASE				
1	Agrochemical use in extended irrigated area	• Provide training on IPM for farmers in extended irrigated area		PMU	

No	*Impacts/Risks*	*Mitigation measures*	*Implementation responsibility*		
2	Emergency flood water discharge	• Announce water release schedule to downstream on the public media to local authority about the volume of water to be released and potential negative impacts • Prepare evacuate and rescue plans • Provide evacuation facility if necessary. • Train local people on emergency response	FS consultant, PMU	Contractor	Work management and local authority
3.	Sedimentation in reservoir before refill o Due to cement packaging material, chemical container, hazardous chemical left or leaked from construction sites o Affect fish, aquatic habitats and aquatic life	• Collect all waste in the reservoir. • Plant trees in watershed of the reservoir to reduce soil erosion progress • Limiting activity on slope land in upper stream • Collect, transport and dipose all waste before refill			Local authority

Table 8. 2. Estimated cost of mitigation measures (the consultant should review and check make sure that proposal is reasonable – some costs seems to be impractical

No	*Item*	*Budget*	*Note*
1	Compensation for land acquisition and support to households affected with water cut off	Total budget: VND 1,621.8 Mill.	
2	Waste transportation	10 millions	included in construction budget
3	Sheets for covering materials: Watering road surface: Signal speed boards 4 x 1 Mill. =	10 unit x 2 Mill. = VND 20,000,000 VND 5 Mill. VND 4 Mill.	
4	Cover sheet for trucks Cleaning road and gathering waste during transportation Compensation for road damaging:	VND 10 Mill. VND 30 Mill. VND 80 Mill.	
5	Cover sheets for borrow pits	20 x 2 Mill. = VND 40 Mill.	

6	5 mobile toilets	5x 30 Mill. = VND 150 Mill.	
7	Hazardous waste management and treatment fees	2 years x 20 Mill. = VND 40 Mill.	
8	Vehicle maintenance fees	2 years x 15 Mill. = VND 30 Mill.	
9	Recycle bin	10 x 500.000 = VND 5 Mill.	
10	Reinstate disturbed areas	VND 50 Mill.	
11	Management and treatment fees	VND 60 Mill. (transportation and treatment of hazardous waste)	
12	Protection clothing and equipment	2 time/year x 2 years x 20 Mill. = VND 40 Mill.	
13	Training workers about working safety and provide personal clothing according to current regulations of Vietnam	2 twice times per year x 2 years x 30 = VND 120 Mill.	
14	Train the staffs of the social unions on the right and their responsibility to the ESMP monitoring and monitor the compliant of construction contractor	Training fees: VND 20 Mill.	
15	Potential conflict between workers and local peoples	Social cultural activity fees VND 20 Mill.	
16	Waste collection during operation phase	Recycle bin, and waste collection fees 1.5 Mill/ month x 12 month x 20 years= VND 360 Mill.	
	Total	**VND 3.876 Mill.**	

Dust control. To mitigate impacts in the construction area, dust control measures shall be implemented on all unpaved roads and construction surfaces, particularly during dry and windy conditions and sections crossing residential houses and buildings. Production of dust and particulate materials at all times should be minimised all the times to avoid impacts on surrounding communities, and especially to vulnerable people (children, elderly people). Dust watering shall occur only during designated hours. The dust generated from stockpiles shall be controlled by compaction and the stockpiles shall not be allowed to expose for extended periods.

The main access road to dam site. All trucks carrying construction materials shall be covered and no vehicles shall be left idling. Regular maintenance of vehicles (daily/weekly) shall be performed at designated areas. The traffic on access and service roads shall be regulated in order to minimize air pollution. In addition, all processes shall follow the code of practice during construction and operation phase that meets the requirements of Vietnamese standard (TCVN 5939-2005).

The duration and magnitude of the impact is anticipated to be low if appropriate mitigation measures are applied during the construction phase.

Noise minimisation. All construction-related traffic on project access roads should be operated within speed limits. Noise levels associated with all machinery and equipment should be maintained at or below 90db where possible. In sensitive areas (including residential neighborhoods, office, schools, etc.) Transportation during peak hours should be minimized, the vehicles shall be required to slow down and banned from using horns when passing these sensitive areas.

Biological impacts management

Large or significant trees in camp areas and access roads should be preserved wherever possible. The application of chemicals for vegetation clearing is not allowed. Construction shall be programmed in sequence so that the scale of earth moving activities and area of exposed surface can be minimized. Re-vegetation shall start at the earliest possible. Appropriate local species of vegetation shall be used. Restoration, of cleared areas such as borrow pits no longer in use, disposal areas, construction roads, construction camp areas, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works shall be accomplished using landscaping, adequate drainage and re-vegetation. Topsoil stripped from the work areas shall be used for landscaping works, and Watercourses, which have been temporarily diverted by the construction activities, shall be restored to their former flow paths. At the completion of construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a similar condition to that prior to the commencement of the works, or to a condition agreed to with local authorities and communities.

Construction Waste Management.

Daily site clean-up, including maintenance of adequate disposal facilities for construction debris should be implemented. Debris generated due to the dismantling of the existing structures shall be suitably reused, to the best extent feasible (e.g. as fill materials for embankments). Under no circumstances any material should be disposed on in any in environmentally sensitive areas. Ensure stabilization for disposal site.

Hazardous waste management.

Storage areas for diesel fuel and lubricants are not located within 100 meters of the camp or watercourses. Storage are of fuel or lubricants and 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.

Erosion and Sedimentation control

Site activities shall be carefully managed in order to avoid site erosion and sedimentation of downstream waterways. Areas disturbed by construction activities shall be maintained in their existing state. The area to be disturbed should be minimal and stabilized as soon as possible. Drainage through the area should be controlled and trap sediment onsite. Install erosion control barriers around perimeter of cuts, disposal pits, and roadways if necessary. Water shall be sprayed as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion and dust.

Construction Camp Management

Recruit the available workforce whenever possible and provide appropriate training as necessary. to address potential ethnic tensions between workers and the local communities. The following general measures should be required for construction camps:

1. Be safe, has adequate and suitable facilities for washing clothes and utensils for the use of workers. The camp should have adequate toilets and washing areas for the workers expected on site. Toilet facilities should also be provided with adequate supplies of clean or potable water, soap, and toilet paper, be conveniently accessible and kept in clean and hygienic conditions at all times.
2. Effective sediment and erosion control during construction and operation of the construction work camps
3. Safe potable water is provided for food preparation, drinking and bathing.
4. There are septic tank systems for camp without causing pollution of nearby watercourses. Wastewater should not be disposed into any water bodies without treatment, in accordance to applicable Vietnamese standards.
5. Apply acceptable storage and disposal or recycling of all solid wastes generated by the labor camp and/or base camp.
6. provide medical and first aid facilities at each camp area;

Safety management During Construction.

The subproject shall be compliance with all national and local safety requirements and any other measures necessary to avoid accidents. Vehicular speed on each section of road will be under controlled. Safe sight distance will be established in both construction areas and construction camp sites. Signs will be placed around the construction areas to facilitate traffic movement, provide directions to various components of the works and provide safety advice and warning. In school vicinity, traffic safety personnel shall be arranged to direct traffic during school hours; Maintain a supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction; Conduct safety training for construction workers prior to beginning work.

Avoid damages to local infrastructure.

The subproject will hold responsible for any damage caused to local roads and bridges due to the transportation of excessive loads and shall be responsible for repair.

Spoil Management.

The average existing ground elevaltion is +40,00m. Before disposal, the 0.3 m of top soil will be removed for resurfacing this site during site reinstatement. After that, the waste will be disposed off to height 5.5 m but will be reduced further to 5.0 m after levelling and compaction [should do compaction layer by layer during the entire construction period, not at the end to reach 0.5 m reduction in height. To that stage, the ground elevation on the top of the disposal site will be equivalent to existing ground level in the surrounding area. The total volume of spoil disposed of at the disposal site will be 5,5*10.000 = 55.000m^3 [height should be calcalculated based on after compaction, less should be disposed of on this site and more on the borrow pit]

The remaining excavated material will be 135,051 – 55,000 = 50,051m^3 for disposal at the borrow pit, from which the volume of excavated soil would be: 113,767*1.16-15263= 116,707m^3.)

The land area of the borrow pit is 6ha or 60,000m^2. Diposal of the 55,051m^3 will make the dump 0.8m high while the site would be excavated to 2m deep. Thus the borrow pit will be 1.2 m lower than the pre-construction groundlevel.

Water cut-off plan to minimise impacts on farmers

Construction schedule is arranged to minimize the impacts on water use and production of downstream area as well as mitigate the impacts on natural environment of project area.

However, due to the effect of water releasing for construction, so that planting season with areas using water from Thach Ban's reservoir is affected. The expected time for construction is two years (no construction in flooding season). In the first year, reservoir is drained totally from March to August for construction of intake culvert, embankment and spillway. Before flooding season of the first year (August 31), intake culvert will be finished, embankment will be constructed to the normal water elevation of +50,80m, reservoir is stored and re- operated.

Thus, the construction of culvert and dam will just impact on summer – autumn crops of the first year (the winter – spring crops finish in March while reservoir releasing for construction of dam and culvert will start in winter – spring crops without irrigation). The area without irrigation in summer – autumn crops is 75ha (including: 45ha of paddy field and 30ha of crops land). 40 ha are irrigated additionally by Hoi Son reservoir. The remaining area of 15 ha has no summer – autumn structure crops (Figure 14-15).

The mitigation measures to be implemented by the contractor have been translated to Environmental Specifications as detailed in Annex Environmental Specifications. The Environmental Specification will be included in construction bidding and construction contract documents.

8.2 Environmental Monitoring Plan

Environmental Monitoring plan includes two types of environmental monitoring

- Routine environmental monitoring to check compliance to the project environmental management requirements, to identify non-compliance or arisen issues and propose mitigation measures

- Environmental quality sampling for verification of the effectiveness of the mitigation measures, propose corrective measures if environmental quality exceed standards.

8.2.1 Environmental Compliance Monitoring

Environmetnal compliance monitoring should be carried out mostly be observation on regular basis by the construction supervisor and PMU environmental officer. The independent monitoring consultant can also monitore based on the plan described below.

Table 8. 3. Environmental Compliance Monitoring Plan

	Impacts/Risks	*Parameters to monitor*	*Location/method*	**Frequency**
1	Land acquisition:	Compensation paid to affected households	Interview affected households	Regular, until farmers are is fully paid
2	Safety risks related to Unexploded Objects (UXO)	UXO clearance contract is signed Work is completed and verified Payments are made	Check documents	Once or until the contract is fully paid
3	Social impacts: conflicts with 80 workers, impacts on household livelihood, gender impacts from land aquision	• Workers are registed to local authority • Number of local people hired by the subproject • Amount of trees, excavated materials reused • Cases of conflicts between locals and the workers • Income, job, cultivation period, crop yield, water irrigation schedule • Complain and griviance of resident	Interview the workers and the community ownstream areas	Every 6 months
4	Gender impacts: Women & children of 23/355 HH affected with land acquisition/water interruption	• Number of women get temporary jobs or business opportunity from the subproject	Interview the contractor, the worker and local community	
5	Landscape modification	• Fertile top soil are retained for reinstatement • Waste are levelled and compacted	all disturbed areas, particularly borrow pit & disposal sites	weekly
6	Biological impacts vegetation, trees, wildlife, aquatic lives	• Vegetation and trees are not over cut • Manual vegetation clearance • Coffer dam built for underwater construction activities	Obervation at disturbered areas interview	
7	Increased level of dust and gas emission	• Visibility in the air • Loose construction materials are covered • Trucks carrying losse materials are coverd		

	Impacts/Risks	*Parameters to monitor*	*Location/method*	**Frequency**
		• Levelling and compaction done		
8	Noise and vibration	• The transportation vehicles, equipment must be maintained periodically. • All vehicles transport materials have to avoid their activities in rush hours and at night time		
9	Solid waste management	• Top soil are retained for reuse and reinstatement • Reuse and recycle are practiced • Waste are Leveled and compacted at disposal site • Waste are loaded in in designated areas only;	Obersations at Construction sites Camp Disposal site	
10	Domestic waste and wastewater generation from camp	Availability and condition of sanitation facility at the camp: toilet, drainage, bins cleaness of the camp and surrounding area	Observation Interview workers	
11	Hazardous management	• Waste oil are stored in safe containers and away from workers camp • Waste oil containers are stored on water-proof base and protected with roof, warning signs and restrict access • Status of contract with hazardous treatment contractor	Observation Interview workers	
12	Changes in flow pattern, water quality in reservoir, La Tinh rive, Nha Que stream and canal system at downstream	• Adeqate sanitation and drainage facilities are installed in the camp • Wastewater from construction site is managed and not discharged directly into water sources • All disturbed areas are reinstated before construction completion.		
13	erosion risks, sedimentation management	• Ground is levelled and compacted • Slops are shaped to enhance stabilisation • Loose construction materials are covered. • Refill the borrow pit after completing construction to serve cultivation		

	Impacts/Risks	*Parameters to monitor*	*Location/method*	**Frequency**
14	Traffic disturbance and increased traffic safety risks: along the access roada & Cat Son school	• Local are informed about construction schedule • No accident along access road due to project vehicles or construction activities • Adequate signs, speed control and fence • Allocate staff to direct traffic during rush hours		
15	Damages to existing local road and othe existing rural infrastructure	• Load of truck used • Road condition is acceptable • No other public service interrupted	Observe and interview	
16	Health and Safety risks for workers	• EHS staff is appointed • Adequate fence, sign, and lighting at the site • First aid kit available • Workers using adequate protective clothings while working	Observation and interivew	
17	Health and safety risks for local community	adequate fence,warning signs, and lightings at the site	observeation	
18	Disruption of irrigation and other public service: 75 ha/ 355 HH of Thach Ban Đong and Thach Ban Tay	• Support are paid infull to affected households • Farmers are informed timely about water cut off plan	interview	
		• Use water from Hoi Son reservoir for irrigation		
19	Pest management related to termite treatment	• Training on IMP for farmers in the area		
20	Agrochemical use in extended irrigated area	Number of training courses and number of farmers trained on IPM		
21	Sedimentation in reservoir before refill due to construction waste	• All construction wastes in the reservoir are collected and transported to disposal site		

8.2.2 Environmental Quality Monitoring Plan

Table 8. 4. The content of environmental quality monitoring programs during construction

No.	*Sample*	*Location*	*Frequency*	*parameter*	*Standard*
1	Air quality	1. The embankment areas (KK01) 2. The spill way areas (KK02) 3. The access road areas (KK03)	One time /three months	- Micro climate condition: wind, temperature, humid - Noise - TSP - Vibration	QCVN 05:2013/BTNMT QCVN 26:2010/BTNMT. QCVN 27:2010/BTNMT
2	surface Water	1. in the reservoir (NM01) 2. at the out let of outlet works (NM02) 3. at the land fill areas (NM03)	Each three months	pH, DO, TSS, COD, Coliform	QCVN 08:2008/BTNMT:
3	Ground water	At land fill areas (NN01)	Each three months	pH, TSS, hardness (CaCO3), Fe TS, E.Coli	QCVN 09:2008/BTNMT:
4	Soil	1. Around disposal site (MĐ 01) 2. Material storage area (MĐ02)	Each three months	- Asen (As) - Cadimi (Cd) - Copper (Pb) - Zinc (Zn)	QCVN 03:2008/BTNMT:
5	Erosion and land slide	Spill way	1 time at quarter VI	Scale and size of land slide	
	Operation phase				
1	surface Water	1. At the out let of outlet works (NM04) 2. at the cannal (NM05)	Every six month	pH, DO, TSS, COD, Coliform	QCVN 08:2008/BTNMT

The cost of social and environmental monitoring is estimated in the table XX below

Table 8. 5. Estimated cost for Environmental and Social monitoring

Unit: VND x 1.000

No	*Categories*	*Unit*	*Vol.*	*Price*	*Auditing*
I/	**Expert salary**				**336,000**
1	Leader	month	3.0	25	75,000
2	Environmental expert	month	3.0	18	54,000
3	Hydrology expert	month	3.0	18	54,00
4	Ecological expert	month	3.0	18	54,000
5	Social expert	month	3.0	18	54,000
6	Assistant (3 persons x3 month)	month	9.0	5	45,000
II/	**Sampling and on-site monitoring**				**89.000**

1	Perdiemt (8 person x 10 day x 5 times)	day	400	350	14,000
2	Renting vehicle (10 day x 5 times)	day	50	1,500	75,000
III	**Sample analysis**				**78,040**
1	Surface Water	sample	15	1,826	27,390
2	Ground water	sample	5	1,788	8,940
3	Soil and sludge	sample	10	2,077	20,770
4	Air samples	sample	15	1,396	20,940
IV	**Logistic**				**35,000**
1	Office material		5	2,000	10,000
2	Document printing out		5	4,000	20,000
3	Communication		5	1,000	5,000
V	**Management fees (50%)**	**%**	**50**	**336,000**	**168,000**
	Total (I+II+III+IV+V)				853,150
	Before tax	%	6		51,189
	VAT	%	10		85,315
	Total				**842,544**

8.3 Capacity Building, Training activities

This programs are focusing on improve the PPMU staffs and other knowledge on environmental and social management and techniques.

Table 8. 6: Training program on environmental management

No.	*Contents*	*Implementation budget (VNĐ)*
1	Sageguards policies of environmental and social of the sub-project	1course * 30 participant = 20 Mill.
2	Improving knowledge on environmental protection	1 course * 40 participant = 30 Mill.
3	Building capacity on ESMP and ESMoP	1 course * 50 participant = 40 Mill.
4	Training on environmental health and safety measures	2 course * 100 participant x 40 Mill./course = 80 Mill.
5	Training on improving of gender equity	2 course * 100 participant x 40 Mill./course = 80 Mill.
Total		**VND 250,000,000**

8.4 Reporting Requirements

Table 8. 7. Reporting Requirements for ESMoP

Responsibility for Preparation	*Report*	*Content*	*Frequency*	*Submission to*
Contractor	Risk/accidents	Collecting information about the risks/accidents	within 24 hour since the risks/ accident happen	PPMU and CSC
	Violations	Report infringes on the environmental and social management regulations	Within a week	PPMU and CSC
	Archaeology discovery (if any)	Reporting to the relevant agencies on the new archaeology discovered	Within 24 hour	PPMU and CSC and Local Cultural Department
	compliance with ESMP covenants	Reporting on the effectiveness of ESMP mitigation measures	Every month	PPMU
CSC	Reporting on the ESMP mitigation measures implementation	Effectiveness of ESMP mitigation measures of CSC the results obtained and method applied to solve the accident and remain issues from the last report	Every month	PPMU
Independent Environmental Consultant	Independent reporting on the ESMoP	The result of on-site monitoring The monitoring results based on community The results from CSC The results from environment monitoring The result obtained from ESMP implementation and comments	Every 3-6 months	PPMU and WB
PPMU	Report of environment activities of the sub-project	The results of ESMP implementation	Every 6 months	CPO and WB

8.5 ESMP Implementation responsiblities

Key responsibilities of PPMU and the contractors are as follows:

a) PPMU

The Provincial Project Management Unit (PPMU) is responsible for ensuring effective implementation of subproject level safeguard measures (ESMP) in close consultation with local authorities and local communities. PPMU will assign/hire at least one full time staff with relevant academic and professional experience as the Safeguard Focal Point. The number of Safeguard Focal Points will depend on the number and extent of the subprojects. The PPMU will ensure incorporating ESMPs and other plans in bidding and contractual documents. During construction, the subproject owner will assign the Construction Supervising Consultant (CSC) and/or field engineer to be responsibility for monitoring and supervision of ESMP and monitoring plan implementation by contractor on a daily basis. In addition, PPMU will ensure adequate budget to execute the monitoring plan during the operation phase. PPMU will submit to CPO the quarterly consolidate safeguard progress and monitoring report on during construction phase and the half-yearly monitoring report during operation phase.

b) Construction Supervision Consultant (CSC)

CSC and/or field engineers will carry out, but not limited to, the following tasks:

- Before the launch of the construction, confirm that (a) all compensation for land and facilities are provided and relocation and/or land acquisition/donation has been completed; (b) the subproject ESIA and/or mitigation measures for specific site are approved by Government; and (c) the above-mentioned environmental plan have been approved by concerned parties.
- During construction, closely supervise the implementation of safeguard measures throughout the construction period.
- At the completion of the construction, confirm the compliance with the agreed environmental plan and inspect any damages incurred by the contractor. If necessary, prepare an order to compensate/restore the construction sites as specified in the contracts. Contractor safeguard performance will be included in the subproject progress report.

In addition, the contractor will recruit national safeguard consultants to assist in the planning and implementation of safeguard measures to be carried out by the contractor, including preparation of the Environmental Action Plan (EAP) and communication with local authorities and local communities. In particular, the safeguard consultants will carry out but not limited to the following tasks:

1. Prepare a EAP in compliance with the ESIP and ECOPs within one month of contract awarding with due attention to reduce potential negative impacts on safety of resident and general public, dust/noise suppression, waste management, and traffic congestion. Efforts should be made to identify sensitive areas that may be affected by and/or issues that may arise from the construction activities due to large number of local population and/or important use of land and water.

2. During construction stage, monitor the compliance with the agreed environmental plan, and maintain close consultation with the community residents, and information disclosure and timely responsive to any possible complaints from residents and general public throughout the construction duration.

3. At the completion of the construction, confirm the compliance with the agreed environmental plan and inspect any damages incurred to be paid by the contractor, including preparation of an order to compensate/restore the construction sites as specified in the contracts.

4. Prepare a periodical report to the contractor and PPMU as agreed in the EAP.

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.

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 ESMP 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. The IEMC will carry out environmental sampling for the subproject

e) Local Community

The community will participate in environmental supervision during costruction phase. Community representatives will involve in monitoring the contractors safeguard compliance In case of there are arising environmental problems that affect the community, they will discuss directly with the contractor for corrective action and/or report to the Supervision Consultant and/or PPMU.

e) Reservoir management and development agency: Take responsibility for maintenance and periodic supervision of project works and report to DoNRE

f) CPO: CPO will guide PPMU staffs to carry out environmental and social management plan of subproject. Supervising the progress of subproject during construction time.

g) Province and District People's Committees (PPCs/DPCs), Provincial DONRE

Oversee 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

8.6 ESMP Implementation budget

Table 8. 8. Budget of ESMP implementation (please check/ fill in the figures)

No	*Item*	*Budget (1,000 VNĐ)*	
		Construction	*Operation*
1	Mitigation measures	1,064,000	400,000
2	Independent Monitoring	842,544	202,000
3	IMP training	120,000	160,000
4	Capacity Building	250,000	340,000
	TOTAL	**2,276,544**	**1,102,000**

CONCLUSION, RECOMMENDATION

Conclusions

Thach Ban Reservoir was built in 1978 with the purpose of irrigation 130 hectares of agricultural land in downstream areas. After long time serving, the apputernant structures of dam have been damaged, making unsafe to the local community, infrastrucutres and for agricultiral practicing , especially in the flooding period. The subproject upgrading and safety guarantee of Thach Ban reservoir, Binh Dinh province is necessary.

After the project completeting and operating, it will ensure the safety of construction for long time, flooding control downstream areas. Beside of that, outlet works after fixing will regulate water flow at full designed function to agricultural activities and supply water to domestic users

For this purpose, it will increse the local income, promote buisiness opportunities, extent the paddy rice cultivation, create the job to local person, and gender development. On the other hand, when agricultural growth and it will support to the others in order development of agro-industriy and post harvest processing

However, during the construction phase of the subproject, some negative/possitive impacts on the surrounding environmental and socio, can be:

Impacts on physical environmental:

Air quality: Dust emissions from the construction works, earthworks, material transportation impact on ambient air quality. However, these effects are not long-term impact, the impacts is gone after completing work in the areas.

Noise, vibration: arising from vehicles, construction machinery. However, due to noise propagation in air and decreases with distance, sub-project area is located far from residential areas so that the impact can be negligible

Water resources: Wastewater generated from construction activities and activities of workers. If not collected in right method, it will increase the pollution into the water resources.

Impact on social environment:

As can that that, the negative impacts on social environmental can not avoidable, however, the project owner shall cooperate with the local authorities and make a request to the contractor to apply a good mitigation measure to reduce these impacts on social and have to implement management plan of socio-environmental monitoring

Reducing the negative impact of the project on the socio-environmental effectively is not only by the project owner but also all the community, the local authorities, the provincial agencies and the environmental protection agencies in particular. And, it must be a increase the local knowledge on environmental and social protection, especially the people living in sub-project area.

The implementation of the subproject brings more positive effects than negative for society. The sub-project ensures water supply for agricultural activities, creating more jobs and increasing income of the population, thereby promoting the economy sector in the areas. Importantly, the project provides safety and flood control to downstream areas, to ensure the safety of thousands of people living in downstream

2. Recommendation

Repairs, upgrades to the existing construction will impact on the environment - society, thus it needs cooperating between all parties in the local, especially between the investor and the local government of Binh Dinh Province on monitoring the implementation, the compliance mitigation measures, and environmental management programs in the differences phases of the sub-project implementation.

CPCs of Cat Son have to establish the cooperation to implementing communication programs, information dissemination and the project implementation plan to the people, also to support and assistance to the subproject. At the same time, the project owner and CPCs have to organize the training program to increase local knowledge on environmental protection, monitoring and household economic development, that is mentioned in this report, developing and making the management plant, suitable policies or institutional framework to promote local economic development

APPENDIX

APPENDIX A – ENVIRONMENT

Appendix A1- Drawing of the main works

Appendix A2-Types of Map

Appendix A3- Policyframework, institution and regulation

Appendix A4- Environmental and social screening

Appendix A5- Diagram of sampling and monitoringenvironment

Appendix A6-Analysis results of environmentalsamples

Appendix A7- Publicconsultation minutes

Appendix A8- Environmental Specifications (for inclusion in bidding and construction contracts)

Appendix A9- Chance Find Procedures

Appendix A10- Termite Treatment Procedures

Appendix A11- Integrated Pest Management (IPM)

Appendix A12- Pictures of current status of subproject area

APPENDIX B – SOCIAL

Appendix B1- Methodogical note

Appendix B2- Public Health intervention Plan

Appendix B3 – Public consultation, participation and communication strategy

Appendix B4- Gender action plan

Appendix B5- Grievance redress mechanism

Appendix B6- Information disclosure, account ability and monitoring

APPENDIX A – ENVIRONMENT

APPENDIX A1 – DRAWING OF THE MAIN WORKS

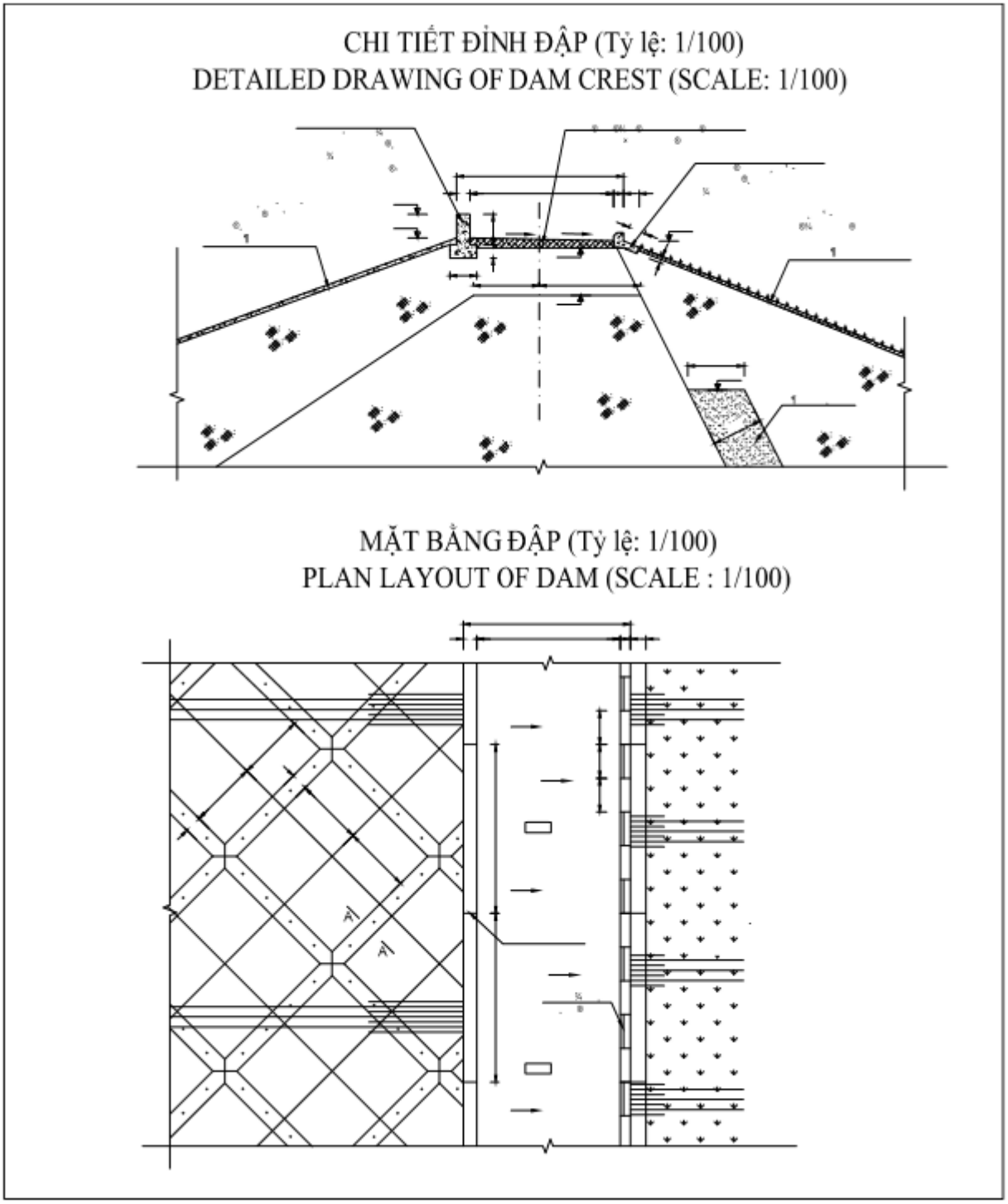


Figure 1.1: Drawing of dam's layout plan

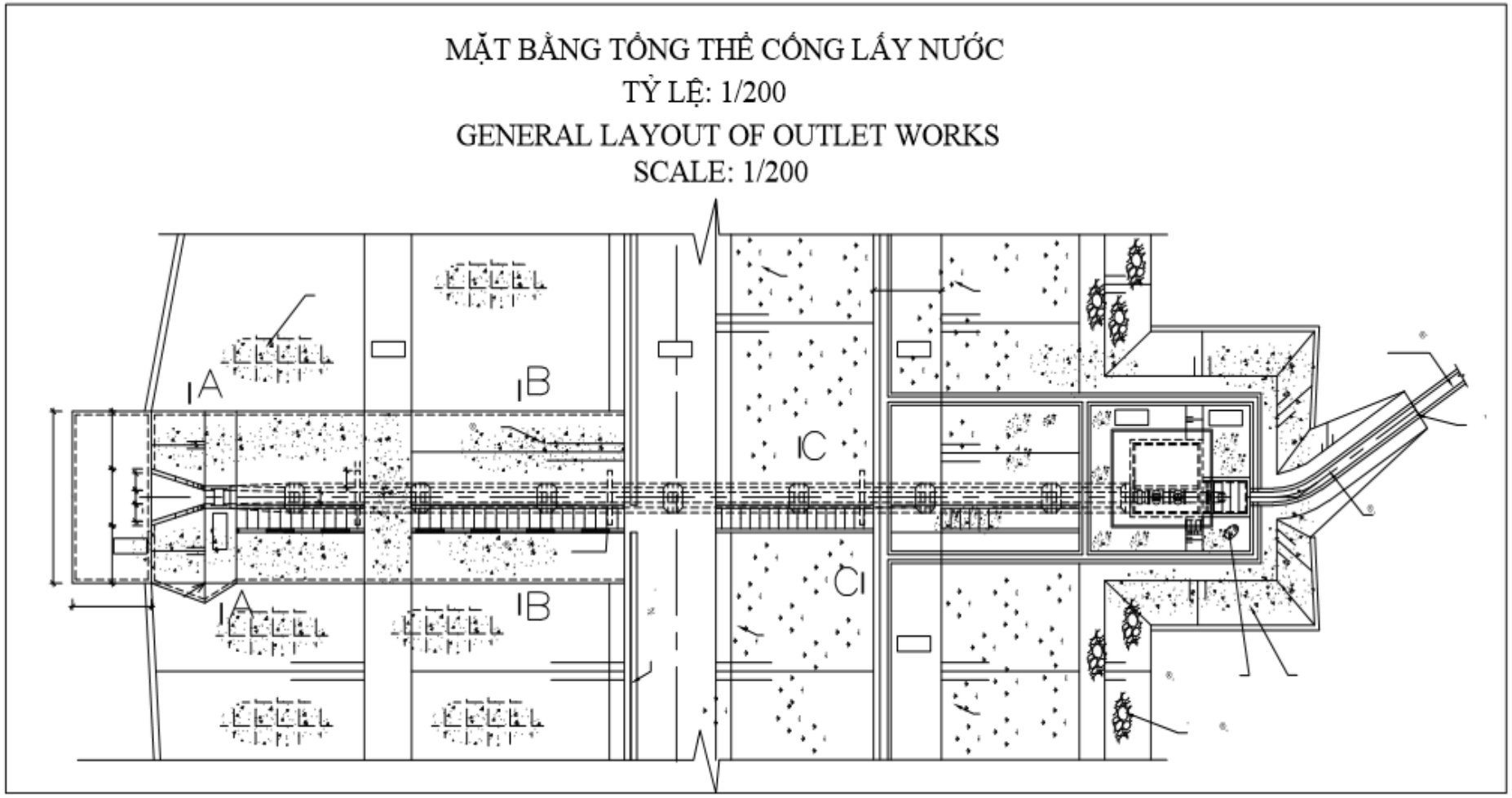


Figure 1.2: Drawing of outlet works

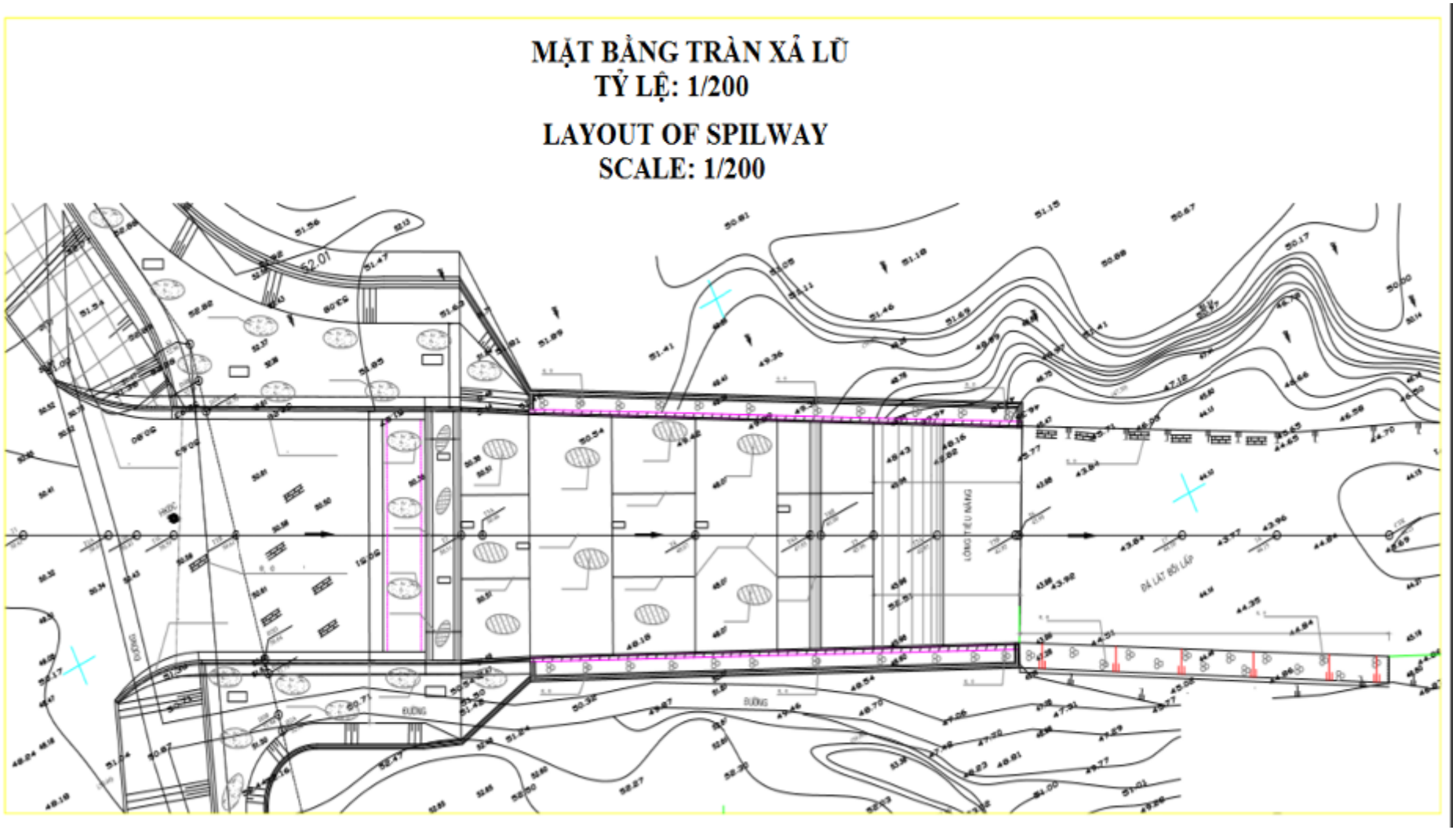


Figure 1.3: Drawing of spillway layout

APPENDIX A2 –TYPES OF MAP

Figure 2.1: Effected areas by Thach ban water interruption

Figure 2.2: Crop land will be covered by Hoi Son reservoir during Thah Ban water itteruption

APPENDIX A3- POLICY FRAMEWORK, INSTITUTION AND REGULATION

3.1 Applicable National policies, legals and administrative frameworks

i) Environment

- Law of environmental protection no. 55/2014/QH13, on Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment. Environmental report should be carried out simultaneously with the establishment of investment projects (Feasibility study report).
- Decree no.18/2015/ND-CP on dated 02/14/2015 regulations on environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plan.
- Directive no.26/CT-TTg on dated 25/08/2014 regards on to implement the Law of Environmental Protection.
- Circular no.01/2012/TT-BTNMT, March 16/2012 regarding regulation on the establishment, evaluation, approval and inspection and certification of the implementation of environmental protection projects in detail, establishment and registration schemes for simple environmental protection.
- Decree no.29/2011/ND-CP dated April 18/2011 regarding regulations on strategic environmental assessment, environmental impacts assessment and environmental protection commitments.
- Circular no.16/2009/TT-BTNMT on dated 07/10/2009 by the Ministry of Natural Resources and Environment, regarding regulations, national technical regulations on the environment, air quality and a number of toxic substances in the ambient air.
- Decision no.22/2006/QD-BTNMT on dated 25/12/2006 by the Ministry of Natural Resources and Environment regarding on the applying the set of Vietnam standards environmental.

ii) Land use and land acquisition

- Land law no.45/2013/QH13 approved by National Assembly of the Socialist Republic of Vietnam Assembly on date 29/11//2013.
- Decree no.43/2014/ND-CP on dated 05/15/2014 regarding on implementing of the Land law 2013.
- Decree no.44/2014 /ND-CP on dated 15/05/2014 regulating method of valuation of land; construction, land price adjustment; specific land valuation and land valuation advisory.
- Decree no.47/2014/ND-CP on dated 05/15/2014 concerning on the provisions on compensation, support and resettlement due to land acquisition.
- Decree no.37/2014/ND-CP dated 30/06/2014 giving more detail information of compensation, support and resettlement when the land acquisition.
- Circular no.23/2014/TT-BTNMT 05/19/2014 regarding on regulations of land use rights, owners house and properties on land.

iii) Construction

- Construction Law no.50/2014/QH13 on 08.18.2014 approved by the National Assembly of the Socialist Republic of Vietnam.
- Decree no.15/2013/ND-CP dated 02/06/2013 on the construction quality management.

- Decree no.207/2013/ND-CP dated 11/12/2013 on supplementation some articles of Decree no.48/2010/ND-CP of May 7/2010 of the Government on the construction contract.
- Decree no.12/2009/ND-CP dated 10/02/2009 on the construction projects management and investment.

iv) Water resources, forest protection, cultural and heritages, biodiversity

- Law of Water resources, approved by Vietnam Assembly on 21/06/2012.
- Decree no.42/2012/ND-CP dated 11/05/2012 by Government on the management and use of land for paddy rice cultivation
- Decree no.112/2008/ND-CP dated 20/10/2008 by Government on the integration of management, protection and exploitation of hydropower reservoirs and irrigations.
- Decree no.120/2008/ND-CP dated 01/12/2008 by Government on the river basins management
- Decree no.149/2004/ND-CP dated 27/07/2004 by Government regulates the license of exploration, use of water resources and wastewater discharge into water resources.
- Law of Forest Protection and Development no.29/2004/QH11 approved by the National Assembly of the Socialist Republic of Vietnam on 03/12/2004.
- Decree no.23/2006/ND-CP dated 03/03/2006 of the Government regarding on the Law of Forest Protection and Development implementation.
- Decision no.57/QD-TTg dated 09/01/2012 approved by Vietnam Prime Minister to forests plan protection and development by 2011-2020.
- Cultural Heritage Law no.28/2001/QH10 approved by the National Assembly of the Socialist Republic of Vietnam on 07.12.2001.
- Biodiversity Law no.28/2008/QH12 approved by the National Assembly of the Socialist Republic of Vietnam on 13/01/2008. Chapter III Conservation and sustainable development of natural ecosystems, and Chapter IV Conservation and development of wildlife.

v) Dam safety regulations

- Circular no.34/2010/TT-BTC by the Ministry of Industry and Trade dated October 7/2010 regarding regulations on dam safety management of hydropower projects
- Decree no. 72 /NĐ-CP on date 07/05/2007 of the government of Vietnam 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 and creating water reservoirs with the scale of capacity smaller than 3,000,000 m3 (three million cubic meters). The works relating to water reservoirs include: water intake, outlet works, flood discharge works, Locks. 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. The 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.

- Document no. 1852/BNN-TCTL on dated 10.06.2014 of the Minister of Agriculture and Rural Development on urgent repairs financial to ensure safe water reservoirs

vi) Resettlement policies

- Decision no.52/2012/QD-TTg, dated November 16/2012, on the support policies on employment and vocational training to farmers whose agricultural land has been recovered by the State.
- Decree no.84/2007/ND-CP of the Government of Vietnam on revision of issuing LURC, land acquisition, implementation of land use right, procedure for compensation, resettlement when land acquired by State and grievance redress
- Circular no.37/2014/TT-BTNMT dated 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land.
- Circular no.37/2014/TT-BTNMT dated 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land.
- Other regulations or administrative decisions related to resettlement plan to be issued by HCMC People's Committee in relation to the Land Law 2014, and its relevant decrees and circulars.
- Decree no.69/2009/ND-CP of government, dated 13 August 2009 on regulating additional planning of land use, land prices, land acquisition, compensation, assistance and resettlement.

vii) Gender policies

- Law 73/2006/QH11 On gender equality the national assembly of the socialist republic of Vietnam 10th session of the xi legislature Published Date 29/ 11/2006
- Decree no.07/2007/ND-CP of January 12/2007 detailing and guiding the implementation Of A Number Of Articles Of The Law On Legal Aid
- Decree No. 70/2001/ND-CP Of October 3, 2001 Detailing The Implementation Of The Marriage And Family Law
- Decree no. 55/2009/ND-CP on sanctioning of administrative violations of gender equality.
- Decree No. 48/2009/ND-CP providing for measures to assure gender equality.
- Circular No. 191/2009/TT-BTC dated 1/10/2009 guiding the management and use of funds for gender equality activities and activities for the advancement of women. The circular was issued in time to meet the requirements of the Law on Gender Equality in ensuring financial resources for equality activities.
- Circular No 07/2011/TT-BTP dated 31/3/2011 issued by Minister of Justice providing guidance on gender equality in legal aid activities.
- Decision No. 2351/QĐ-TTg dated 24/12/2010 of the Government Prime Minister approving the National Strategy on Gender Equality (NSGE) period 2011-2020

viii) Indigenous Peoples and Minority group development policies

- Decision no.1956/2009/QD-TTg, dated November 17/2009, by the Prime Minister approving the Master Plan on vocational training for rural labours by 2020
- Decree no.82/2010/ND-CP of government, dated 20 July 2010 on teaching and learning of ethnic minority languages in schools.
- Resolution no.30a/2008/NQ-CP of government, dated 27 Dec. 2008 on support program for rapid and sustainable poverty reduction for 61 poorest districts.
- Decision no.74/2008/QD-TTg of the Prime Minister dated 9-June-2008 on support productive land and residential land for poor ethnic minority households in Mekong Delta area.
- Decree no.60/2008/NĐ-CP dated 9-May-2008 of the government on the functions, tasks, authorities and structure of the Committee for Ethnic Minorities Affair.

- Decision no.06/2007/QD-UBDT dated 12-January-2007 of the Committee for Ethnic Minorities Affair on the strategy of media for the program 135-phase 2.
- Decree no.70/2001/ND-CP: all documents registering family assets and land use rights must be in the names of both husband and wife.

ix) National policies and planning of reducing poverty

- Decision no.33/2007/QD-TTg of the Prime Minister dated 20-July-2007 on the policy of assistance to improve knowledge of laws as a program of 135, phase 2.
- Circular no.06 dated 20-September-2007 of the Committee for Ethnic Minorities Affair guidance on the assistance for services, improved livelihood of people, and technical assistance for improving the knowledge on the laws according the decision 112/2007/QD-TTg.
- Decision no.05/2007/QD-UBDT dated 06-September-2007 of the Committee for Ethnic Minorities Affair on its acceptance for three regions of ethnic minorities and mountainous areas based on development status.

x) The policies relate to the subproject implementation issuing by local authority

- Decision no.818/QD-Phu Cat People's Committee on dated 03/6/2014 regarding to appraisal of survey plan and project bidding to the construction works: repair, upgrade Thach Ban reservoirs
- Decision no.1290/QD-Phu Cat People's Committee on dated 07.15.2014 regarding to appraisal of the survey results of the consultants in the project of Thach Ban reservoir: repair, upgrade

xi) National standards

a) Water:

- QCVN 01:2009/BYT: National technique regulations on drinking-water quality
- QCVN 02:2009/BYT: National technique regulations on running water quality
- QCVN 08:2008/BTNMT: National technical regulation on surface water quality.
- QCVN 09:2008/BTNMT: National technical regulation on underground water quality
- QCVN 14:2008/BTNMT: National technical regulation on domestic wastewater
- QCVN 39:2011/BTNMT: National technical regulation on Water Quality for irrigated agriculture

b) Air quality:

- QCVN 05:2008/BTNMT: Air quality – Surrounding air quality criterions
- QCVN 06:2008/BTNMT: Air quality – maximum permitted concentration of noxious substances in the surrounding air.
- QCVN 07:2008/BTNMT: Air quality – Threatening of noxious substances in the air
- TCVN 6438:2001: Maximum permission limit of discarding dismissed gases.

c) Soil environment

- QCVN 03:2008/BTNMT: National technique regulations on permitted limit of hard metal in land
- QCVN 43:2012/BTNMT: National technical regulation on sediment quality

d) Solid waste management:

- TCVN 6696:2009: Solid waste – garbage cleaning. Common requirements for environmental protection
- QCVN 07:2009: National technique regulations on clarifying harmful waste.

e) *Vibration and Noise*:

- Technique regulations on vibration (replacing TCVN 6962:2001 – Vibration caused by construction work and factories – maximum permitted level in environment in public

areas and residence zones)

- QCVN 26:2010/BTNMT – National technique regulations on noise (replacing TCVN 5948:1999 Acoustics – Noise caused by transportation moving when speeding up – permitted calculation level).

f) Health and labor safety:

- Decision No. 3733/2002/QĐ-BYT of Ministry of Health dated October 10th 2002 about applying article 21 on labor health and relating safety criterions for microclimate, noise, vibration, chemicals – permitted level in work place.

3.2 Selected environmental and legal safeguard policies of WB

According to the safeguard policies of World Bank, an ESIA report should include the systematic analysis of economic, policies, regulations, technical and social aspect to ensure that the potential negative impacts are identified and mitigated during the subproject implementation and in compliance with the policy should be considered properly. Therefore, in reality condition of the proposed sub-project, five (05) environmental and legal safeguard policies of WB are triggered.

APPENDIX A4: ENVIRONMENTAL AND SOCIAL SCREENING

Table 4.1: Screening and Environmental Categorization

Screening question	*Yes/ no*	*Remark is*
1. Does the subproject have the potential to cause significant adverse impacts to natural or critical natural habitats?		
- Leads to loss or degradation of sensitive Natural Habitats defined as: land and water areas where (i) the ecosystems' bio-logical communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions. Important natural habitats may occur in tropical humid, dry, and cloud forests; temperate and boreal forests; Mediterranean-type shrub lands; natural arid and semi-arid lands; mangrove swamps, coastal marshes, and other wetlands; estuaries; sea grass beds; coral reefs; freshwater lakes and rivers; alpine and sub alpine environments, including herb fields, grasslands, and paramos; and tropical and temperate grasslands..	No	Land acquisition of 23 households with area of 143,504m^2 for borrow pit, construction road, storage area and campsite. The affected trees are eucalyptus, and crops such as cassave, peanut, maize, rice... there is no impact of local fauna
- Leads to loss or degradation of Critical natural habitat, i.e., habitat that is legally protected, officially proposed for protection, or unprotected but of known high conservation value. Critical habitats include existing protected areas and areas officially proposed by governments as protected areas (e.g., reserves that meet the criteria of the World Conservation Union [IUCN] classifications, areas initially recognized as protected by traditional local communities (e.g., sacred groves), and sites that maintain conditions vital for the viability of these protected areas. Sites may include areas with known high suitability for bio-diversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species.	No	Conservation areas, protect areas do not exist in the project areas. In upper stream of the reservoir. There is only secondary production forest; the main plants here are Acacia mangium. In the areas does not have critical natural habitats or vulnerable species following CITES

2 . Does the subproject have the potential to cause significant adverse impacts to physical cultural resources?		
Leads to loss or degradation of physical cultural resources, defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. They may be located in urban or rural settings, above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community.	No	Cat Son areas have 3 physical cultural resources: (i) Mieu Son Nguyen, 3.179,0 m^2; (ii) Mieu Son Van, 974,0 m2; (iii) Cay Roi church, 797,33 m2, total areas of the construction is 4.150,1 m2. All physical cultural resources in the place located in Thach Ban Tay village and far away from the construction
- Potentially results in a contravention of national legislation, or national obligations under relevant international environmental treaties and agreements, including the UNESCO World Heritage Convention or affect sites with known and important tourism or scientific interest	No	The project implementation following and accordance with National and international law, regulations.
3. Does the subproject have the potential to cause significant adverse impacts on the lands and related natural resources used by ethnic minorities?		
Potentially result in impacts on lands or territories that are traditionally owned, or customarily used or occupied, and where access to natural resources is vital to the sustainability of cultures and livelihoods of minority peoples. Potentially impact the cultural and spiritual values attributed to such lands and resources or impact natural resources management and the long-term sustainability of the affected resources.	No	Indigenous/Ethnic minorities group is Ba Na 38 person/11 household, equal 0,8% of total resident living at Thach Ban Tay village of in Cat Son commune. This group is not impacted by the subproject implementation
4. Does the subproject have the potential to cause significant adverse effects to populations subject to physical displacement?		
Leads to physical displacement of populations dependent upon lands or use of specific use of resources that would be difficult to replace or restore? Otherwise lead to difficult issues in the ability of the subproject to restore livelihoods?	No.	– No displaced households - 142,893 m^2 of land are acquired for accillary works inclusing: 132,893m^2 of annual crop land of 11 households and 10,000m^2 of paddy field managed by People's Committee of Cat Son commune - 1,611m 2 of land are acquired permanently for management road, including : 677m^2 of

		garden land and 588m^2 of annual crop land of 12 households and 346m^2 of land managed by People's Committee of Cat Son commune - Impact due to cut – off water for construction: 447,774m2 of paddy field and 299,991m^2 of crop land ò 355 households (1226 people) stop summer – autumn crop in 2016 (1 crop season)-
5 . Does the subproject entail the construction of a large dam?		
Does the subproject require construction of a dam that is: • 15 meters or more in height • between 10 and 15 meters in height with special design complexities--for example, an unusually large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials. • Under 10 meters in height but expected to become large dams during the operation of the subproject?	No	The crest of embankment is 12,1m in height, and is not belong to large dam type classification
Does the operation of the subproject rely on the performance of: • an existing dam or a dam under construction (DUC); • power stations or water supply systems that draw directly from a reservoir controlled by an existing dam or a DUC. • diversion dams or hydraulic structures downstream from an existing dam or a DUC, where failure of the upstream dam could cause extensive damage to or failure of the new World Bank-financed structure and irrigation or water supply projects that will depend on the storage and operation of an existing dam or a DUC for their supply of water and could not function if the dam failed	Yes	The sub-project implementation will support and increase the dam safety and protect to downstream communities.
6 . Does the subproject entail the procurement or use of pesticides?		

Do the formulations of the products fall in World Health Organization classes IA and IB, or are there formulations of products in Class II? ?	No	
7. Does the subproject have the potential to cause irreversible impacts or impacts that are not easily mitigated?		
Leads to loss of aquifer recharge areas, affects the quality of water storage and catchments responsible for potable water supply to major population centers.	No	The sub-project is not impact to surface and ground water resources and not affect to domestic water supply
A lead to any impacts such that the duration of the impacts is relatively permanent, affects an extensive geographic area or impacts have a high intensity.	No	Impact during Summer crops cultivation period with 75ha due to drainage water to construct embankment and outlet works
8. Does the subproject have the potential to result in a broad diversity of significant adverse impacts?		
Multiple sites in different locations affected each of which could cause significant losses of habitat, resources, land or deterioration of the quality of resources.	Yes	- Land acquisition for material exploitation 6ha. During this activity, removing the top layer of land is required. It can affect to soil environment, site vegetation covers and air quality. - Land acquisition for camping site construction 1,5 ha crop land. Solid waste and wastewater are generating in this activities and impact to physical environmental. - Access road operation with 845,4 m in length, increasing noise, dust and traffic condition in the local will happen in this task
Potential, significant adverse impacts likely to extend beyond the sites or facilities for the physical works.	Yes	- Land acquisition for temporally servicing road with arable land 1.500 m^2. Potential impact to local road 400m from Son Loc Bridge to servicing road. - Rapid construction worker up to 80 workers. The construction activities could dramatically affect the existing infrastructure and community services. The dramatic increase in population levels, or "boom-town" effect, will increase the demand for additional services such as community services and staff (medical, emergency, safety, etc.), markets, education centre, waste water production and sanitation services,

		power/fuel and potable water (drinking, food preparation etc.). These services may cause social conflicts with local villagers as the demand increases. However, the services will also benefit local villagers and people inhabiting adjacent communes. This is a reverse impact
Transboundary impacts (other than minor alterations to an ongoing waterway activity).	No	The project implementing within Vietnam territory and it not relate to river transboundary. No inland water way transportation activities in the areas.
Need for new access roads, tunnels, canals, power transmission corridors, pipelines, or borrow and disposal areas in currently undeveloped areas.	Yes	- The existing earth fill access road from Son Loc to the dam is often saturated by water in rainy period, caused difficult to road users and rescue if any abnormal issue occur. The local community requires upgrade the road and hardnosed surface of road by concrete material.
Interruption of migratory patterns of wildlife, animal herds or pastoralists, nomads or semi-nomads	No	Wild life, natural habitats and special species are not affected by project implementation. Because, the project implementation is not taking place in the areas, and it not taking place on the migration roads of wild life
9. Is the subproject unprecedented?		
Unprecedented at the national level?	No	Several similar projects have been executed
Unprecedented at the provincial level?	No	Several similar projects have been executed. This is the first t project funded by WB in the local
10. Is the project highly contentious and likely to attract the attention of NGOs or civil society nationally or internationally?		
Considered risky or likely to have highly controversial aspects.	No	The project is just focus on repair, upgrades the appurtenant structures, and therefore is not effect to local communities and their living environment.
Likely to lead to protests or people wanting to demonstrate or prevent its construction.	No	The consensus and agreement of local authority and community to approve the sub-project implementation.

Table 4.2: Potential Environmental and Social Impacts to be addressed

No.	*Does the subproject entail these environmental impacts?*	*No*	*Low*	*Medium*	*High*	*Not known*	*Remarks*
1	Encroachment on historical/cultural areas	✓					
2	Encroachment on an ecosystem (e.g. natural habitat sensitive or protected area, national park, nature reserve etc....)	✓					Sub-project not impact to natural habitat, vulnerable areas, protection areas or national park, etc.
3	Disfiguration of landscape and increased waste generation		✓				- Site clearance and open access road will increase localized air quality and landscape - Construction activities: excavation, landfill, wasted earth and rock disposal, concrete work, etc., increasing noise, dust and construction debris, waste generation. Rapid workers on construction site leading to increase solid waste and wastewater
4	Removal of vegetation cover or cutting down of trees during clearance for		✓				- Removal of vegetation cover for material exploitation:

	construction						6ha. - Land acquisition for camping site construction 1,5 ha crop land. - Access road operation with 845m in length
5	Change of surface water quality or water flows (e.g. Increase water turbidity due to run- off, waste water from camp sites and erosion, and construction waste) or long-term.				✓		Wastewater will impact to surface water quality due to run-off if not collect in right method. This impact can be handled in good condition and it is a temporally and insignificant effect.
6	Increased dust level or add pollutants to the air during construction		✓				Material transportation and machine operation will increase exhausted gases, dust to pollute air. This impact can be handled in good condition and it is a temporally effect
7	Increased noise and/or vibration			✓			- Increasing noise and vibration in construction of management road in Januray and February of the first year and casting concrete

							road surface in June – August of the second year; - Increasing noise and vibration in construction of dam in April – August of the first year. However, noise/ vibration pollution do not impact much on people life. - Increasing noise/ vibration at borrow pit/ quarries due to operation of excavator
8	Displacement	✓					No household displacement in the areas
9	Use of resettlement site that is environmentally and/or culturally sensitive	✓					Not use the environmentally/ culturally sensitive resettlement site
10.	Risk of disease dissemination from construction workers to the local peoples (and vice versa)?)			✓			The majority and the most immediate adverse health impacts are expected to occur where construction workers (80 workers) and camp followers concentrate. These impacts would consist of communicable diseases (food- and water-borne, sexually transmitted diseases and

							HIV/AIDS).
11.	Potential for conflict between construction workers and local peoples (and vice versa)?			✓			Increasing number of workers at construction site if there is no proper management measures and good collaboration with authorities may cause dispute with local residents
12.	Use of explosive and hazardous chemicals	✓					Explosive material and hazard chemical are not use during construction phase
13.	Use of sites where, in the past, there were accidents incurred due to landmines or explosive materials remaining from the war	✓					UOXs are not existing the local
14.	Construction that could cause disturbance to the transportation, traffic routes, or waterway transport?.		✓				The activities of construction phase are impact to transportation and local traffic at low level, due to: - The transporting routes material to construction site are short. - Only 10 household living in sides of the servicing road from TL364 via

							Son Loc bridge to construction site;
15.	Construction that could cause any damage to the existing local roads, bridges or other rural infrastructures.			✓			Damaging the transportation road from TL364 to construction site via junction of Son Loc bridge, about 400m in length
16.	Soil excavation during subproject's construction so as to cause soil erosion.				✓		Erosion progress occurring around the material pits exploitation and areas of appurtenant structures rain addition, disposal site if it is not compacted and covered with grass may cause erosion in rainy season
17.	Need to open new, temporary or permanent, access roads?				✓		Needs opening access road from provincial road QL 364 to construction site via Son ´Loc bridge with 845m in length.
18.	Separation or fragmentation of habitats of flora and fauna?	✓					No impact of natural habitant
19.	Long-term impacts on air quality	✓					The air quality is effecting during construction phase and is a temporally effect
20.	Accident risks for workers and				✓		-Provide health care services to

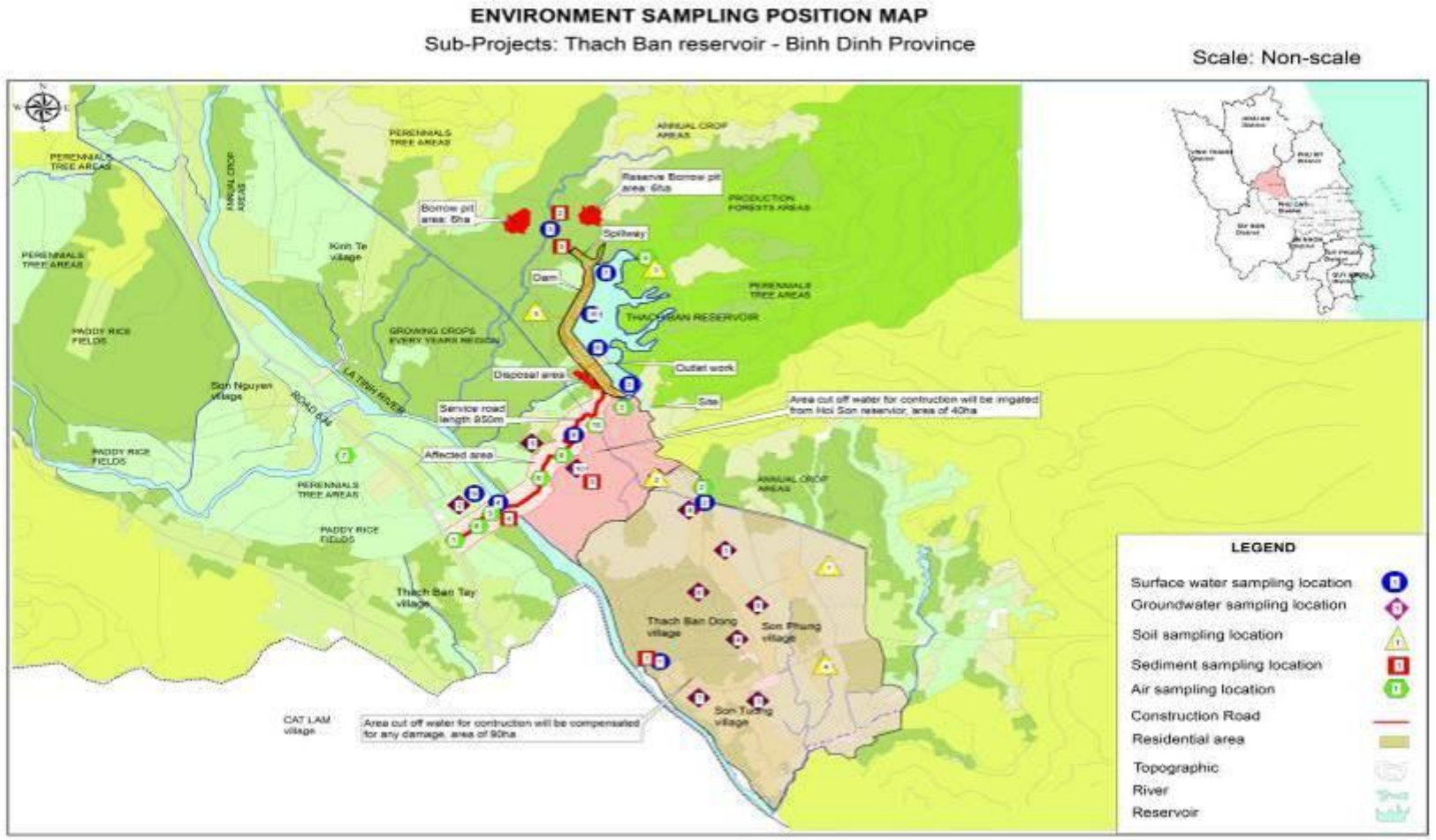
	community during construction phase.						construction workers and local workers according to the Vietnamese standard - Educate and promote awareness on personal hygiene and transmission of diseases
21.	Use of hazardous or toxic materials and generation of hazardous wastes		✓				Leaking oils and grease during Vehicle and equipment maintenance and storage.
22.	Risks to safety and human health				✓		- Impact to workers' hearing mechanisms. - Impact to workers' respiratory system - Impact to visual perception Malaria, skill problem Diarrhea can be exposed due to camping site inadequacy treatment
23.	Interruption water supply to domestic users and to irrigation during appurtenant structures construction			✓			Impact to 355 households 447,774 m2 paddy rice cultivation areas, and 299.991 m2 crop land of Thach Ban Dong, Thach Ban Tay villages of Cat Son commune (from April to August

							of same year)
24.	Increase flooding level and reservoir sedimentation		✓				The proposed sub-project is not increase the water storage capacity of the reservoir, it just focused on repair the appurtenant structures of the dam
Does the subproject entail land acquisition or restriction of access to resources?							
25.	Permanent or temporary loss of land or resources for any families, resettlement			✓			- 1.611 m2 of land of 12 households are acquired permanently for service road - 143.504 m2 of paddy field, crop land of 11 households are acquired temporarily for campsite, material storage and disposal site
26.	Use land that is currently occupied or regularly used for productive purposes (e.g., gardening, farming, pasture, fishing locations, forests)	✓					No
27..	Displacement of individuals, families or businesses	✓					No
28.	Temporary or permanent loss of crops, fruit trees or household infrastructure			✓			1.611 m2 of land of 12 households are acquired permanently for service road - 143.504 m2 of paddy field, crop

							land of 11 households are acquired temporarily for campsite, material storage and disposal site - no households living in acquired land
29.	Involuntary restriction of access by people to legally designated parks and protected areas	✓					Neither public parks nor conservation areas had been found
If the answer to any of the questions 25-29 is "Yes", please consult the ESMF; preparation of a Resettlement Plan (RP) is likely required).							
Are ethnic minority peoples present in the subproject area?							
30.	Ethnic minority groups are living within the boundaries of, or nearby, the subproject.	✓					
31.	Members of these ethnic minority groups in the area potentially could benefit or be harmed from the project.	✓					
If the answer to questions 28 or 29 is "Yes", please consult the ESMF; and preparation of an Ethnic Minority Development Plan (EMDP is likely required).							
Does the subproject entail construction of or depend upon a dam							
32.	Involve the construction of a large dam?	✓					The crest of embankment is 12,1m in height, and is not belong to large dam type classification
33.	Depend on water supplied from an existing dam or weir or a dam	✓					No

	under construction?						
If the answer to question 32 or 33 is "Yes", please consult the ESMF; a Dam Safety Report (DSR) will likely be required)							

APPENDIX A5: DIAGRAM OF SAMPLING AND MONITORINGENVIRONMENT



APPENDIX A6 - ANALYSIS RESULTS OF ENVIRONMENTALSAMPLES

Table 6.1 : Analysis results of surface water in subproject area (February 2015)

Viện Nước, Tưới tiêu và Môi trường
Phòng Thí nghiệm Tổng hợp
Địa chỉ: 1/95 – Chùa Bộc – Đống Đa – Hà Nội
Tel: 844-8.539.127
Fax: 844-5.634.809

BẢNG KẾT QUẢ PHÂN TÍCH CHẤT LƯỢNG NƯỚC MẶT

Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Thạc Bàn, huyện Phù Cát, tỉnh Bình Định

Tháng 2 năm 2015

Chỉ tiêu	Đơn vị	NM1	NM2	NM3	NM4	NH1	NH2	NH3	NH4	NM5	NM6	QCVN 39:2011	QCVN 08:2008	
													A2	B1
Nhiệt độ	°C	28,6	28,9	29	28,7	28,7	28,8	28,6	28,6	28,7	28,4	-	-	-
Độ đục	NTU	12,02	13,49	16,75	18,86	20,92	19,08	18,70	22,12	34,12	36,06	-	-	-
pH	-	7,5	7,45	7,38	7,56	7,88	7,15	7,21	7,36	7,4	6,7	5,5-9	6-8,5	5,5-9
DO	mg/l	6,24	6,56	4,32	4,96	5,12	4,96	4,96	5,32	4,48	4,24	≥2	≥ 5	≥4
EC	µs/cm	360	296	310	7200	370	124	226	213	310	264		-	-
SS	mg/l	18,24	23,16	19,62	22,58	25,44	29,46	27,8	25,72	59,32	52,16	-	-	-
TDS	mg/l	292,54	167,64	626,87	2223,96	227,46	74,03	134,93	73,90	168,45	180,03	-	-	-
COD	mg/l	25,8	29,28	20,5	39,42	23,36	28,86	26,6	24,56	26,4	26,3	-	15	30
BOD_5	mg/l	7,88	8,68	6,84	12,86	8,06	9,82	8,16	9,41	14,2	15,16	-	6	15
NO_2^-	mg/l	0,01	0,03	0,03	<0.01	0,02	0,04	0,02	0,02	0,06	0,02	-	0,02	0,04
NO_3^-	mg/l	0,32	0,26	0,08	0,05	0,06	0,08	0,04	0,03	0,26	0,8	-	5	10
NH_4^+	mg/l	<0.01	0,84	0,39	0,39	0,53	0,34	0,45	0,22	0,78	0,44	-	0,2	0,5
PO_4^{3-}	mg/l	<0.01	0,01	0,03	0,03	0,04	0,02	0,05	0,01	0,2	0,16	-	0,2	0,3
SO_4^{2-}	mg/l	18,24	23,16	19,62	22,58	25,44	29,46	27,8	26,72	26,08	20,12	600	-	-
Fe_{TS}	mg/l	0,48	0,70	1,18	0,50	0,82	0,80	0,86	0,70	0,86	0,32		1	1,5
As	mg/l	0,00101	0,00389	0,00186	0,00229	0,00252	0,00106	0,00328	0,00215	0,00136	0,00217	0,05	0,02	0,05
Pb	mg/l	0,00196	0,00491	0,00076	0,00016	0,00043	0,00177	0,00033	0,00831	0,00462	0,00475	-	0,02	0,05

Cd	mg/l	0,00005	0,000042	0,00006	0,00011	0,00022	0,00013	0,00005	0,00009	0,00028	0,00048	0,01	0,005	0,01
Coliform	MPN/100ml	11000	11000	15000	4500	6900	1500	1100	6000	4500	6300	-	5000	7500

Hà Nội, Ngày 15 tháng 03 năm 2015

T/M Nhóm phân tích

Lê Văn Cư

Trưởng phòng Thí nghiệm Tổng hợp

Nguyễn Đức Phong

Viện Nước, Tưới tiêu và Môi trường

VIỆN NƯỚC TƯỚI TIÊU VÀ MÔI TRƯỜNG

PHÓ VIỆN TRƯỞNG

Vũ Thị Thanh Hương

Table 6.2: Analysis results of ground water in subproject area (February 2015)

Viện Nước, Tưới tiêu và Môi trường
Phòng Thí nghiệm Tổng hợp
Địa chỉ: 1/95 – Chùa Bộc – Đống Đa – Hà Nội Tel: 844-8.539.127 Fax: 844-5.634.809

BẢNG KẾT QUẢ PHÂN TÍCH CHẤT LƯỢNG NƯỚC NGẦM

Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Thạc Bàn, huyện Phù Cát, tỉnh Bình Định

Tháng 2 năm 2015

TT	Chỉ tiêu		NG1	NG2	NG3	NG4	NG5	NG6	NG7	NG8	NG9	NG10	QCVN 09:2008
1	Nhiệt độ	°C	29,8	30	29,8	29	29,6	30,1	30,4	29,9	29,6	29,9	-
2	Độ đục	NTU	0	5,35	3,13	1,62	4,92	1,32	4,65	3,27	4,23	2,06	-
3	pH	-	8,4	7,5	7,22	7,18	7,10	7,05	7,11	6,95	7,00	7,52	5,5-8,5
4	DO	mg/l	4,6	5,32	4,92	6,80	4,64	5,28	4,60	4,80	4,16	5,96	-
5	EC	µs/cm3	75,07	88,21	89,12	62,53	110,1	40,42	89,06	142,06	100,12	107,05	-
6	SS	mg/l	2,44	2,05	7,95	30,60	18,32	15,56	15,71	8,24	10,92	21,80	-
7	TDS	mg/l	43,0	46,9	49,38	43,20	74,07	24,69	64,19	83,95	74,07	81,47	-
8	COD	mg/l	0,64	2,40	1,60	1,28	0,80	0,96	1,92	0,80	0,64	1,28	4
9	NO_2^-	mg/l	0,01	0,32	<0.01	<0.01	<0.01	<0.01	0,04	<0.01	<0.01	<0.01	15
10	NO_3^-	mg/l	0,04	0,74	0,06	0,26	1,38	1,62	1,02	3,66	3,22	2,74	-
11	NH_4^+	mg/l	<0.01	<0.01	0,11	0,039	0,101	0,017	0,034	0,032	0, 07	0,06	0,1
12	PO_4^{3-}	mg/l	<0.01	<0.01	<0.01	0,06	0,03	0,01	0,01	0,02	0,28	0,16	-
13	SO_4^{2-}	mg/l	2,64	1,8	4,46	1,48	2,98	6,88	3,42	4,60	6,10	5,02	-
14	Cl^-	mg/l	147,47	15,60	11,34	10,64	8,51	8,08	36,58	22,69	26,23	64,52	-

15	Fe	mg/l	0,06	0,46	0,15	0,06	0,09	0,08	0,07	0,06	0,05	0,12	5
16	As	mg/l	0,00910	0,00984	0,00045	0,00112	0,00031	0,00030	0,00028	0,00029	0,00045	0,00036	0,05
17	Pb	mg/l	0,00310	0,00107	0,00236	0,00219	0,00286	0,00279	0,00189	0,00362	0,00250	0,00162	0,01
18	Cd	mg/l	0,00005	0,00005	0,00008	0,00006	0,00007	0,00010	0,00005	0,00011	0,00006	0,00006	-
19	Coliform	MPN/100ml	KPH	KPH	KPH	KPH	KPH	KPH	KPH	KPH	KPH	KPH	3
20	Cl.Perfringen	KL/10ml	0	0	0	0	0	0	0	0	0	0	-

Hà Nội, Ngày 15 tháng 03 năm 2015

Viện Nước, Tưới tiêu và Môi trường

T/M Nhóm phân tích

Lê Văn Cư

Trưởng phòng Thí nghiệm Tổng hợp

Nguyễn Đức Phong

VIỆN NƯỚC TƯỚI TIÊU VÀ MÔI TRƯỜNG

PHÓ VIỆN TRƯỞNG

Vũ Thị Thanh Hương

Table 6.3: Analysis results of air quality in project area, February 2015

Viện Nước, Tưới tiêu và Môi trường
Phòng Thí nghiệm Tổng hợp
Địa chỉ: 1/95 – Chùa Bộc – Đống Đa – Hà Nội Tel: 844-8.539.127 Fax: 844-5.634.809

BẢNG KẾT QUẢ PHÂN TÍCH CHẤT LƯỢNG MÔI TRƯỜNG KHÔNG KHÍ

Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Thạc Bàn, huyện Phù Cát tỉnh Bình Định

Tháng 2 năm 2015

TT	Kí hiệu mẫu	Độ rung	Tiếng ồn	Bụi ts	SO2	NO2	CO
		dB	dBA	µg/m3	µg/m3	µg/m3	µg/m3
1	KK1	0,011	34,03	46,8	70	36	2115
2	KK2	0,004	14,04	23,6	86	41	2207
3	KK3	0,005	9,46	32,7	74	38	2126
4	KK4	0,008	8,85	34,5	65	35	2008
5	KK5	0,006	10,32	54,7	66	29	2020
6	KK6	0,013	29,44	60,2	63	30	2010
7	KK7	0,028	34,06	28,8	66	36	2203
8	KK8	0,045	46,07	32,8	70	27	2109
9	KK9	0,014	23,26	26,1	59	32	2176
10	KK10	0,030	28,24	30,4	62	40	2231
QCVN 05:2009		-	-	300	350	-	30000
QCVN 26:2010		-	70	-	-	-	-

Hà Nội, Ngày 15 tháng 03 năm 2015

T/M nhóm phân tích

Lê Văn Cư

Trưởng phòng

Nguyễn Đức Phương

Viện Nước, Tưới tiêu và Môi trường

VIỆN NƯỚC TƯỚI TIÊU VÀ MÔI TRƯỜNG

PHÓ VIỆN TRƯỞNG

Vũ Thị Thanh Hường

Table 6.4: Analysis results of sludge in subproject area (February 2015)

Viện Nước, Tưới tiêu và Môi trường
Phòng Thí nghiệm Tổng hợp
Địa chỉ: 1/95 – Chùa Bộc – Đống Đa – Hà Nội Tel: 844-8.539.127 Fax: 844-5.634.809

BẢNG KẾT QUẢ PHÂN TÍCH CHẤT LƯỢNG BÙN ĐÁY

Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Thạc Bàn, huyện Phù Cát tỉnh Bình Định

Tháng 2 năm 2015

TT	Kí hiệu mẫu	Đơn vị	BĐ1	BĐ2	BĐ3	BĐ4	BĐ5	QCVN 03:2008
1	pH-H2O	-	5,36	5,65	5,37	6,57	5,34	-
2	pH-KCl	-	4,89	5,19	4,81	5,92	4,76	-
3	$Mùn_{ts}$	%	1,68	2,10	2,71	1,37	2,11	-
4	N_{ts}	%	0,081	0,092	0,108	0,069	0,123	-
5	P_{ts}	%	0,031	0,034	0,040	0,032	0,036	-
6	K_{ts}	%	0,188	0,138	0,225	0,216	0,208	-
7	Fe	mg/kg đất khô	79,84	89,12	73,44	73,6	82,130	-
8	Al^{3+}	ldlg/100g	0,154	0,166	0,164	0,174	0,202	-
9	Thành phần cơ giới	0,02-2mm	83,35	76,00	79,63	82,00	77,35	-
		0,02-0,002 mm	10,23	15,88	13,85	16,58	18,04	-
		<0,002mm	6,42	8,12	6,52	1,42	6,61	-
10	Ca^{2+}	ldlg/100g	1,60	2,80	1,60	8,40	6,24	-
11	Mg^{2+}	ldlg/100g	1,20	0,80	3,20	3,60	2,14	-
12	As	mg/kg đất khô	1,97	2,03	3,78	3,88	2,09	12
13	Pb	mg/kg đất khô	7,95	8,04	7,37	8,55	6,37	70
14	Cd	mg/kg đất khô	0,14	0,12	0,20	0,16	0,18	2
15	Cu	mg/kg đất khô	8,16	14,48	12,22	13,63	11,27	50
16	Zn	mg/kg đất khô	41,74	48,02	60,63	67,74	49,08	200

Hà Nội, Ngày 15 tháng 03 năm 2015

T/M nhóm phân tích	Trưởng phòng	Viện Nước, Tưới tiêu và Môi trường
Lê Văn Cư	Nguyễn Đức Hường	PHÓ VIỆN TRƯỞNG Vũ Thị Thanh Hương

Table 6.5: Analysis results of soil quality in subproject area (February 2015)

Viện Nước, Tưới tiêu và Môi trường
Phòng Thí nghiệm Tổng hợp
Địa chỉ: 1/95 – Chùa Bộc – Đống Đa – Hà Nội Tel: 844-8.539.127 Fax: 844-5.634.809

BẢNG KẾT QUẢ PHÂN TÍCH CHẤT LƯỢNG ĐẤT

Tiểu dự án: Sửa chữa, nâng cấp hồ chứa nước Thạc Bàn, huyện Phù Cát tỉnh Bình Định

Tháng 2 năm 2015

TT	Chỉ tiêu	Đơn vị	Đ1	Đ2	Đ3	Đ4	Đ5	QCVN 03:2008
1	pH-H2O	-	6,48	5,96	6,35	5,63	5,78	-
2	pH-KCl	-	5,91	5,40	5,88	5,02	5,12	-
3	$Mùn_{ts}$	%	1,32	1,73	1,49	1,03	1,49	-
4	N_{ts}	%	0,064	0,034	0,037	0,048	0,051	-
5	P_{ts}	%	0,029	0,014	0,015	0,018	0,019	-
6	K_{ts}	%	0,173	0,153	0,237	0,161	0,165	-
7	N_{dt}	mg/100g	0,21	1,27	1,35	1,07	1,40	-
8	P_{dt}	mg/100g	0,83	2,58	2,29	1,43	1,72	-
9	K_{dt}	mg/100g	30,65	5,3	3,8	6,04	3,18	-
10	Thành phần cơ giới	0,02-2mm	79,03	89,27	83,43	86,35	68,70	-
		0,02-0,002mm	12,57	10,03	15,00	12,70	24,65	-
		<0,002mm	8,40	0,70	1,57	0,95	6,65	-
11	Ca^{2+}	ldlg/100g	4,40	1,92	2,80	1,60	3,04	-
12	Mg^{2+}	ldlg/100g	2,00	1,04	1,60	2,40	0,56	-
13	As	mg/kg đất khô	1,02	1,03	2,708	4,36	1,39	12
14	Pb	mg/kg đất khô	3,94	5,04	9,37	6,56	8,37	70
15	Cd	mg/kg đất khô	0,114	0, 22	0,30	0,36	0,26	2
16	Cu	mg/kg đất khô	9,16	16,48	15,22	14,23	12,27	50
17	Zn	mg/kg đất khô	45,74	43,25	80,63	47,74	39,08	200

Hà Nội, Ngày 15 tháng 03 năm 2015

T/M nhóm phân tích	Trưởng phòng	Viện Nước, Tưới tiêu và Môi trường
Lê Văn Cư	Nguyễn Đức Phương	PHÓ VIỆN TRƯỞNG Vũ Thị Thanh Hương

APPENDIX A7: COMMUNITY CONSULTATION MINUTES

7.1. Consultation minutes for subproject preparation

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

BIÊN BẢN CUỘC HỌP THAM VẤN CHUẨN BỊ DỰ ÁN

1- Tên dự án: **Sửa chữa và nâng cao an toàn đập (WB8)**
2- Tiểu dự án : ...Sửa chữa nâng cao an toàn hồ Thạch Bàn
3- Thời gian họp: ...8h...ngày ..28..tháng ..1...năm 2015
4- Địa điểm họp: .....Trụ Sở Ban dự án Thuỷ lợi Bình Định
5- Thành phần cuộc họp
a) Đại diện Sở NN và PTNT Bình Định
Ông (bà): .....Nguyễn Văn Bảo..... Chức vụ:.....Trưởng phòng QLXDCT
b) Đại diện Sở TN&MT .....
Ông (bà): ...Võ Thị Thắm..... Chức vụ:....Trưởng phòng...
c) Đại diện Ban Quản lý dự án
Ông (bà): ...Hồ Nguyên Sĩ..... Chức vụ:.....PTB...BQL.....
d) Đại diện UBND các huyện phù Cát
Ông (bà): ..Lương Ngọc Anh..... Chức vụ:....PCT..UBND huyện phù Cát
Ông (bà): ..Võ Văn Dâu..... Chức vụ:...Trưởng phòng..TNMT huyện
Ông (bà): ..... Chức vụ:.....
Ông (bà): ..... Chức vụ:.....
Ông (bà): ..... Chức vụ:.....
e) Đại diện UBND các xã vùng dự án: Cát Sơn.....
Ông (bà): ..Nguyễn Ngọc Bình..... Chức vụ:....Cán bộ Chính.....
Ông (bà): ..... Chức vụ:.....
Ông (bà): ..... Chức vụ:.....
Ông (bà): ..... Chức vụ:.....
Ông (bà): ..... Chức vụ:.....
f) Đại diện công ty QLKT CTTL
Ông (bà): ..Đoàn Văn Lâu..... Chức vụ:....phó giám đốc
g) Đại diện đơn vị tư vấn
Ông (bà): ..Vũ Quốc Chính..... Chức vụ:.....
Ông (bà): ..... Chức vụ:.....
6. Nội dung cuộc họp
a) Đại diện Ban QLDA, ông:.....Hồ Nguyên Sĩ..... trình bày nội dung các TDA.
b) Đại diện đoàn tư vấn: ...ông...Vũ Quốc Chính..... 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 *(Ghi số xã, huyện, số hộ, số người, diện tích đất tự nhiên trong vùng dự án)*:

thôn Thạch Bàn Đông và Thạch Bàn Tây cuối xã Cát Sơn với tổng số hộ là 296 hộ, 86 ha đất sản xuất nông nghiệp

b) Về các đối tượng bị ảnh hưởng *(Đất nông nghiệp, đất lâm nghiệp, thủy sản và các loại khác, số hộ bị ảnh hưởng (thu hồi đất, di dân, di chuyển mồ mả...), tỷ lệ người dân tộc thiểu số bị ảnh hưởng, số người được hưởng lợi, tỷ lệ hộ nghèo, di tích lịch sử văn hóa, số mồ mả bị di dời)*:

Các hộ bị thu hồi đất làm mới vật liệu

296 hộ không được thông cấp xuất hiện khi cắt nước thì công trình

7.2 Về tác động của dự án đến môi trường:

- Tác động tích cực *(hạn chế ngập lụt vùng hạ du, hạn chế các sự cố vỡ đập, tràn, cống, tạo việc làm, tăng thu nhập, tăng diện tích tưới, tăng năng suất cây trồng, NTTS, nâng cao đời sống... vùng được hưởng lợi và đối tượng được hưởng lợi)*:

Diện tích tưới tiêu được đảm bảo, năng suất cây trồng tăng

đảm bảo an toàn hồ đập

- Tác động tiêu cực *(Tác tiêu cực có thể xảy ra trong quá trình chuẩn bị, thi công và vận hành dự án và những khu vực bị ảnh hưởng, đối tượng bị ảnh hưởng. Các tác động tiêu cực có thể xảy ra như: Ô nhiễm môi trường đất, nước, không khí, sản xuất, thu nhập, mất việc làm, bị ngừng các dịch vụ công cộng...)*:

Không cắt đường giao thông hiện có

Khi thi công gây bụi, tiếng ồn ảnh hưởng đến công trình

ảnh hưởng đến đời sống trong thời gian thi công

7.3- Tác động của dự án đến xã hội:

- Tác động tích cực *(Tạo việc làm, tăng thu nhập, tăng diện tích tưới, tăng năng suất cây trồng, NTTS, nâng cao đời sống...)*

Khi dự án đi vào hoạt động, đảm bảo nước tưới cho sản xuất nông nghiệp, năng suất cây trồng tăng, đời sống của người dân được đảm bảo

- Tác động tiêu cực :

– Khi thi công công trình, một lượng lớn công nhân từ nơi khác đến sẽ gây mất an ninh và trật tự xã hội, vệ sinh môi trường

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

– 100% đại biểu đồng ý triển khai dự án

7.6- Kiến nghị của các ngành liên quan:

– Trong quá trình lập dự án đầu tư, chủ dự án cần tiến hành đánh giá tác động môi trường theo luật BVMT 2005

– Chủ đầu tư xem xét, tính chi phí bảo dưỡng sửa chữa đường giao thông sau khi thi công

8- Kết luận:

– Chủ đầu tư cam kết đảm bảo bồi thường thiệt hại cho các hộ bị thu hồi đất, các hộ Bị ảnh hưởng theo đúng chính sách của WB và Chính phủ Việt Nam.

– Chủ đầu tư cam kết thực hiện tốt các biện pháp giảm thiểu

Chủ trì hội nghị

PHÓ GIÁM ĐỐC

BAN QUẢN LÝ DỰ ÁN THỦY LỢI

Hồ Nguyên Sĩ

Thư ký hội nghị

Sở Nông nghiệp & PTNT

Sở TN&MT

Võ Thị Thắm

Ban Quản lý dự án

THỊ GIÁM ĐỐC

Nguyễn Hoàng Tiến

Hồ Nguyên Sĩ

Công ty QLKT CTTL

UBND Huyện ..Phú Lộc..

~~UBND Huyện~~ ..Viện Đào tạo & Khoa học Ứng dụng Huế Trung

Phạm Cường Mạnh

UBND Huyện .....

UBND Huyện .....

Sở Giáo dục và Đào tạo

Nguyễn Cường

Sở Y tế

Võ Văn Thanh

Sở Văn hóa, thể thao & Du lịch

Sở Xây dựng

Võ Thị Thiên

Sở Giao thông Vận tải

Phạm Ngọc Ấn

UBND Xã Cát Sơn

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

Dự án cải tạo và nâng cao an toàn đập (WB8)
Tiểu dự án Hồ Thạch Bàn Tỉnh Bình Định

BIÊN BẢN HỌP THAM VẤN CỘNG ĐỒNG

Bình Định ngày 6 tháng 3 năm 2015

1- Thời gian, địa điểm làm việc:

- Thời gian: 6/31/2015
- Địa điểm : UBND xã Cát Sơn

2. Thành phần:

- Đơn vị tư vấn :

1) Võ Thị Thanh Hường – Trưởng đoàn
2) Võ Quốc Chức – Chuyên gia môi trường

- Số lượng đại biểu tham dự: 40, trong đó: Nam: 38 Nữ 2
- Thành phần

Đại diện: UBND xã, Đảng ủy, UB.MTTQ xã, Hội nông dân, Đoàn thanh niên, Hội phụ nữ, HTX nông nghiệp

3. Nội dung tham vấn

Hội nghị đã triển khai các nội dung tham vấn như sau:

- Giới thiệu về nội dung, các hạng mục công trình của dự án
- Về sự đồng thuận đối với việc triển khai dự án
- Về các đối tượng bị ảnh hưởng và phạm vi ảnh hưởng
- Về tác động tích cực của dự án đến môi trường, xã hội
- Về tác tiêu cực đến môi trường, xã hội
- Các kiến nghị của cộng đồng về các biện pháp giảm thiểu tác động đến môi trường, xã hội

4. Ý kiến thảo luận:

a) Về sự đồng thuận của địa phương đối với dự án:

100% đại biểu đồng ý triển khai dự án

b) Về phạm vi ảnh hưởng của dự án và các đối tượng bị ảnh hưởng:

- Về phạm vi ảnh hưởng:

130 ha diện tích tưới của thôn Thạch Bàn Đông và Thạch Bàn Tây

- Về các đối tượng bị ảnh hưởng:

Các hộ sản xuất nông nghiệp nằm trong vùng tưới tiêu từ hồ Thạch Bàn

02 hộ phải giải phóng mặt bằng, thu hồi đất làm mỏ nguyên liệu đắp đập và đường

c) Về những tác động của Dự án đến môi trường tự nhiên và kinh tế - xã hội:

- Tác động tích cực:

- Đảm bảo tưới ổn định cho 130 ha diện tích tưới

Ổn định sản xuất, tăng năng suất cây trồng

- Đảm bảo an toàn hồ đập

- Tác động tiêu cực

- Trong thời gian thi công ảnh hưởng đến cộng đồng do bụi, tiếng ồn của các phương tiện chở vật liệu xây dựng

- Ảnh hưởng đến an ninh và trật tự xã hội, vệ sinh môi trường tại khu vực thi công

- Ảnh hưởng đến diện tích tưới trong thời gian thi công, hư hỏng đường do vận chuyển nguyên vật liệu thi công

d) Kiến nghị các biện pháp giảm thiểu tác động môi trường của Dự án:

Xem xét lựa chọn tuyến đường thi công qua cầu Lồi Lồi để tránh ảnh hưởng đến khu dân cư

Khi vận chuyển nguyên vật liệu cần tránh những giờ cao điểm

Tránh các hoạt động đào, đắp đất trong mùa mưa

e)Kiến nghị đối với chủ dự án:

Xem xét chia nước từ hồ Kỳ Sơn để tưới cho 40 ha đất nông nghiệp khi thi công công trình

Bồi thường hư hỏng đường và CSHT do hoạt động thi công gây ra,

Xem xét lựa chọn tuyến đường thi công qua Cầu Sài Lòi để tránh ảnh hưởng đến khu dân cư

Tiến hành đánh giá rủi ro ở hạ lưu khi có xả lũ khẩn cấp

Vận chuyển xử lý rác thải SH và rác thải XD tránh làm mất vệ sinh môi trường

UBND XÃ……………….

Chủ tịch

KT/CHỦ TỊCH

PHÓ CHỦ TỊCH

Vũ Đông Phi

7.2 Consulation minutes of mitigation measures

ỦY BAN NHÂN DÂN
XÃ Cát Sơn

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

Số: 05 /CV-UBND

Bình Định, ngày 8 tháng 3 năm 2015

V/v ý kiến tham vấn về dự án sửa chữa và nâng cao an toàn đập- TDA tỉnh.....

Kính gửi: BQL Dự án thuỷ lợi Bình Định

UBND xã Cát Sơn đã nhận được Văn bản số........ ngày....... tháng.......năm 2015 của BQL Dự án thuỷ lợi Bình Định 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 Dự án "**sửa chữa và nâng cao an toàn đập- TDA tỉnh** ....". Sau khi xem xét tài liệu này, UBND xã Cát Sơn có ý kiến như sau:

1. Về những tác động tiêu cực của Dự án đến môi trường tự nhiên và kinh tế - xã hội (*nêu 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 Cát Sơn đồng ý với các đánh giá về tác động tiêu cực có thể xảy ra đối với môi trường và xã hội như tác động đến các hộ bị thu hồi đất, tác động do bụi tiếng ồn của các phương tiện chở vật liệu xa ảnh hưởng đến an ninh và trật tự xã hội, vệ sinh môi trường tại khu vực thi công

2. Về các biện pháp giảm thiểu tác động môi trường của Dự án (*nêu 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 đồng ý với các phương án giảm thiểu và bảo vệ môi trường đã được đề xuất trong tài liệu gửi kèm

3. Kiến nghị đối với chủ dự án:

(nêu 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).

- Đề nghị chủ đầu tư dự án nghiêm túc thực hiện các biện pháp giảm thiểu tác động môi trường và xã hội.

- Bồi thường thiệt hại hoàng đồng và cát do hoạt động thi công gây ra.

Trên đây là ý kiến của UBND xã Cát Sơn gửi Ban Dự án Thủy lợi Bắc Giang để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường của Dự án./.

Nơi nhận:
- Như trên;
- Lưu ...

ỦY BAN NHÂN DÂN
XÃ Cát Sơn
CHỦ TỊCH

KT/ CHỦ TỊCH
PHÓ CHỦ TỊCH

MẶT TRẬN TỔ QUỐC
XÃ Cát Sơn

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

Số: 04/CV-MTTQ

Cát Sơn, ngày 6 tháng 5 năm 2015

V/v ý kiến tham vấn về dự án sửa chữa và nâng cao an toàn đập- TDA tỉnh.....

Kính gửi: BQL Dự án thủy lợi Bắc Giang

MTTQ xã Cát Sơn nhận được Văn bản số..... ngày..... tháng... năm 2015 của BQL Dự án thủy lợi Bắc Giang 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 Dự án "**Sửa chữa và nâng cao an toàn đập- TDA tỉnh... Bắc Giang...**". Sau khi xem xét tài liệu này, MTTQ xã Cát Sơn .....có ý kiến như sau:

1. Về những tác động tiêu cực của Dự án đến môi trường tự nhiên và kinh tế - xã hội (*nêu 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 Cát Sơn hoàn toàn nhất trí với các tác động tiêu cực của dự án đến môi trường tự nhiên và kinh tế - xã hội. Các tác động này cần được đánh giá chi tiết và cụ thể.

2. Về các biện pháp giảm thiểu tác động môi trường của Dự án (*nêu 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*)

Các biện pháp giảm thiểu tác động môi trường của dự án đưa ra là hoàn toàn phù hợp với các điều kiện của địa phương. Các biện pháp giảm thiểu tối đa các tác động đến môi trường và xã hội.

1

3. Kiến nghị đối với chủ dự án:

(nêu 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).

Đề nghị chủ Dự án nghiêm túc thực hiện các giải pháp giảm thiểu tác động môi trường đã đề xuất trong báo cáo gửi kèm

Trên đây là ý kiến của MTTQ xã Cát Sơn gửi Ban Quản lý Dự án thủy lợi Bắc Giang để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường của Dự án./.

Nơi nhận:
- Như trên;
- Lưu …

MẶT TRẬN TỔ QUỐC
XÃ Cát Sơn
CHỦ TỊCH

P. Chủ tịch Văn Trung

APPENDIX A8- ENVIRONMENTAL SPECIFICATIONS (FOR INCLUSION IN BIDDING AND CONSTRUCTION CONTRACTS)

Construction Camp Management Plan

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, 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:

7. The construction camp site will have to be approved by the local authority.
8. 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.
9. The Contractor shall provide adequate and suitable facilities for washing clothes and utensils for the use of contract labor employed therein.
10. 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.
11. Camp areas shall be located to allow effective natural drainage and landscaped so as to avoid erosion.
12. The Contractor shall provide suitable, safe and comfortable accommodation for the workforce.
13. The Contractor shall provide adequate lavatory facilities (toilets and washing areas) for the number of workers expected on site, plus visitors. Toilet facilities should also be provided with adequate supplies of clean or potable water, soap, and toilet paper. Separate and adequate bathing facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions at all times.
14. The Contractor shall implement effective sediment and erosion control measures during construction and operation of the construction work camps in accordance with the environmental requirements as stipulated by the EMP and SESIA, especially near rivers.
15. The Contractor shall provide recreational facilities to the workforce. Such facilities will help mitigate against potential conflict and impact on the local population as the incentive to go outside the camp will be reduced.
16. The Contractor shall provide safe potable water for food preparation, drinking and bathing.

17. 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.
18. 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.
19. 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.
20. 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.
21. 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 outlet.
22. 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.
23. 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.
24. Concrete batching plants shall not be located within 500 m of any residence, community or work place.
25. The Contractor shall provide medical and first aid facilities at each camp area; and
26. 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:

1. Access to the camp shall be limited to the residing workforce, construction camp employees, and those visiting personnel on business purposes.
2. Prior approval from the construction camp manager shall be required for visitor access to the construction camp.
3. Adequate, day-time night-time lighting shall be provided.
4. A perimeter security fence at least 2m in height shall be constructed from appropriate materials; and

5. 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 employment of the Client or its Contractors. The Code of Conduct shall be available to local communities at the project information centers or other 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. Maintenance of appropriate standards of dress and personal hygiene shall be in effect.
12. Maintenance of appropriate hygiene standards in accommodation quarters shall be set in place.
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.

Construction Impact Management Plan

In order to reduce the impact of the construction activities on local communities and the environment, the Construction Contractor shall implement the following Sub-Plans in accordance with the following stipulations:

Erosion and Sedimentation

Site activities shall be carefully managed in order to avoid site erosion and sedimentation of downstream waterways. In order to minimize negative erosion impacts in the project area, the following activities shall be carried out by the Contractor:

1. Erosion and sedimentation shall be controlled during the construction. Areas of the site not disturbed by construction activities shall be maintained in their existing state.
2. Disturb as little ground area as possible, stabilize these areas as soon as possible, control drainage through the area, and trap sediment onsite. Install erosion control barriers around perimeter of cuts, disposal pits, and roadways.
3. Slope works and earth moving/excavation shall be conducted in order to minimize exposure of the soil surface both in terms of area and duration. Temporary soil erosion control and slope protection works shall be carried out in sequence to construction.
4. Conserve topsoil with its leaf litter and organic matter, and reapply this material to local disturbed areas to promote the growth of local native vegetation.
5. Apply local, native grass seed and mulch to barren erosive soil areas or closed construction surfaces.
6. Apply erosion control measures before the rainy season begins, preferably immediately following construction. Install erosion control measures as each construction site is completed.
7. In all construction sites, install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is re-established. Sediment control structures include windrows of slash, rock berms, sediment catchment basins, straw bales, brush fences, and silt fences.
8. Control water flow through construction sites or disturbed areas with ditches, berms, check structures, live grass barriers, and rock.

9. The ground surface at the construction site offices shall be concreted or asphalted in order to minimize soil erosion.
10. Erosion control measures shall be maintained until vegetation is successfully re-established.
11. Water shall be sprayed as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion and dust.

Particulate Emissions and Dust

The Contractor shall propose methods and actions to control dust resulting from construction related activities, including quarry sites, crushing and concrete batching plants, earthworks including road construction, embankment and channel construction, haulage of materials and construction work camps. In particular the Contractor shall undertake the following:

1. Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding communities, and especially to vulnerable people (children, elderly people).
2. Time removal of vegetation to prevent large areas from becoming exposed to wind.
3. Place screens around construction areas to minimize dust proliferation, paying particular attention to areas close to local communities.
4. Spray water as needed on dirt roads, cut areas and soil stockpiles or fill material. Spraying shall be carried out in dry and windy days, at least twice a day (morning and afternoon). The frequency of spraying near local communities shall be increased as needed.
5. Pave access roads with gravel in the sections which near the communities and other sensitive receptors to reduce generation of air-borne dust.
6. Provide an adequate ventilation system and other measures to control concentration of air pollutants within tunnels.
7. Transportation of materials by vehicles and construction of access roads shall be properly designed. For example, the access road can be constructed and paved by concrete/asphalt, or laid with small graded rocks, prior to major earthworks which may require transportation of substantial amount of materials on-site and off-site.
8. Ensure adequate maintenance of all vehicles. Construction plant/vehicles that generate serious air pollution and those which are poorly maintained shall not be allowed on site.
9. Transport of chemicals or materials such as cement, sand and lime shall be covered entirely with clean impervious material to ensure that these materials shall be contained. Overflow of material shall be avoided; and
10. The exhaust gases from construction machinery and vehicles are accepted. However, the engines shall be inspected and adjusted as required to minimize pollution levels.

Noise

To minimize noise the Contractor shall:

1. Maintain all construction-related traffic on project access roads at established speed limits.
2. Maintain all on-site vehicle speeds at or below 30 kph, or otherwise designated.

3. To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90db.
4. In sensitive areas (including residential neighborhoods, hospitals, rest homes, schools, etc.) more strict noise abatement measures may need to be implemented to prevent undesirable noise levels.
5. Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.
6. Design a transportation schedule for entry of construction materials to minimize the adverse impact on residents, as well as the traffic on the existing roads. The transportation vehicles shall be required to slow down and banned from using horns when passing sensitive areas. Transportation during peak hours should be minimized. The Contractor shall provide the transportation route in advance to the Engineering Supervisor.
7. Maintain the construction equipment in its best operating conditions and lowest noise levels possible.
8. Use temporary noise barriers to minimize the noise caused by construction equipment;
9. Provide hearing protection to workers who must work with highly noisy machines such as piling, explosion, mixing, etc., for noise control and workers protection.
10. Areas for the storage of fuel or lubricants fenced and have a compacted/impervious floor or other surface 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 an oil skimmer or other appropriate device to remove hydrocarbons. Empty fuel or oil drums may not be stored on site. Proper MSDS labeling shall be in place and training provided to workers handling these materials.
11. The construction supervision team shall be equipped with portable noise detection devices to monitor the noise level at the sensitive receptors.
12. Materials leaving the construction site shall be transported during non-peak hours in order to minimize traffic noise due to the increase in traffic volumes.
13. Use of properly designed silencers, mufflers, acoustically dampened panels and acoustic sheds or shields, etc. shall be made. Mufflers and other noise control devices shall be repaired or replaced if defective.
14. Use of electric-powered equipment when applicable instead of diesel-powered or pneumatic-powered equipment.
15. Equipment known to emit a strong noise intensity in one direction, shall when possible, be oriented to direct noise away from nearby sensitive receptors.
16. Machines and equipment that may be in intermittent use shall be shut down between work periods or throttled down to a minimum operation.

Earthworks, Cut and Fill Slopes

The contractor shall ensure that the following procedures are undertaken:

1. All earthworks shall be properly controlled, especially during the rainy season.

2. The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the works.
3. The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
4. In order to protect any cut or fill slopes from erosion, in accordance with drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.
5. Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by the Supervisory Engineer, and
6. Disposal sites should not be located where they can cause future slides, interfere with agricultural land or any other properties, or cause runoff from the landfill towards any watercourse. Drains may need to be dug within and around the landfills, as directed by the Supervisory Engineer.

Stockpiles and Borrow Pits

The Contractor shall prepare and overall Stockpiles and Borrow Pits Management Plan for the total works. Operation of a new borrowing area, on land, in a river, or in an existing area, shall be subject to prior approval of the Environmental Supervisor, and the operation shall cease if so instructed by the Supervisory Engineer.

Borrow pits shall be prohibited where they might interfere with the natural or designed drainage patterns. River locations shall be prohibited if they might undermine or damage riverbanks, or carry too much fine material downstream.

The location of crushing plants shall be subject to the approval of the Supervisory Engineer, and not be adjacent to environmentally sensitive areas, or to existing residential settlements, and shall be operated with approved fitted dust control devices.

Rock or gravel taken from a river shall be far enough removed to limit the depth of material removed to one-tenth of the width of the river at any one location, and not to disrupt the river flow, or damage or undermine the riverbanks.

The Plan shall include:

1. A map showing the extent of the area to be developed.
2. A method statement defining the proposed working methods.
3. The proposed access and haulage routes between the borrow pits and the destination for the extracted materials.
4. A justification for the quantities of materials to be extracted, an estimation of the waste material to be generated and disposal details for such waste materials.
5. Details of the measures taken to minimize the borrow pit areas and their visual impact on the surrounding area, and

6. Details of the measures to be taken for the long-term rehabilitation of the borrow pit areas in order to avoid situations that could constitute a threat to health and safety and cause environmental degradation.

In general terms, the Contractor shall:

1. Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 meters away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies.
2. Limit extraction of material to approved and demarcated borrow pits.
3. Stockpile topsoil when first opening the borrow pit. After all usable borrow has been removed, the previously stockpiled topsoil should be spread back over the borrow area and graded to a smooth, uniform surface, and adequately sloped for drainage. On steep slopes, benches or terraces may have to be established to help control erosion.
4. Excess overburden should be stabilized and re-vegetated. Where appropriate, organic debris and overburden should be spread over the disturbed site to promote re-vegetation. Natural re-vegetation is preferred to the best extent practicable.
5. Existing drainage channels in areas affected by the operation should be kept free of overburden.
6. Once the job is completed, all construction -generated debris should be removed from the site to an approved disposal location.
7. The Contractor shall ensure that all borrow pits used are left in an appropriate condition with stable side slopes, re-establishment of vegetation, restoration of natural water courses, avoidance of flooding of the excavated areas wherever possible so no stagnant water bodies are created which could breed mosquitoes, and
8. When the borrow pits or the local depressions created by the construction activities cannot be refilled or reasonably drained, the Contractor shall consult with the local community to determine their preference for reuse such as fish farming or other community purposes.

Disposal of Construction Waste

The Contractor shall carry out the following activities:

1. Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.
2. Debris generated due to the dismantling of the existing structures shall be suitably reused, to the best extent feasible (e.g. as fill materials for embankments). The disposal of remaining debris shall be carried out only at sites identified and approved by the Supervisory Engineer. The Contractor should ensure that these sites (a) are not located within designated forest areas; (b) do not impact natural drainage courses; and (c) do not impact endangered/rare flora. Under no circumstances shall the Contractor dispose of any material in environmentally sensitive areas.
3. In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such, debris or silt and restore the affected area to its original state to the satisfaction of Supervisory Engineer.

4. All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, will be considered incidental to the work and should be planned and implemented by the contractor as approved and directed by the Supervisory Engineer.
5. Consult with local communities, if any, living close to spoil disposal sites that may be affected. The consultation shall provide local stakeholders with detailed information of the potential spoil disposal site, and provide an opportunity for them to express their opinions and concerns with the proposed plans. Information and feedback from the consultation process shall be incorporated into the final design for each spoil disposal site.
6. Include provisions for incorporating the most appropriate stabilization techniques for each disposal site.
7. Assess risk of any potential impact regarding leaching of spoil material on surface water.
8. Include an appropriate analysis to determine that the selected spoil disposal sites do not cause unwanted surface drainage, and
9. Stabilize spoil disposal sites to avoid erosion in accordance with the requirements of the Landscape and Re-vegetation Plan.

Demolition of Existing Infrastructure

The Contractor shall implement adequate measures during demolition of existing infrastructure to protect workers and public from falling debris and flying objects. Among these measures, the Contractor shall:

1. Set aside a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels.
2. Conduct sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable.
3. Maintain clear traffic ways to avoid driving of heavy equipment over loose scrap.
4. Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged.
5. Evacuate all work areas during blasting operations, and use blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures.
6. Provide all workers with safety glasses with side shields, face shields, hard hats, and safety shoes.

Other Management Plans

The contractor shall be responsible for preparing the following management plans in accordance with the stipulated terms of reference:

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

- A review of the preliminary site drainage design prepared during the detailed design.
- 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).
- Detailed design including drawings, location maps, specifications of drainage collection channels and wastewater treatment facilities.
- Proposed discharge locations and treatment standards.
- A detailed implementation program of the proposed drainage system.
- 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.
- 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.
- 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 outlet.
- 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.
- 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.
- Drainage control devices such as sediment traps shall be installed at each discharge outlet, and they shall be cleaned regularly, and
- Chemical toilets can be provided on each work site employing 5 workers or more.
- 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

Waste such as those listed below are expected due to construction activities:

- Surplus excavated materials requiring disposal due to earth moving activities and slope cutting.
- Disposal of used lumber for trenching works, scaffolding steel material, site hoarding, packaging materials, containers of fuel, lubricant and paint.

- Waste generated by demolition of existing houses / buildings affected by the project or breaking of existing concrete surfaces.
- Waste from on-site wastewater treatment facility (e.g. treatment of bentonite from tunneling works by sedimentation process), and
- Domestic waste generated by construction workers, construction campsite and other facilities.

The above wastes must be properly controlled through the implementation of the following measures:

- Minimize the production of waste that must be treated or eliminated.
- 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).
- Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each, and
- 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;

- A method statement on waste recycling, re-use and minimization of waste generation.
- 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.
- 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
- Collected waste shall be disposed of properly through a licensed waste collector.

Pollution Prevention Plan

Emergency Plan for Hazardous Materials

If the construction site is expected to have or suspected of having hazardous materials (chemicals, asbestos, hydrocarbons, or other similar hazardous materials), the Contractor will be required to prepare a Hazardous Waste Management Plan and Emergency Response Plan to be approved by the Environmental Supervisor. Removal and disposal of existing hazardous wastes in project sites should only be performed by specially trained personnel following national or provincial requirements, or internationally recognized procedures.

The Contractor shall:

- Make the Hazardous Waste Management Plan available to all persons involved in operations and transport activities.
- Hazardous waste (or chemical waste) shall be properly stored, handled and disposed of in accordance with the local legislative requirements. Hazardous waste shall be stored at designed location and warning signs shall be posted.
- Inform the Environmental Supervisor, or Construction Supervisor of any accidental spill or incident in accordance with the plan.
- Prepare a companion Emergency Response Plan outlining all procedures to be undertaken in the event of a spilled or unplanned release.
- Initiate a remedial action following any spill or incident; and
- Provide a report explaining the reasons for the spill or incident, remedial action taken, consequences/damage from the spill, and proposed corrective actions. The Emergency Plan for Hazardous Materials shall be subsequently updated and submitted to the PEO for no objection.

Chemical Waste

During construction there will be a potential for pollution to adjacent habitat areas and watercourses caused by chemical wastes such as spent waste oil, spent lubricant, contaminated soil material due to leakage of hydraulic oil, fuel from construction plant or vehicles, etc. The following measures shall be put into place in order to minimize the damage caused by chemical waste:

- All refueling of heavy equipment and machinery shall be undertaken by a service vehicle to prevent any spillage or contamination by chemical wastes such as maintenance oils, lubricants, etc.
- All the fuel and hazardous material storage shall be adequately enclosed to prevent any spillage problems.
- Storm water runoff from open workshops, repair areas, and enclosed storage areas shall be collected and treated in hydrocarbon separation pits/tanks before discharge to drains and waterways.
- All explosives shall be transported, stored and handled in accordance with applicable laws and good design engineering and constructions practices. The contractor shall provide details of proposed storage and security arrangements.

Maintenance of Construction Equipment

The Contractor shall:

- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands). Fuel storage shall be located in proper areas and approved by the PEO.
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems, and

- All spills and collected petroleum products shall be disposed of in accordance with standard environmental procedures/guidelines. Fuel storage and refilling areas shall be located at least 100m from all cross drainage structures and important water bodies or as directed by the PEO.

Vegetation Clearing and Salvage

Clearing of Construction Areas

Areas proposed for clearing shall be included in the Vegetation Clearing and Salvage Plan. Only those proposed areas shall be cleared in accordance with the Plan and approved by the Engineering Supervisor. The Vegetation Clearing and Salvage Plan shall consider the existing usage of the project land to allow its existing usage to continue as long as is practicable, without interference with the Contractor's activities. Vegetation shall not be disturbed in those areas not submitted with the Plan.

The Contractor shall also arrange to coordinate with local communities as part of the Livelihoods Development Plan to clear the reservoir area.

The following measures shall be implemented:

- Large or significant trees in camp areas and access roads should be preserved wherever possible.
- The application of chemicals for vegetation clearing shall be minimized. To the best extent possible, non-residual chemicals shall be selected and with negligible adverse effects on human health.
- Herbicides use in the project shall be shown to be effective against the target vegetation species, have minimum effect on the natural environment, and be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well for personnel applying them.
- The design of roads, including temporary and permanent access roads shall avoid crop areas where reasonable and practical.

Landscape, Visual impacts and Re-vegetation

The construction program of the project shall be executed in phases, particularly in those locations where severe or high landscape and visual impacts are expected.

The following measures shall be implemented:

- Construction shall be programmed in sequence so that the scale of earth moving activities and area of exposed surface can be minimized.
- Re-vegetation shall start at the earliest opportunity. Appropriate local species of vegetation shall be used.
- The requirement of compensatory planting shall be included in the design and project contract. A Master Landscaping Plan and requirements of ecological monitoring or survey during different stages of the project shall be prepared during the design stage that shall be implemented during the construction and maintained during operation.
- Facilities and structures shall be located according to the terrain and geographical features of the project site.

- Restoration, of cleared areas such as borrow pits no longer in use, disposal areas, construction roads, construction camp areas, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works shall be accomplished using landscaping, adequate drainage and re-vegetation.
- Existing trees and plants within the construction boundaries shall be tagged to indicate whether the trees are to be retained transplanted or removed. Transplantation of existing trees affected by the project works shall be carried out prior to the commencement of construction.
- Excavations shall avoid damage to the root systems. Mitigation measures are also required to prevent damage to trunks and branches of trees.
- Temporary hoarding barriers shall be of a recessive visual appearance in both color and form.
- Upon completion of the construction, the affected areas shall be immediately restored to their original condition, including the re-creation of natural and rocky shoreline, footpath and re-establishment of disturbed vegetation.
- At the highly visually sensitive zones, construction may be scheduled where possible at the low tourist seasons.
- Construction trucks shall operate at night when possible and kept cleaned and covered when shipping bulk materials.
- Construction sites shall be surrounded with fence if located at the scenery zones to avoid direct visual sights of the construction sites.
- There shall not be construction camps in scenic areas.
- Random disposal of solid waste in scenic areas shall be strictly prohibited.
- All mixing stations and concrete batching plants shall not be located near rivers or in scenic areas. The stockpiles shall be located in hidden areas, and outside of the sight from tourists;
- Use the existing roads as access road if possible to minimize the need for new access roads which lead to damage existing landforms and vegetation.
- Land use for agricultural activity prior to use for construction activities shall be, as much as possible, restored to a state to allow the same agricultural activity to continue.
- Spoil heaps and excavated slopes shall be re-profiled to stable batters, and grassed to prevent erosion.
- Topsoil stripped from the work areas shall be used for landscaping works, and
- Watercourses, which have been temporarily diverted by the construction activities, shall be restored to their former flow paths.

Site Restoration

- At the completion of construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a similar condition to

that prior to the commencement of the works, or to a condition agreed to with local authorities and communities.

- Remedial actions that cannot be effectively carried out during construction shall be carried out on completion of the restoration works (and before issuance of the acceptance of completion of works).

Various activities to be carried out for site restoration are:

- The construction campsite shall be grassed and trees cut replaced with saplings of similar tree species.
- All affected areas shall be landscaped and any necessary remedial works shall be undertaken without delay, including grassing and reforestation.
- Water courses shall be cleared of debris and drains and culverts checked for clear flow paths.
- All sites shall be cleaned of debris and all excess materials properly disposed.
- Borrow pits shall be restored.
- Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas.
- Saplings planted shall be handed over to the community or the land owner for further maintenance and watering, and
- Soak pits and septic tanks shall be covered and effectively sealed off.

Safety during Construction

The Contractor's responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Present details regarding maximum permissible vehicular speed on each section of road.
- Establish safe sight distance in both construction areas and construction camp sites;
- Place signs around the construction areas to facilitate traffic movement, provide directions to various components of the works, and provide safety advice and warning. All signs shall be in English and Vietnamese language and be constructed according to Vietnamese specifications.
- Estimate maximum concentration of traffic (number of vehicles/hour).
- Use selected routes to the project site, as agreed with the PEO, and appropriately sized vehicles suitable to the class of roads in the area, and restrict loads to prevent damage to local roads and bridges used for transportation purposes.
- Be held responsible for any damage caused to local roads and bridges due to the transportation of excessive loads, and shall be required to repair such damage to the approval of the PEO.
- Not use any vehicles, either on or off road with grossly excessive, exhaust or noise

emissions. In any built up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor.

- Maintain adequate traffic control measures throughout the duration of the Contract and such measures shall be subject to prior approval of the PEO.
- Carefully and clearly mark pedestrian-safe access routes.
- If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours.
- Maintain a supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction.
- Conduct safety training for construction workers prior to beginning work.
- Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed boots, etc.) for construction workers and enforce their use.
- Provide post Material Safety Data Sheets for each chemical present on the worksite.
- Require that all workers read, or are read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant.
- Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers.
- During heavy rains or emergencies of any kind, suspend all work; and
- Brace electrical and mechanical equipment to withstand seismic events during the construction.

Environmental Training for Construction Workers

During construction there will be a potential for workers to damage protected areas and waterways adjacent to camps and work areas. The Contractor shall prepare an Environmental Training Plan for all construction workers: the Plan shall address the following items:

- All Contractor's employees shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they attended the training sessions detailed in the Plan.
- The Plan shall educate all construction workers on the following issues but not limited to them: fire arm possession, traffic regulations, illegal logging and collection of non-timber forestry products, non disturbance of resettlement communities, hunting and fishing restrictions, waste management, erosion control, health and safety issues, all prohibited activities, the Code of Conduct requirements and disciplinary procedures, and general information on the environment in which they will be working and living;
- Establishment of penalties for those who violate the rules; and
- Proposed methods for conducting the training program, which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and 'tool box' meetings.

APPENDIX A9- CHANCE FIND PROCEDURES

The project works could impact sites of social, sacred, religious, or heritage value. "Chance find" procedures would apply when those sites are identified during the design phase or during the actual construction period.

Cultural property includes monuments, structures, works of art, or sites of significant points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This includes cemeteries, graveyards and graves.

In the event of finding of properties of cultural value during construction, the following procedures for identification, protection from theft, and treatment of discovered artifacts should be followed and included in standard bidding document.

- Immediately stop the construction activities in the area of the chance find.
- Delineate the discovered site or area.
- Secure the site to prevent any damage or loss of removable objects.
- Notify the supervisory Engineer who in turn will notify the responsible local authorities.
- Responsible local authorities and the relevant Ministry would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures.
- Decisions on how to handle the finding shall be taken by the responsible authorities and the relevant Ministry. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance), conservation, restoration and salvage.
- Implementation of the authority decision concerning the management of the finding shall be communicated in writing by the relevant Ministry of Cultural, Sport and tourist.
- Construction work could resume only after permission is given from the responsible local authorities and the relevant Ministry concerning safeguard of the heritage.
- The World Bank needs to be notified by PMU on the issues and actions taken.
- These procedures must be referred to as standard provisions in construction contracts. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered.
- Relevant findings will be recorded in World Bank Supervision Reports and the overall effectiveness of the project's cultural property mitigation, management, and activities will be assessed.

APPENDIX A10- TERMITE TREATMENT PROCEDURES

Name of chemical to be used: Metavina 10DP. This product can kill termite via directly exposure or infection. Process of survey, exploration and termite treatment and hidden risks for dam

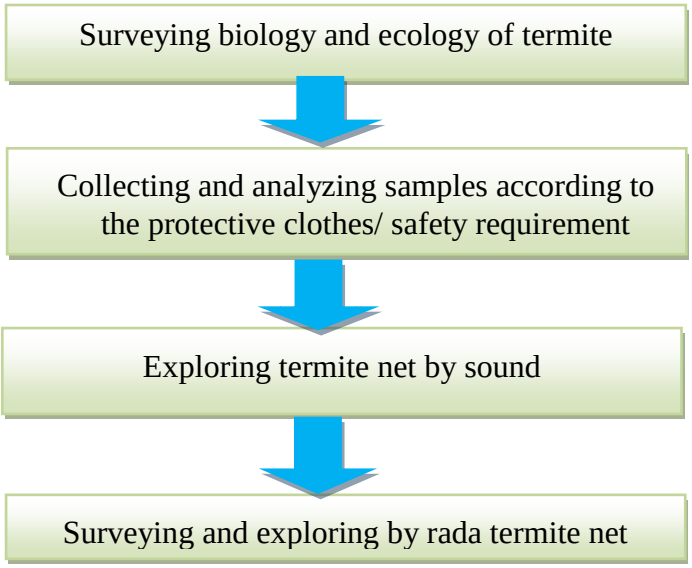


Figure 1: Process of surveying and exploring termite net in dam

Process of termite treatment for dam

Drill a screw and inject termiticide into termite nests then inject clay to voids created by termites in the foundation of the dam in order to protect the surrounding environment and thorough handling of potential dangers caused by termites. This measure does not harm the environment but it requires construction unit to use the specialized equipments, and experience in construction termite treatment for irrigation works. Steps of construction termite treatment as follows:

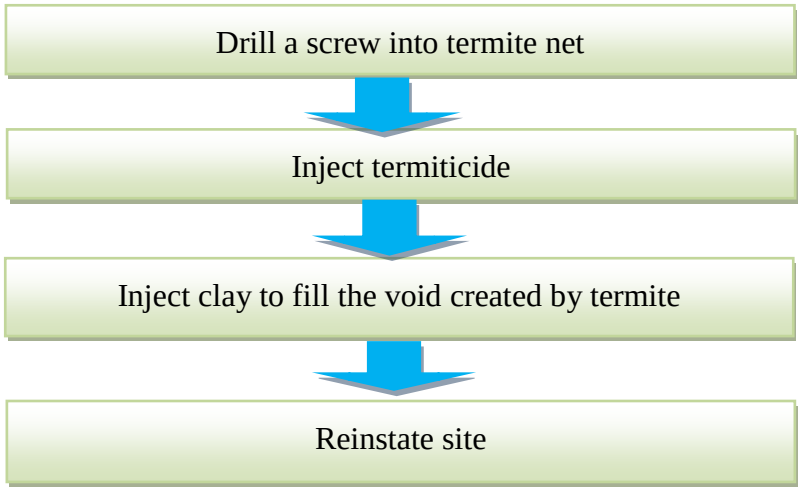


Figure 2: Process of termite treatment in dam

Requirement of protective clothes/ safety for workers

For termite treatment, the potential impacts may occur such as incidents due to using construction machines in dam slope. therefore, it is neccessary to implement the requiremrnt of protective clothes/ safety for works as follows:

i) Operating properly equipments and machine under right procedure to ensure safety.

ii) Checking current status of machines, equipment before operating. The people who are not responsible for construction, without training on technial operation are not allowed in operation, repairing construction machines.

iii) Staffs, workers must be equiped fully protective clothes such as shoes, gloves, helmet, name lable.

iv) Power line, water for construction have to arrange tidily to not obstruct construction activities Construction signs must be available at construction site.

APPENDIX A11- INTEGRATED PEST MANAGEMENT (IPM)

1. Objectives

a, General objectives

Strengthening flora protection at local level, reducing pesticide use in the field, improving the efficiency of prevention, managing well pesticide and pesticide use process to reduce the risk of contamination pesticides on the environment and affect human health

b, Specific objectives

- Support of the Department of Plant Protection of Binh Dinh provinces in strengthening pest management and pesticide management in accordance with the national action plan on food hygiene and safety, food security, adaptation to climate change and the concerned international conventions that the Government has approved.
- Strengthening environmental protection, food safety through strengthening the role of predators; reduce pesticide residues to ensure food hygiene and safety, reduce environmental pollution (water, land, air).
- Improving farmers' knowledge: distinguish the major pests, secondary; identify predators and their role in the field, clearly understand the effect of two colors of pesticides, property use, know how to survey pest and use threshold control; understand and apply pest control measures in IPM to increase income for farmers.

2 Basic principles of IPM framework

The following principles will be applied to the sub-projects of Binh Dinh province likely to increase the use of fertilizers and pesticides on 130ha cultivation land:

a. "Prohibited list": As defined in the screening criteria in Environmental and social Management Framework (ESMF), the project will not finance the purchase of pesticides in large quantities and hence do not trigger OP4.09. However, if there is a serious infestation of pests in the region, the project will support to buy small quantities of pesticides. The acquisition, pesticides, storage and transportation will be subjected to the provisions of the Government and without objection of the Bank, the purchase of pesticides can be done. The list of banned pesticides will not be used and circulated.

b. IPM program and project support: supporte and implementation of IPM program is part of the EMP for the sub-project. Support project will include technical assistance (consulting) to perform the non-chemical options, and priority support for agricultural extension services, including additional operating costs. The bank support fee for integrated prevention program of the sub-project and will be required or approved an independent program or as a part of ESMP. A proposed budget has been allocated for the implementation of IPM programs for the downstream areas of the project area. Detailed planning work will be completed through consultation close to farmers, local authority/PCP organization.

c. The project will apply IPM programs as a method to minimize the potential negative impact of the increased use of fertilizers and chemicals. However, the improvement of knowledge and experience in the use of fertilizers and chemicals are through research surveys and training courses in the work as well as selecting safe use of non-chemicals, other techniques, is being investigated and/or applied in Vietnam. National IPM Program has also summarized

the results of the implementation and the lessons of experience. The project will apply National IPM program results and detailed technical guidance.

d. IPM Program subproject can be set up to support the implementation of the Government's policy and objectives focusing on reducing the use of chemical fertilizers and pesticides.

e. In normal conditions, if pesticide use is considered to be a necessary option, only pesticides registered with the government and the international recognition in use and project will also provide technical and economic information for chemicals use demand. It should consider the options in the management of not harmful chemicals and can also reduce reliance on the use of pesticides. The measures will be incorporated into the project design to reduce risks related to the handling and use of pesticides to allowed possible level and managed by users.

f. The planning and implementation of mitigation measures and other activities will be carried out closely with the authorities, powers and stakeholders, including suppliers of chemicals, to facilitate cooperation and understanding each other.

3. The approach of IPM

Focus more on the risks of abuse and excessive use chemical of plant protection products. The concerned plant are rice, vegetables, tea etc. these plants tend to be sprayed more of pesticides.

Focus on community education, the initial survey will be incorporated into the task with the aim of clarifying the root cause of the abuse and excessive use of plant protection products and the associated risks. Support the capacity building of the instructor (trainer) IPM. The current program will need to be reviewed and new modules will be supplemented to increase the portion related to reducing the risk of plant protection products. The training program will be enriched with the integration of many activities such as System Rice Intensification (System Rice Intensification - SRI), minimum tillage (minimum tillage), production community and use of bio-products replacing plant protection chemicals the training activities, the application will be made in the wide area application of the model.

To perform this content, it should perform the following steps:

- Step 0: Hiring consultants: A group of consultants (IPM consultants) will be hired to assist PMU in implementing IPM programs including ensurring results and cooperation among the agencies, farmers, and other stakeholders. The task for the consultant will be implemented at an early stage of project implementation.
- Step 1: Set up the basic requirements of the register the program of farmers. This step should be implemented as soon as possible with appropriate questionnaire to establish base in 2013 for the use of fertilizers and of pesticides in the project area. Consultation with key agencies in the conduct of training, registration of participating farmers.
- Step 2: Set program goals and prepare a work plan. Based on the results from the questionnaire and consultation at Step 1, work plan and schedule will be prepared, including budgeting and implementation object. The work plan will be submitted to the PMU and approved by the World Bank for review and comment.
- Step 3: Implementation and annual review. After approval of the work plan, the activities will be implemented. Implementation progress will be included in the project progress reports. An annual evaluation report will be implemented by PMU and Sub-Department of Plant Protection.

- Step 4: Evaluate the impact. An independent consultant will be hired to carry out the impact assessment. This is to assess the performance of the project and to provide lessons. PMU will hire a national consultant to perform impact assessment of IPM the program

4. The contents of the sub-projects

(i) Collection of information and selection of solutions

Before implementing IPM program, consultants must have the original investigation to have the necessary information such as:

- Survey to collect data on: staple crops have economic significance in the project area: seeds, crop, growth characteristics, and farming techniques.
- Survey to collect data on soil conditions, pedology, local climate.
- Investigate the situation of the pest, harmful rule arises, their economic damage causing on the major crops in the project area.
- Investigate the role of natural enemies parasitic of pests on the major crops in the project area.
- Investigate the actual situation of pest control measures, pesticide use and their effect at the local.
- Investigate the socio-economic conditions, income, technical knowledge, and practices.

On the basis of these findings, a proposal to evaluate IPM measures will apply on specific crops in regions and localities implement the project through the following measures:

- Cultivation methods: Soil, field sanitation, crop rotation, intercropping, crop seasons, reasonable sowing and planting density, rational use of fertilizers; appropriate caring measures.
- Using seed: the tradition seed and the proposed seed in use.
- The biological measures: taking advantage of available natural enemies in the field, using probiotics.
- Determination of the level of harm and prevention threshold.
- Chemical measures: safe using with natural enemies, the economic threshold; 4 correct use of medicines.

(ii) Develop of demonstration models IPM

This section done by the Department of Crop Production, based on soil characteristics, climate, farming skills. Department of Crop Production will propose to the TDA of pilot field for agricultural development with the highly effective main crops. IPM activities in the pilot field will serve for sightseeing and guidance of practice.

Some of the main contents when building the IPM in the pilot field, as follows:

- Construction of demonstration models for applying IPM measures proposed above.
- Building model involved by the people with the guidance of technical staff.
- In the model, there need to build nuclear farmers, group leader.

- In addition to technical assistance there should be support materials, for households participating in demonstration models.
- Compiling IPM guiding documentation for major crops: rice, vegetables ...
- Scale of model: depending on crops, specific economic conditions, models were constructed using different scales: 5-10 ha / model.

(iii) Coaching and training of IPM staff

TOT (Training of trainers) and Farmer Field School (FFS):

- Each sub-project will organize workshops and staff training of IPM. The content of the training includes:
  - Distinguish the major and secondary pests.
  - Identify the natural enemies of pests and diseases in the field.
  - Investigate methods to detect worms and diseases.
  - Understand the impact of two pesticides, using appropriate pesticides.
  - The techniques pest control under IPM principles.
  - Advanced farming techniques.
- The understanding must be trained in theory and practical application in the field. The contents above can be trained under thematic groups: farming thematic, identification thematic and detection methods of pests and their natural enemies, the thematic of IPM techniques in production.
- Training object: The technical staff of the Department of Agriculture, Sub-department of plant protection, agricultural extension of districts, communes, and cooperatives. These students will train to the farmers in the project area, the implementing of models.
- The size of each class is from 20 to 30 students, held in each district. Learning time in each stage. According to the thematic training session, each session may last 3-5 days on both theory and practice.
- Lecturer: hire experts from University/Research institute/Agricultural Extension Center...

(iv) Coaching and training of farmers

Training of Farmers (TOF) follows Farmer Field School (FFS):

- Method: Combine theoretical training and base on practical fields of farmers and demonstration model on demonstration IMP in the pilot field.
- Contents are the same as IMP staff training.
- Participants: participating farmers, farmers who direct implement the models and farmers outside if interested.
- Classes are organized in each commune.
- Lecturer: staffs attended TOT classes

(v) Evaluate and visit the field based on of demonstration models and field applied of IPM following the models of farmers

Visit the coast conference, farmers performing the demonstration models are reporters. The farmers implement the model directly with the participants; visiting farmers will calculate, compare economic performance and identify lessons, limitations and the work being done and not being done

(vi) Scientific seminar, evaluation of result and exchange of experience and information, expand the model

Invite experts in related fields participating in the assessment, analysis and additional evaluation, perfecting the processes; the mass media, the propaganda extension organization, expansion and transfer the result, the technical advances to farmers, and production areas with similar conditions

5. The expected results and activities of the project

The project is expected to achieve the following results:

- The risk of food safety and the environment are minimized through the implementation of existing regulations in business management and use of plant protection products and other provisions in national policy and the implementation.
- The capacity of Phu Cat PPD, farmer trainers are enhanced meeting training work, IPM training and IPM practice advocacy are maintained.
- Support for farmer groups after learning IPM to continue experiment to determine the application technical advances more effectively in production and popular in the community.
- Support for strengthening commune locality, strengthening pesticide management including the implementation and enforcement of legislation controlling plant protection products. Construction and distribution of a short list of specific plant protection products proposed use for rice and safe vegetables production.

6- Implementation of IPM programs

Currently, Vietnam is implementing the national IPM program, so sub-projects requires coordinated planning and integration of the IPM program of the project with the National IPM program to perform more effectively within of each sub-project.

- Binh Dinh Project Management Unit PPMU:
    - Developing and implementing IPM program.
    - To be responsible for the preparation of periodic reports on the implementation and submitting to CPO, WB. Final plan and budget will be completed and discussed with the CPO. All documents will be stored in the project file.
- Binh Dinnh Sub-Department of Plant Protection:
    - Provide policy and technical guidelines for the implementation of the IPM program.
    - Join in IPM model building.
    - Join coaching and staff training IPM.
- Phu Cat Plant Protection Station

  - Coordinate with IPM staff to implement coaching and trained of farmers implemented IPM through the approach and provide of knowledge, support for of farmers on the safe use of pesticides when necessary.
  - Guide the list of banned pesticides
  - Examine the distribution facility providing pesticides to ensure the provision of safe pesticides for farmers

- Cat Son People's committee

Organizing for farmers decided to maintain the routine IPM was formed from a training course by organizing IMP-clubs or groups of farmers with the different levels of organization and structure, along with many activities (including the integration of the contents of cattle, credit, market access, etc,.)

- Households in the project area:
  - Implementing IPM program has trained.
  - The members of the IPM club support together to develop agricultural activities. They also play a central role in the task of organizing community IPM program and general agricultural planning of commune and district as well.
- Environmental Safety Monitoring Consultant
  - Monitoring the implementation of IPM program of sub-projects.
  - Guides local PMU in the implementation.
  - To recommend measures to improve the efficiency of implementation of IPM program of sub-projects.

7- Funds for implementation of IPM program

Funding estimates of the sub-projects implement IPM program includes the following categories:

- Funds for coaching and IPM staff training: Calculated for the classes held in each district = unit price x number of district of each sub-project.
- Funds for coaching and training of farmers: Calculated for the organization of class in each commune = unit price x number of commune in each sub-project.
- Funds held assessment and the shore tours based on demonstration models and field applying IPM following models of farmers. Each district held a conference for shore tours in 1 day.
- Scientific conference, evaluating results, information and experiences exchange, expanding the model. Each District held a scientific conference.

ANNEX 11.1 - NORMS OF FERTILIZER FOR SOME MAJOR CROPS

1/ Norms of Fertilizer

a, For direct sowing rice:

- The amount of fertilizer is 1ha (8-10 tons) of manure, 250 kg Urea, 500 kg superphosphate, K chloride 150kg.
- Whole basal fertilizing of manure, phosphate + 20% urea + 30% K.
- Additional fertilizing tillering 60-70% urea + 20% K.
- Note: The spring crop only put down fertilizer when the weather is not too cold and nitrogen fertilizer limited when rice is in ear to avoid fall in the end of the crop pests.

b, For transplanted rice

Amount of the fertilizer for 1 acres: 4-5 kg decomposed manure, urea nitrogen 8-12 kg 6-12 kg K chloride, Lam Thao superphosphate 15-25 kg. Specific fertilizer depending on the frame with rice, soil properties:

- High-yielding hybrid rice varieties grown on sandy soils, silver colored, fertilize with manure maximum.
- Domesticated rice varieties, nutrient-rich soil fertilizer with a minimum quantity.
- Sandy soil, silver colored, with mineral fertilizer ratio 1 N: 1 K2O: 1 P2O5 (1 protein: 1 K: 1 time per pure fertilizer concentration)..

Boggy land, wetlands regularly, typically acidic, rich in protein, lack of time, lack of potassium fertilizer lime powder before transplanting 7-10 days and reduced nitrogen fertilizers, increasing phosphorus, K, etc. ....

- Recommendation on manufacturing: For initiative water soil, the total amount of fertilizer deeply lined manure, 30-40% protein + phosphate, K before transplanting harrow. None initiative water land is not nitrogen fertilizer liner to prevent cold rice death.
- The 1st additional fertilizing when rice plants have taken root in green (15-20 days after transplanting). Apply 50-80% protein 20-40% + K, water levels flooded 5cm.
- Additional fertilizing Series 2: When the rice stand, about 1-4 to 10-4 every year, 10% nitrogen fertilizer notes and other potassium. Nitrogen pay attention to the color of the leaf, if the leaf is dark green, do not apply nitrogen fertilizer to increase the amount of K, so until flowering rice, the leaves are green ginger is good, keep humidity saturated soil (soft land, subsidence feet).
- In addition to ensuring high yield and stability need to better control some pests and diseases of rice such as BPH, stem borer, sheath blight, blast, ...

Note: only rice cultivation and nitrogen fertilizer when the outdoor temperature is greater than 15^0C.

c) Hybrid maize crops:

- The amount of seed for 1 ha: 15 kg
- Organic manure: lowland areas reach at least 4-5 tons, and highland areas 3-4 tons or more.
- Urea 300 kg
- Phosphate 400 - 500 kg
- Potassium fertilizer 150 kg

d) Domesticated maize crop:

- The amount of seed for 1 ha: 25 kg
- Organic manure: lowland areas reach at least 4-5 tons, and highland areas 3 tons or more.
- Urea 200 - 250 kg
- Phosphate 350 - 400 kg
- Potassium fertilizer 100 - 120 kg

(If using other kinds fertilizer to apply, must taken to ensure the regularization the amount of according to 3 kinds of NPK fertilizer)

2/ The requirement intensive technical guidance

Department of Agriculture, Agricultural Extension Station in collaboration with the Agricultural Extension training for hamlets extension workers understand the tasks required to perform work at the facility. Mastering the knowledge and basic technical requirements for intensive rice, maize.

Intensive technical guidance in hamlets. Printing leaflets to guide the production, intensive rice plant and maize farmers for each.

a) The rice plants:

- About seed; cultivated by the new hybrid rice varieties, limit the use of the old hybrids, Steering simultaneously sowing of seasonality, monoculture on the same field, due to time of growth, leading to different characteristics difficult disease management, water control and take care.
- Regarding technical aspects
  - For rice sowing: Continue to apply the sowing areas with convenient conditions to ensure irrigation water, flat land (with accompanying technical process).
  - For rice plants: a new technique is applicable implanted moderately high density 55-60 clusters / m2, less transplant dedicated to saves Seed and time shorten the tillering, apply enough fertilizer under the guidance of technical staff.
  - Apply day intensive from Seed stage, saving seeds, apply integrated pest management (IPM), reduced plant pesticide to reduce input costs.

b) Maize crop:

- About seeds; lowland areas and upland in the uplands and upland villages of communal planting some of the maize hybrids. The area is not cultivated maize, maize buy pure, pure, high yield potential. Maize must originate clear, good quality seeds, the specialized agencies testing before supply for sowing.
- Technique: Planting density from 5.5 to 6 thousand plants / ha, only 1 tree / hole, the upland districts in density from 5 to 5.5 thousand plants / ha (1-2 plants / hole), enough organic fertilizers and inorganic fertilizers are balance, Arlier additional fertilizing as instructed.

To be suitable to each sub of the communes climate in the district. Suggest People's Committees of communes selected for the 1 to 3 seeds of rice, maize applied to the area of their communes.

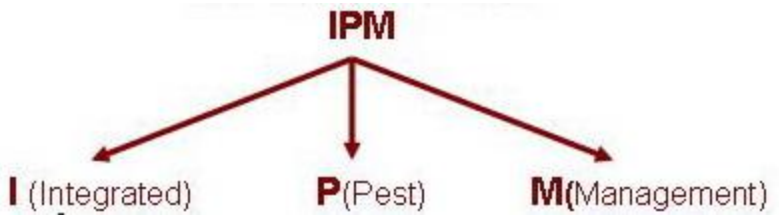
ANNEX 11.2 -INTEGRATED PEST MANAGEMENT IPM FOR THE RICE CROPS

1- Definition, basic principles of integrated pest management

1.1. What is Integrated Pest Management (IPM)?

According to the expert group of the Food and Agriculture Organization (FAO), "Integrated Pest Management" is a pest management system that in the specific the context of the environment and the population dynamics of the species causing damage, using all the techniques and appropriate measures can be, in order to maintain the density of the pest below cause economic damage.

Abbreviation



Thus, IPM stands for Intergrated Pest Management

1.2. Five basic principles of integrated pest management (IPM)

(i). Planting and health care of crops:

- Choose good seed, suitable for local conditions.
- Choose healthy and qualified crops.
- Planting, cared for properly techniques to grow good crops which are resistant and high yielding.

(ii) Check fields regularly, understand the progress of the growth and development of plants, pests, weather, land, water to take timely remedial measures.

(iii) Farmers become experts field: Farmers' technical knowledge, management skills need to advocacy field for many other farmers.

(iv) Pest prevention

- Using appropriate preventive measures, depending on the severity of disease, parasitic natural enemies in each stage.
- Using of chemical drugs has reasonable and proper technique.

(v) Protect natural enemies: Protecting the beneficial organisms to help farmers kill pests.

2- Contents of integrated pest management

2.1. Farming methods

(i) Early land preparation and field sanitation

- Land preparation and field sanitation soon after planting to kill many caterpillars and pupae live in the rice stem borer and rice stubble, loss of shelter and food source of the brown planthopper, green hoppers... Brokers are the transmission of viral diseases for rice as dangerous illness blighted gold, rice ragged stunt disease.
- Principles of impact of field sanitation measures and handling crop residues after harvest is cut off the ring cycle of pests from the crop to other crops and pests limited source accumulation, transmission spread at beginning of the crop.

(ii) Crop rotation

Rice rotation with other crops to avoid pathogen accumulation in rice from the crop to other crop.

(iii) Appropriate Planting

Planting rice to ensure appropriate growth and good development, achieve high productivity, avoids the risk of the weather. The determination of appropriate the crop having to rely on the characteristics of the damage incurred pests important to ensure that rice avoiding peak of the epidemic.

(iv) Use healthy seeds, pest resistant and short seeds

- Healthy seeds, free disease helps to rice facilitate development.
- Using resistant rice seeds reduce drug use chemical pest control, reduce pollution, protect natural enemies; keep balance agricultural ecosystems.
- Rice seed with short growth period of about 100-110 days, plant earlier in the season could have been avoided borer, deep bite panicle. Rice seed with extremely short growing period is 80-90 days brown planthopper prevention measures effective for brown plant hopper could not accumulate in sufficient quantities to cause severe damage in extremely short day breeds.

(v) Cultivation density is reasonable

- The density and sowing techniques, depending on the rice seeds transplanting, crop, soil and nutrition, aged rice, rice quality, process agricultural intensification.
- The density is too thick or too little will affect productivity, while also affecting the generation and development of pests, weeds.
- The rice fields are often sown too thick closed up early, causing high humidity, creating conditions for sheath blight and brown plant hopper damage incurred at the end of the crop.

(vi) Using reasonable fertilizers

Fertilization excessive or unreasonable fertilizer will make plants grow normally and not prone to pest infestation. Rice fields fertilization are more susceptible to infectious diseases rice blast, sheath blight, leaf blight.

2.2. Manual methods

Light traps catch butterflies, break eggs, rub stripping foil fencing using leaf spray, dig down to catch mice.

2.3. Biological methods

(i) Creating a favorable environment for beneficial organisms are natural enemies of pest development to contribute to kill pests:

- Protection of natural enemies to avoid toxic chemicals by using selective medication drugs, narrow-spectrum drugs, drugs used when absolutely necessary and should be based on economic thresholds...
- Create habitat for natural enemies after planting by intercropping, planting legumes on bunds, disintegrator for lurking natural enemies...
- Application of cultivation techniques facilitate reasonable development natural enemies.

(ii) Priority use drugs Biological Plant Protection

The medicines is effective only biological pest control, non-toxic to beneficial organisms, safe to human health and the environment

ANNEX 11.3 - LIST OF PLANT PROTECTION DRUGS BANNED IN VIETNAM

COMMON NAMES - TRADE NAMES	
Pesticides, preservatives forest	
1	Aldrin (Aldrex, Aldrite)
2	BHC, Lindane (Gamma - BHC, Gamma - HCH, Gamatox 15 EC, 20 EC, Lindafor, Carbadan 4/4G Sevidol 4/4G)
3	Cadmium compound (Cd)
4	Chlordance (Chlorotox, Octachlor, Pentichlor)
5	DDT (Neocid, Pentachlorin, Chlorophenothane)
6	Dieldrin (Dieldrex, Dieldrite, Octalox ...)
7	Eldrin (Hexadrin)
8	Heptachlor (Drimex, Heptamul, Heptox)
9	Isobenzen
10	Isodrin
11	Lead compound (Pb)
12	Methamidophos: (Dynamite 50 SC, Filitox 70 SC, Master 50 EC, 70 SC, Monitor 50 EC, 60 SC, Isometha 50 DD, 60 DD, Isosuper 70 DD, Tamaron 50 EC)
13	Methyl Parathion (Danacap M25, M40; Folidol - M50 EC; Isomethyl 50 ND; Metaphos 40 EC, 50 EC; (Methyl Parathion) 20 EC, 40 EC, 50 EC; Milion 50 EC; Proteon 50 EC; Romethyl 50 ND; Wofator 50 EC)
14	Monocrotophos: (Apadrin 50SL, Magic 50 SL, Nuvacron 40 SCW/DD, 50 SCW/DD, Thunder 515 DD)
15	Parathion Ethyl (Alkexon, Orthophos, Thiopphos)
16	Sodium Pentachlorophenate monohydrate (Copas NAP 90 G, PDM $_4$ 90 powder, P-NaF 90, PBB 100 powder)

17	Pentachlorophenol (CMM 7 liquid oil, Oil eradicate termites M-4 1.2 liquid)
18	Phosphamidon (Dimeccron 50 SWC/DD)
19	Polychlorocamphene (Toxaphene, Camphechlor)
20	Stroban (Polychlorinate of camphene)
Crops Fungicides	
1	Arsenic compound (As) except Dinasin
2	Captan (Captane 75 WP, Merpan 75 WP)
3	Captafol (Difolatal 80 WP, Folcid 80 WP)
4	Hexachlorobenzene (Anticaric, HCB)
5	Mercury compound (Hg)
6	Selenium compound (Se)
Rodenticides	
1	Talium compound (TI);
2	2.4.5 T (Brochtox, Decamine, Veon)

APPENDIX A12- SOME PICTURE OF CURRENT STATUS OF SUBPROJECT AREA

1. Pictures of current status of construction components

Seepage through embankment

Stream behind spillway

Current status of downstream slope

Current status top of dam

Current status of service road

Canal connecting Thach Ban reservoir to downstream area

2. Pictures of sampling, field surveying

Taking ground water

Taking surface water in irrigation canal

Taking surface water in Thach Ban reservoir

Taking sludge at dissipation yard behind spillway

Taking surface water in La Tinh river

Taking ground water

APPENDIX B – SOCIAL

APPENDIX B1 – METHODOGICAL NOTE

1. Materials collection

Summary of work in the process of project preparation by stakeholders; Feasibility studies, provincial project proposals, prepared materials of subprojects; Provincial socio - economic development reports, related current legal documents; available documents on customs, habits of the locals

2. Fieldwork

Fieldwork in the project area, questionnaire interview combined with field observations and group discussions, in-depth interviews with local leaders, representatives of AH and relocation groups. This activity will help collect general information of the socio-economic situation, socio-economic characteristics of people/ localities in the project area, as the basis to propose appropriate measures in minimizing the adverse impacts directly and indirectly by the project.

- *Socio-economic survey at household level by quantitative questionnaires:* The consultant conducted a socio-economic survey on 23 households with land acquisition and among total 355 households which may be affected by water cut for construction and are also the beneficiaries. The Consultant selected and interviewed 100 households (including representatives of 60/80 accommodated households downstream). Interviews were conducted to collect information according to a designed questionnaire including available possible answers; there are also open questions for further comments, while serving for information assessment and reliability verification of information, considering needs for support, rehabilitation and risks of forced relocation.

- *How to select the sample of households interviewed:* Select 100% of land acquired households (23 households) and 20% of households that may be affected indirectly (100 households). Total 123 households were surveyed and interviewed.

- *In-depth interview:* Interviewers will include: PMU, DRC; Local government officials; Officials of local unions; affected households; representatives of beneficiaries.

- *Group Discussion (FGD):* The consultant worked with local leaders, subproject leaders to plan key FGDs. Each group consisted of 5-8 people. FGD invited participants were selected from representatives of households under the following criteria: APs (direct, indirect), representatives of beneficiary households, female headed households, especially difficult households (the elderly, disabled, policy families...).

- *Observations:* The Consultant took field visit, photographs of the situation and talked to people, to clarify the results of in-depth interviews, focus group discussions as evidence for assessment results.

Participatory rapid assessment (PRA): The Consultant used tools of participatory rapid assessment to assist communities to easily identify the issues that need priority attention on settlement related to raising awareness of objectives, potential positive and negative impacts of the project. Qualitative survey work includes in-depth interviews, focus group discussions, consultations with objects selected in the table below:

Table 1: Results of interviews and consultations dated 25/2/2015

Objects	*In-depth interviews*	*FGD*	*Consultation*
1. Affected households (direct, indirect) and representatives of beneficiary households	123 hhs	01 session	123 hhs
2. Management, operation officials	01 staff		02 staff
3. Local leaders	02 people		
4. Social – political organizations, village head		01 session	02 organizations
5. Irrigation officer (CPC)	01 staff		
6. Local State management agencies for agriculture, irrigation (DARD, Sub-dept)			03 agencies
7. Others (health agencies, media …)			06 agencies
Total	9 staff and 123 hhs	03 FGDs	13 staff, agencies and 123 hhs

APPENDIX B2 - PUBLIC HEALTH INTERVENTION PLAN

1. The necessity of the construction of puplic health management plan

The activities of the subproject will generate impacts on the surroundings quality: air, water and soil environment, in addition it may arise disease. All these factors will affect directly 80 workers and households along the transport route (10 households). The consequence of these effects lead to increase occupational accidents, traffic accidents, diseases related to respiratory and intestinal system and eyes.

There are 10 households and 80 workers will directly contact with sources of pollution and disease from the activities of the project, although subproject have had measures to limit pollution such as dust, emissions, wastewater and epidemics, but there are potential impacts that we do not see immediately, so need to take measures for early detection of disease and sources of disease. The plan indicates the measures to minimize and prevent those impacts.

2. Objective

To control and prevent diseases, raise awareness of the people and the workers to protect health yourself; help people access fully medical services. Organize regularly medical examination to detect early disease due to impacts of the subproject; to build treatment plans for incidents related to diseases, occupational accidents and traffic.

3. Measure and content of public health management

- To train and raise awareness, prevent impacts on health
- Organize regularly medical examination for workers and people in the subproject region
- Build plan to minimize the impact on public health
- Build plan to prevent and treat diseases

4. Role and responsibility of agencies, organizations and individuals

Department of Agriculture and Rural Development (DARD)/ Project Management Unit (PMU):

- DARD and PMU are responsible for building materials about public health safety training.
- Coordinate all levels of authorities in Cat Son commune (local authorities, Fatherland Front, Women's Union, Farmers' Union, Youth Union, hamlet representative) organize propagandic activities about health safety.

Department of Health, Cat Son district Preventive Medicine Center

- To coach and raise awareness for all basic levels, contractors and residents about prevention measures and treatments of diseases;
- Check the medical examination process;
- To direct promptly when epidemics appear, resolving incidents related to public health.

People's Committee, Social Organizations

- To guide and organize the health safety work; to coordinate closely with contractor, Department of Health and Preventive Medicine Center when epidemics appear.

Health Station: To prepare the medical examination plan and guide water pollution treatment, adequacy prevention and treatment.

5. Implementation Schedule

Public Health Management Plan implemented at 3 stages of the subproject and extended 6 months at operation stage.

Table B2-1 Implementation Schedule of "Public Health Management Plan"

No	Measure	Content	Responsible unit	Cost	Time
1	To train and raise awareness, prevent impacts on health	- Identify the impact of air and water environment, food safety. - Preventable measures (using a comforter when entering the affected area, treat water pollution by alum and chloramine B) - Cleaning household sector, ranch house	- Department of Agriculture and Rural Development (DARD) - Project Management Unit (PMU) - Cat Sơn district Preventive Medicine Center - Health Station at commune/ ward - Contractor	15.000.000 millions	2 stages in the early and the mid-stage of the project
2	- Organize regularly medical examination for workers and people in the subproject region	- Check the health of workers 3 months/ time, residents in the affected areas 6 months / time - The diseases related to respiratory system, intestinal tract, eyes - To consult the affected people during examination - Advise or handle when the detection of abnormalities related to the impact of subproject (timely notify to the authorities and functional units)	- Department of Agriculture and Rural Development (DARD) - Project Management Unit (PMU) - Cat Sơn district Preventive Medicine Center - Health Station at commune/ ward - Contractor	Budget of Cat Sơn district	3 months/ time from the start of construction to 6th month
3	- Build plan to minimize	- Medical staffs at commune/ ward monitor regularly	- Department of Agriculture and Rural	Budget of Cat Sơn district and	Continuously during the construction

No	Measure	Content	Responsible unit	Cost	Time
	the impact on public health	the implementation of the mitigation measures of construction units. - To treat timely occupational accidents and traffic - To vaccinate completely children, pregnant woman	Development - Project Management Unit (PMU) - Cat Sơn district Preventive Medicine Center - Health Station at commune/ ward - Contractor - Women's Union - Fatherland Front	contractor	time
4	Build plan to prevent and treat epidemic	- To spray fly and mosquito- spray in the project area with the frequency of 3 months/ time. - To guide the water sanitation; use chloramine B for pretreatment of wastewater on work site and households. - When appearing epidemic, we need localize epidemic, isolate infectious objects and spray chloramine B to disinfect.	- Department of Agriculture and Rural Development (DARD) - Project Management Unit (PMU) - Cat Sơn district Preventive Medicine Center - Health Station at commune/ ward - Contractor - Women's Union - Fatherland Front	Budget of Binh Dinh province (Department of Health) and contractor	Continuously during the construction time (15 months)

APPENDIX B3 - PUBLIC CONSULTATION, PARTICIPATION AND COMMUNICATION STRATEGY

1. The necessity of the construction of communication plan

The subproject "***Repair and Improvement for Safety of Thach Ban Reservoir***, ***Binh Dinh Province"*** cause of impacts: (i) positive impacts: ensure safely 80 households in the downstream area, ensure stability source of irrigation water supply for 130 ha of arable land; (ii) negative impacts: acquire land and assets on land of 23 households, reduce economy and public health issue, impact on gender equality, etc.

The communication and public consultation plan is done throughout from the establishment of the investment project to the project operation. This helps local communities and managers to understand and visualize the entire impacts (positive, negative) to provide mitigation measures the impact on the natural environment and society, especially vulnerable objects include children, the elderly, women and sensitive ecosystem.

Information from communication and public consultation plan help managers, local authorities, monitoring unit to give decisions quickly or change timely decisions or plans during the project implementation.

2. Objective

To public information about sub-project and provide all materials on the action plan to government at various levels, social organizations, unions and resident in sub-project areas. To consult local communities and organizations for the plan will be made for each phase of the project. The feedback helps the investors and the management level to improve plans to meet the needs pratical, prior to the implementation of the action plan.

3. Contents

- Information on the subproject and policies of interest will be disseminated to people by Project Management Unit (PMU);
- Environmental and Social Management Plan: (i) the PMU and consultancy units provide information of impacts and mitigation measures; (ii) To consult the local authorities and social organizations, unions, people around the project area.
- Resettlement Action Plan: Provides information about land acquisition, resettlement, compensation cost apply framework and support policies of the subproject and the provisions of Quang Binh Province and government at various levels, affected people
- Gender Action Plan: provides information about gender equality for the local authorities and social organizations, unions, people around the project area.
- Public Health Management Plan: provides information on the solutions, disease prevention plan, and medical examination periodically.
- Social security, traffic safety, social evils: provide information about law, legal education for workers, and people around the subproject area.
- Dam Safety: disseminate plans when occurring dam safety incidents in the construction process and the rainy season.
- Operate mining and flood discharge: provide information and detailed plans for the flood discharge to people around the project area and downstream area; make protection plan for the people, the buildings in downstream of the dam.

4. Forms of communication, community consultation

In order to organize the effective communication activities, need understand the basic elements of the communication process and public relations of them.

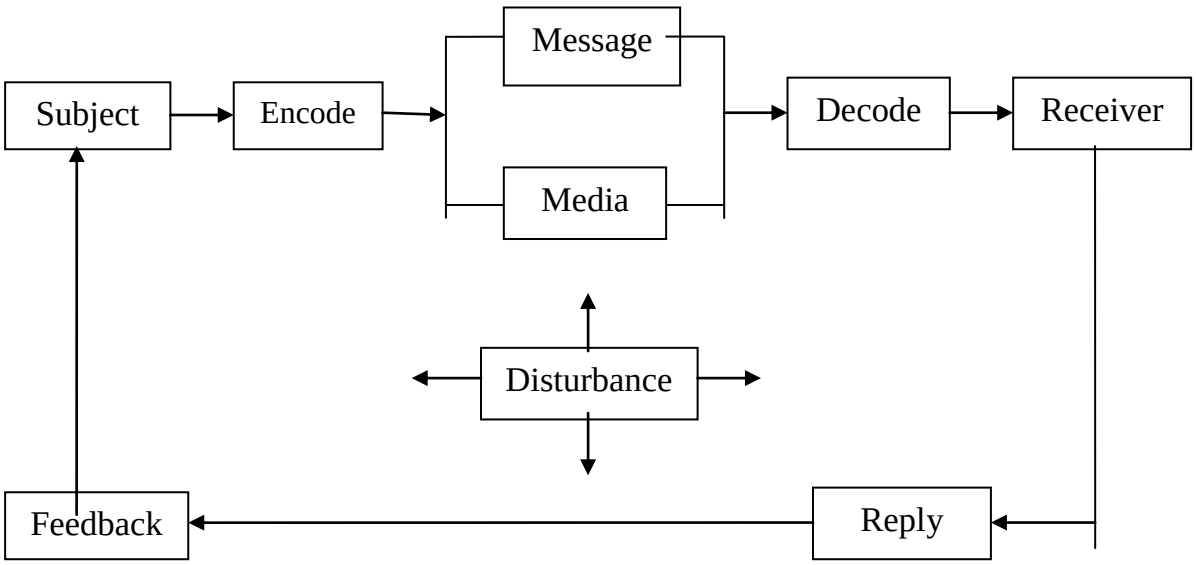


Diagram B3-1: The elements of the communication process

- Organize the meetings to disseminate information for local authorities, social organizations, unions, people of the subproject region (Cat Son commune, Phu Cat district);
- Through the mass media, basis loudspeakers, commune and village boards.
- Issue the brochures, consultative questionnaires to local authorities, unions, people of the subproject area;
- Through the activities of organizations and clubs;
- Training;
- Other media and information forms.

5. Role and responsibility of agencies, organizations and individuals

Department of Agriculture and Rural Development represent of Binh Dinh province people's committee is the investor, the Irrigation Project Management Unit is the project implementation unit.

Department of Agriculture and Rural Development (DARD)/ Project Management Unit (PMU):

- DARD and PMU are responsible for building materials about communication plan and participatory public consultation.
- Coordinate government at various levels in Cat Son commune (local authorities, Fatherland Front, Women's Union, Farmers' Union, Youth Union, hamlet representative) organize propaganda activities for this plan.

People's Committee, Social Organizations

- To guide and organize the propaganda activities and disseminate contents of communication, participatory public consultation.

- Direct news agencies, local propaganda agencies to spend the appropriate time for disseminating plans and the impact of the subproject.

Land Clearance Committee

- Provide information about land acquisition, resettlement, compensation cost apply framework and support policies of the subproject and the provisions of Quang Binh Province and government at various levels, the affected people.

Health Station: disseminate information on the disease prevention plan, medical examination periodically, solutions when having epidemic.

6. Implementation Schedule

The communication plan and participatory public consultation implemented under stages of the subproject; to provide completely information for local people and government at various levels.

Table B3-1 Implementation Schedule of "Communication Plan, Consultation with Community Participation"

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
1	Preparation	Disseminate information, consult the authorities about subproject: scale, type of investment, the main works, incidence, benefits of the subproject.	Organize meeting at government at various levels, mass organizations.	DARD and PMU	Binh Dinh Province People's Committee, Department of Planning and Investment, Department of Finance, Department of Natural Resources and Environment, Phu Cat People's Committee, Government of Cat Son commune.	
		Disseminate information about policies, compensation plan, the draft of resettlement action plan.	Meetings, leaflets, consultation votes at all government levels, the affected households around the subproject area.	PMU coordinate with design consultancy unit, resettlement action plan consultancy unit.	Phu Cat district People's Committee, Cat Son commune, Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct, 378 households in the project	Perform 2 times: to prepare and present a draft of resettlement action plan

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
					area.	
		Disseminate information about project, present the draft of ESIA and ESMP reports, gender plan, public health, communication, etc.	Meetings, leaflets, consultation votes at all government levels, the affected households around the subproject area	PMU coordinate with design consultancy unit, ESIA consultancy unit	Phu Cat district People's Committee, Cat Son commune, Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct, 378 households in the project area.	Perform 2 times: to prepare and present a draft of resettlement action plan.
		Compensation and resettlement	Organize meetings to disseminate information about measure, counting, compensation plan, post information in noticeboard of commune/ precinct and village/ urban groups.	PMU coordinate with Compensation, Assistance and Resettlement Board	Cat Son commune People's Committee, Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct and 23 affected households.	Implement according to Resettlement Action Plan report.
No	**Stage**	**Content**	**Form**	**Responsible unit**	**Receptive unit**	**Note**
2	**Construction and Operatio**	Gender Action Plan		PMU and Social Supervising Consultant	Cat Son commune People's Committee,	Implement in 3 phases
		Public Health Management				

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
	n	Plan	Meetings, leaflets, basic broadcasting, consultation votes at government at various levels, the affected households around the subproject area		Women's Union, Fatherland Front, Farmers' Union, Cadastral Division of commune/ precinct and 378 affected households.	of the subproject.
		Social Management Plan				
		Environmental Management Plan		PMU and Environmental Supervising Consultant	DONRE, Cat Son commune People's Committee, Women's Union, Fatherland Front, Farmers' Union, Health Station, Cadastral Division of commune/ precinct and 378 affected households.	Implement in 3 phases of the subproject
		Public order and social evils		PMU and contractor	Cat Son commune People's Committee, Women's Union, Fatherland Front, Farmers' Union, Health Station,	
		Traffic Safety and Fire Prevention and Extinction				Construction Stage.

No	Stage	Content	Form	Responsible unit	Receptive unit	Note
					Cadastral Division and Police of commune/ precinct .	

Monitoring Assessment: PMU makes the monitoring report of communication plan and participatory public consultation to control communication content, synthesize feedback from the Supervising Consultant Unit, local government, social organizations, unions and citizens to supplement or amend policies and measures of the management plan to suit each stage of the subproject.

Implementation Cost

The implementation cost of this plan is integrated with other plans (communication content and methods will be acquired and build by other plans. Social Management Plan chairs other plans that related to social issues. Cost of this phase focuses primarily for broadcasting and organizations, the expected cost is VND 50,000 millions in 15 months processing.

APPENDIX B4 - GENDER ACTION PLAN

A gender action plan is needed to facilitate the full participation of women in the project construction stage, providing new opportunities for women to boost their income, without increased burden on their lives, and contributing to the enhancement of women's role and status in the project area. The objectives of this plan include:

- The local contractors will employ at least 30% of female workers in maintenance, construction and repair works;
- For a similar type of work, female workers should be paid as much as male workers;
- Safety conditions must be equal to both men and women;
- The local contractors will not use child labor;
- The use of local labors is encouraged and the establishment of labor camps will be avoided;
- The Women's Group and Union will be consulted about the design of subprojects;
- Training on gender mainstreaming will be provided for national, provincial and local authorities (i.e. PMUs, and other stakeholders);
- Training and capacity building is provided for women to engage in public decision-making and sub-projects in a way that makes the most sense (i.e. training in participation, negotiation skills, marketing skills, mathematics and literacy);
- The involvement of women in project study tours is ensured.
- The agricultural extension services aimed at women are designed and delivered to women;
- The awareness enhancement campaign on HIV/AIDS will be launched before the start of civil works. PMU is responsible for monitoring including the participation of women, target works and trainings, and HIV prevention campaigns;
- At least one woman shall be involved in the Supervision Board of a commune (about 1/3 of the members).

The Project's Gender Action Plan

Achievements	*Tasks and Indicators*	*People in charge*	*Period*
Achievement 1: Improvement of dam safety and irrigating conditions.	The contractors shall prioritize unskilled labor (through subcontracting); at least 30% of the total labor force is local unskilled ones; Among this 30% local labor, female workers shall be prioritized; Male and female labor will receive the same wages for the same type of work; The Contractors shall not employ children; Those locals wish to work for the	PMU/Project Coordinator shall ensure the record of these terms in the Contract; the list of registered labor shall be submitted by communal officials the Contractor; Communal officials shall ensure the achievement of the	During construction stage

Achievements	*Tasks and Indicators*	*People in charge*	*Period*
	project shall register at their villages/hamlets. Then, these registrations shall be provided by the Head of the villages and communes to the Contractors for selection in favor of poor and vulnerable households.	targeted objectives. The communal women group shall ensure the involvement of local female workers in the Project.	
Achievement 2: Enhancement of people's capacity to make advantages of the Project	At least 30% of women shall participate in agricultural extension courses.	Staff of Provincial PMU, District staff, Communal staff.	During construction stage
Achievement 3: **Enhancement of awareness on potential social evils of vulnerable objects, especially women and ethnic minorities**	Programmes on HIV/AIDS and human trafficking. Programmes on community-based risk mitigation. Information about risk mitigation will be transferred to the communes and villages affected by the Project using the participatory approach with a focus on the poor and vulnerable households (e.g. ethnic groups, households headed by women, households with elderly and disabled people). The documents and information should be appropriate in terms of language, culture and gender, and especially translated into ethnic languages in the region; Women's Union, the representative of Centre for HIV/AIDS prevention and communal staff shall give training to communicators in each commune/village in the project area. The programs will be implemented at the communes and villages by two communicators (village chief and	The Provincial and Communal Women's Union shall organize and host the program (training and preparation of materials) in collaboration with the district/communal health center. The Village's Women's Union shall popularize and communicate information. The district/communal Health Centres shall support the communal Women's Union. Project coordinator shall provide local and international gender experts and specialists on Ethnic Minorities. Gender experts and specialists on EM shall review existing	Monthly, before and during construction stage

Achievements	*Tasks and Indicators*	*People in charge*	*Period*
	one member of the Women's Union). The program will be implemented in the villages and on market-days through distribution of project/program materials and use of loudspeakers	materials and supplement the required ones for the Program.	
	Program on risk mitigation during project construction stage: PMU and the contractor will coordinate closely with the health services in communes and districts to implement programs on awareness enhancement and education on disease prevention, diagnosis and treatment for laborers. All programs and documents are built with integration of gender issues, including vulnerability and needs of men and women. The Contractor shall: Implement awareness enhancement programs workers and communities, including education and communication on HIV infection and preventive measures. Provide free consulting services and encourage employees to do HIV tests so that they all know about their health status. Support the access to health services and encourage HIV-infected patients to admit their status; Provide medical equipment (free condoms) for workers in the camps;	PMU The Contractor Local Health Centre Communal staff The Women's Union shall perform general coordination for better HIV prevention.	During construction stage.
Project Management	Guidelines on Gender and Development and Education shall be provided for PMU staff, local	Project implementation	During design and initial implementation

Achievements	*Tasks and Indicators*	*People in charge*	*Period*
	agencies and Contractors. All capacity enhancement activities shall include the involvement of women and ethnic minorities.	consultant PPMU	stages

To perform this task, CPMU and PMU with assistance from consultants for protect socio / gender, will establish and implement an effective management system. This system will provide feedback on a number of indicators to show that is to avoid or mitigate the social risks associated with the project properly

Estimated funding for implementation of the gender action plan

No.	*Content*	*Detail*	*Unit*	*Total*
1	Women's group meetings (3-4 meetings / hamlet)	Package, 3 hamlets x 1,000,000 VND / hamlet	1,000,000 VND / hamlet	3,000,000
2	Training for hamlet women officers	2 people/ hamlet x 3 hamlets	500,000	3,000,000
	Total			**6,000,000**

APPENDIX B5 - GRIEVANCE REDRESS MECHANISM

Complaints relating to any matter of the Project will be settled through negotiations aimed at achieving consensus. The complaint will pass through three stages before it can be filed to the court. The Enforcement Body will incur all administrative and legal fees relating to complaint handling.

The complaints relating to the Project shall be settled in compliance with Article 138 of the Land Law 2003; Article 28 of the Law on Complaints; Article 63 and 64 of Decree No.84/2007/ND-CP; Clause 2 of Article 40 of Decree No.69/2009 and regulations on complaints in Decree No.75/2012/ND-CP dated 20/11/2012. According to Clause 2 in Article 138 of the Land Law 2003 and 2013:

(i) In case of complaints against administrative decisions and administrative actions on land management first settled by the Chairman of the People's Committees of districts, towns and cities under the province, without contentment of the complainant, the complaints can be filed to the People's Court or appealed to the Chairman of the People's Committees of provinces and centrally-run cities. In case of appeal to the Chairman of the People's Committees of provinces and cities under central authority, the decision of the Chairman of the People's Committees of provinces and cities under central authority is the final one.

(ii) In case of complaints against administrative decisions and administrative actions on land management first will be settled by the Chairman of the People's Committees of districts, towns and cities under the province, without contentment of the complainant, the complaints can be filed to the People's Court.

(iii) The time limit for complaints against administrative decisions and administrative actions on Land Management is thirty (30) days after the date of receipt of the administrative decision or being informed of that administrative decision. Within 45 days from the date of receipt of the first complaint resolution decision, the complainant, if disagree, can make an appeal to the state authority or the People's Court.

In terms of complaint settlement, in Law on Complaints, Article 14: Rights and obligations of the person competent to settle first-time complaints:

(i) The person competent to settle first-time complaints should:

- Ask the complainant, relevant agencies, organizations and individuals to provide information, documents and evidence within 07 days of the request as a basis for complaint settlement;
- Determine to employ or cancel the emergency measures as defined in Article 35 of this Law;

(ii) The person competent to settle first-time complains should perform the following obligations:

- To receive the complaint and issue a notice in writing to the complainant, agencies, organizations, or individuals entiltled to appeal and the state inspection agencies at the same level of acceptance of resolving complaints against administrative decisions and actions;
- To settle the complaints against administrative decisions and actions if required by the complainant;

- To open a dialogue with the complainant and agencies, organizations and individuals concerned;
- To decide complaint settlement and be responsible before the law for settlement results. In case of complaints from authorized agencies, organizations and individuals, the results shall be notified to agencies, organizations and individuals in accordance with law;
- To provide information, documents and evidence relating to the complaint for the complainant when they are required by the complainant for second-time settlement or appeal to the People's Court.

(iii) To compensate for first-time settlement and damages due to administrative decisions and actions in accordance with regulations on the State responsibilities.

(iv) The person competent to settle first-time complaints should perform their rights and obligations as stipulated by Law.

In terms of announcement of complaint settlement decision: In Article 12 of Decree No.75/2012/ND-CP dated October 3rd, 2012 of the Government detailing the implementation of some articles of the Law on Complaint.

(i) Within 15 days from the date of decision of complaint settlement, the person competent to settle the complaint for the second time shall announce the complaint settlement decision by one of the forms specified in Clause 2 in Article 41 of the Law on Complaints.

(ii) In case of announcement at a meeting, the attendees of the meeting must include: the person issuing the complaint settlement decision, the complainant or their representatives, the person subject to complaint and agencies, organizations and individuals concerned. Before conducting a public meeting, the person competent to settle complaints must send a notice to agencies, organizations and individuals involved 3 days in advance.

(iii) The announcement of complaint settlement decision shall be made on the mass media (television, radio, printed and electronic newspaper). If the agency of the person competent to settle complaints has their own portal or website, the complaint settlement decision should be made public on this portal or website. The minimum number of announcement is 02 times on radio, television, and printed publications. The period of announcement on electronic publications, portals or websites should be at least 15 days from the date of notification.

(iv) In case of notice at the office or the Reception Room of agencies and organizations competent to settle complaints, the period for the notice of complaint settlement decision to be posted up is at least 15 days.

The procedure for complaint settlement consists of 4 stages as below:

(i) **The first stage in the Communal People's Committee**: Households affected can file their complaints to any member of the CPC, possibly through the village chief or directly to the CPC in writing. The mission of the CPC officials or village chief is informing the entire CPC the complaint. Then, the CPC will hold a private meeting with the households affected and sign the complaint decision within 10 days. The CPC secretary shall be responsible for compiling and filing documentation of all complaints handled by the CPC. The duration of first-time settlement of complaints shall not exceed 30 days from the date of signing the complaint decision; for complicated cases,

this period could be extended but not exceed 45 days from the date of receipt of the complaint. In remote regions difficult for travelling, the time limit for complaint settlement is no more than 45 days from the date of acceptance; for complicated cases, this period could be extended but not exceed 60 days from the date of acceptance (according to Article 28, Law No.02/2011/QH13 dated 11/11/2011). If the complaint is not resolved for the first time or the complainant is not content with the settlement results from the date of receipt of the first-time settlement decision, they have the right to file the complaint for second time to the People's Court or the District People's Committee.

(ii) **The second stage in the District People's Committee**: According to Article 63 of the Decree No.84/2007/ND-CP of the Government, the procedure for complaint settlement against administrative decisions and actions of the Chairman of the District People's Committee is: (i) Within ninety (90) days from the date of issuance of administrative decisions and actions by the Chairman of DPC regarding land management stipulated in Article 162 of Decree No.181/2004/ND-CP that people of relevant rights and obligations disagree with, complaints can be filed to the DPC; (ii) the Chairman of the DPC shall settle the complaint within the period of 30 days from the date of signing complaint decision. In remote areas difficult for travelling, the duration for settlement is no more than 45 days from the date of acceptance; for complicated cases, this period shall be expended but not exceed 60 days from the date of acceptance; (iii) The settlement decision of the Chairman of the DPC shall be publicly available and sent to the complainant and other people of relevant rights and obligations; (iv)Within forty-five (45) days from the date of receipt of the settlement decision of the Chairman of the DPC that the complainant does not agree with, the appeal can be filed to the People's Court or the provincial People's Committee. The time limit for appeal may be longer, but not more than 60 days from the date of receipt of the decision for complex cases. In remote areas difficult for travelling, this period is no more than 60 days from the date of acceptance, and no more than 70 days for complicated cases (according to Article 37, Law on Complaints No.2/2011/QH13 dated 11/11/2011); (v) The body accepting the complaint shall record this in the Complaint Settlement Logbook.

(iii) **The third stage in the Provincial People's Committee**: The procedure for complaint settlement against administrative decisions and actions of the Chairman of the Provincial People's Committee is (i) Within thirty (30) days (or 45 days for complicated cases) or within 45 days for remote areas (or 60 days for the complicated cases) from the date of issuance of administrative decisions and actions by the Chairman of the PPC regarding land management stipulated in Article 162 of Decree No.181/2004/ND-CP that people of relevant rights and obligations disagree with, the complaint can be filed to the PPC; (ii) The Chairman of the PPC shall settle the complaint within the time limit stipulated in Law on Complaints; (iii) The complaint settlement decision of the PPC shall be publically available and sent to the complainant and other people of relevant rights and obligations; (iv) Within forty-five (45) days from the date of receipt of the settlement decision from the Chairman of the PPC that the complainant does not agree with, the appeal may be filed to the People's Court. The time limit for appeal may be longer but not more than 60 days from the date of acceptance for complicated cases. In remote areas difficult for travelling, this period shall not exceed 60 days from the date of acceptance, and 70 days for complicated cases; (v) The body accepting the complaint shall record this in the Complaint Settlement Diary.

(iv) **The final phase, the arbitration by the Court**: Within forty-five (45) days from the date of receipt of the settlement decision by the Chairman of the PPC that the

complainant is not satisfied with, an appeal shall be filed to the People's Court (according to Article 64 of Decree No.84.2007/ND-CP). During the processing time, the land acquisition decision is still implemented. If the state authority handling the complaint concludes that the land acquisition is unlawful, the state agency issuing land acquisition decision shall cancel their decision and make compensation for damages (if any) caused by land acquisition decision. If the land acquisition is considered as lawful, the person being acquired land shall abide by the decision. Within 30 days from the trial date, the Council on Resettlement and Compensation shall pay the affected households the amount specified by the Court. If the land acquisition is concluded as legal by the Court, the person with acquired land shall comply with the decision (according to Article 54 of Decree No.84/2007/ND-CP)..

APPENDIX B6 - INFORMATION DISCLOSURE, ACCOUNT ABILITY AND MONITORING

1. Consultation and announcement

The main objectives of information announcement and public consultation is to ensure the participation of affected communities, households, local governments and organizations concerned in sharing the Project information, consulting the selection of technical plans, planning impacts on land, income and assets on land... The announcement is an important contribution in accerlerating the Project progress during implementation and preparation, as well as when the project is put into operation with the consensus of the community, government, and PMU. This will minimize the possibility of conflicts and other risks and increase the investment efficiency and social significance of the Project.

The public consultation and announcement should ensure:

The local authorities as well as the representatives of the people affected shall be involved in the project planning and decision making process. The PMU shall work closely with the commune/district during the implementation of the Project. The involvement of the people affected in the implementation process shall be remained by asking the commune/district to invite the representatives of the affected people to be a part of the Council on Compensation and Resettlement as well as in resettlement activities.

All information about the items and activities planned for the Project should be shared to the people affected.

The demands and priorities of the affected people, as well as their responses to the proposed policies and activities, should be collected.

The affected people should be fully informed of the decisions influencing directly their income and lives, and can be involved in activities and making decisions on issues directly affecting them.

The transparency in all activities relating to land acquisition, compensation, resettlement and rehabilitation should be ensured.

For the World Bank, those people affected by the project should be fully informed and consulted on resettlement and compensation plans. Consultation is the starting point for all activities related to resettlement. The people affected by resettlement may be afraid that their livelihoods and community relations can be affected, or their rights can not be guaranteed. Being involved in resettlement planning and management helps to alleviate these fears and bring the affected people the opportunity to participate in decisions that affect their lives. The implementation of resettlement without consultation may lead to an inappropriate strategy and ultimate ineffectiveness. Without consultation, the affected people may have negative reactions to the project, causing social problems, significant delay or even cancellation in completion of goals, thereby increasing the costs. As a result, with consultation, the initial resistance can be translated into the constructive participation.

For Vietnam, a further key step in strengthening democracy at grass-roots level is the Directive No.30-CT/TW of the Central Committee of the Communist Party of Vietnam in "Building and implementing regulations on grassroots democracy" and the Decree No.79/2003/ND-CP also on this issue. The key point of this legislation is the famous slogan, which is "People know, people discuss, people do and people inspect." The Ordinance No.34/2007/PL-UBTVQH11 has addressed the matters that should be consulted by local governments and communities before decision-making by the authorities, including building

compensation and resettlement plans relating to the project and works in the commune/ward. The Clause 2 in Article 39 of the Law on Land 2003 requires the announcement of resettlement issues such as reasons, land acquisition plans, relocation plans, overall compensation plans, and land clearance to the people affected.

Thus, consultation and participation is an innovation in the implementation of projects in Vietnam. This policy will address the shortcomings in the implementation of the projects, as both the locals and the person in charge of project implementation are inexperienced in this field.

The following points should be noted to encourage the participation of stakeholders in the consultation process of the project:

Identify and attract all stakeholders, especially people living in the project area and those affected (men, women, the poor, ethnic minorities...), in the process of consultation and participation;

Develop participatory strategies for Project planning, implementation, monitoring and evaluation.

Develop the topics and content needed for promotion and popularization campaigns, as well as negotiation procedures for the affected people on their benefits.

Attract stakeholders in decision making at all stages of the project (e.g. design plans, compensation methods, implementation schedule, etc...).

Establish a schedule for completion of activities such as campaigns to provide information, the extents and forms of compensation, benefits, location and relocation plan.

Develop procedures for complaint settlement.

The public consultation should be regularly carried out for the units in charge of preparation and detailed design of the project categories. This helps to ensure the participation of communities in the proposed designs and limit the adverse impacts on the community. This also helps works to be friendlier with the community and users.

The consultation should also be performed with related parties, including the units to be in charge of management and operation of works to ensure that they are consulted and commented on the designs.

During the construction stage, the Project owner should announce promotion in mass media regarding construction activities and expected schedule, measures to support the people affected and the procedure for receipt of feedbacks from the community. The affected persons shall be informed of the Project policies and procedures to ensure no many changes in their future lives. In case of any questions about the Project, they can inform and obtain the support from the PMU.

The content and method of public consultation / announcement is as follows:

Items	*Method of public consultation/announcement*	*Period*	*Person in charge*
1. Detailed design drawings: Alignment alternatives	Meeting with the government of the ward/commune and relevant units; the representatives of the affected households.	Survey and design stages	the Consultant, PMU

2. Land acquisition, clearance and compensation.	The ward/communal staff, together with PMU staff, shall consult with APs for initial assessments. Land acquisition and compensation plans shall be developed and discussed with APs before submission to authorities for decision. Policy announcement and explanation shall be made in meetings with APs.	Prior-implementation stage	the Communal People's Committee, PMU
3. Project implementation progress, monitoring mechanism and accountability	Meetings in residential blocks, posters and notices in public	The commencement stage and during implementation stage	the Communal People's Committee, PMU
4. Employment and wages of local labor.	Meeting between the Construction unit, local authorities/supervision board and the local	Prior-construction stage	The construction contractor, local authority and the community
5. Potential adverse impacts and mitigation measures	Combined with Item 2 and 3 above	Prior and during implementation stage.	PMU, construction contractor, the communal people's committee

2 Social accountability

The announcement of the proposed plans of the Project to the affected people and stakeholders during community consultation and field survey by the social assessment consultants is to make a paradigm for continuing public information during the project implementation. Moreover, as required at all public meetings, the affected always wish for meetings to regularly exchange information with PMU at the headquarters of CPC where the community will suffer from impacts during project implementation. Therefore, reports on resettlement plans and environmental management plans should reflect the responsibility of PMU in ensuring the regular announcement of information to the public.

In addition to regular meetings between the PMU and the affected communities in CPC offices, the public meetings in all communes where public consultation has been conducted

have identified the need to establish the tight connection for easy and quick contact with the PMU. The best way is to provide the phone number and address of the PMU in charge in all locations of the Project's items and the headquarters of all the communes of the entire Project's components.

3. Participatory supervision

In order for the project components to ensure its effecicney and necessasity, it is neccessary to have a monitoring plan with the participation of stakeholders such as the Department of Natural Resources and Environment, Department of Construction, Department of Planning and Investment, Department of Transport ... After completion, the direct management and operation agency/ unit of the project items should be involved in the design and construction proceses.

Together with the independent monitoring unit of the project, there should have a community-level supervision division to monitor project activities, especially activities related to resettlement, sanitation and the construction of various items. The supervision division will include representatives of local authorities, representatives of organizations such as the Women's Union, Fatherland Front, Veterans, Association, representatives of local people... This The supervision division in collaboration with independent monitoring unit of the Project will monitor the project activities based on indicators of social safety. Indicators of rehabilitation, production, environmental sanitation, traffic will be built to serve the monitoring plan of the Project. The grasping reality will help community supervision division report information related to the project progress, problems arisen during the project implementation to the PMU for promptly actions. The responsibility of this division is to collect feedback from the people and competent authorities as well as from the PMU. At the same time, people are also involved in the supervision, safety guarantee and sanitation in the construction phase.

The Community supervision division should be involved in the training plan on strengthening monitoring and evaluation of project activities, training on monitoring activity skills as a part of the participatory monitoring plan of the Project.

It is noted that the Resolution 80/ CP on community supervision for construction works in localities should be applied.